



# Globalization & the Nordic Success Model: Part II

Arto Lahti

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# **GLOBALIZATION & THE NORDIC SUCCESS MODEL – PART II**

GLOBAL CHALLENGE AND THE  
NEW ECONOMICS

Globalization & the Nordic Success Model – Part II: Global Challenge and the New Economics

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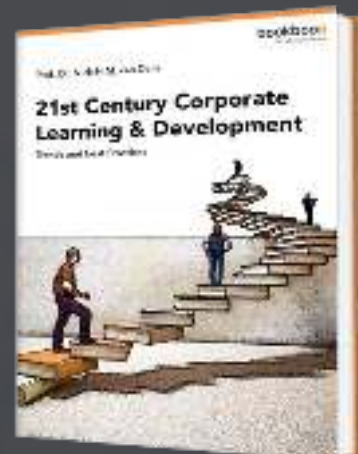
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# ACKNOWLEDGEMENTS: WHY I APPRECIATE FAMILY BUSINESSES?

In 1970, I started my carrier in **Pori Cotton Factory (Porin Puuvilla Oy)** on the banks of the River Kokemäenjoki in Pori. The factory is the largest industrial complex ever built in Finland. It was founded in 1898 by **Gustav Ramberg**, and later owned by the Ahlström family. The production finally ended in 1994. Today, Puuvilla is a business, education and leisure center. In 1970 I was engaged to a highly dynamic company in which I assisted German consultants in the rationalization of production. The **German industrial method** was widely applied to reveal bottlenecks of the production process and make them detectable for operative production managers.

In 1971–1974, I worked in **Friitala Oy** that was known of high quality leather goods. Since the late 1950s, his family (later Hellemaa) collaborated with West Germany, which allowed the use of modern chemicals in the leather finishing. The fashion designed by e.g. Jukka Rintala was presented at international fairs in the same top category as the famous Italian collections. I had an opportunity to learn about the top fashion in international context. I could participate in some strategic projects although I was mainly responsible for factory rationalization. In the early 1970s a major worry was the unexpected wage drifts. One reason for that was the fact that the inflation rate was high in Finland in the years 1971–1974. We had difficulties with product calculations. In spite of continuous “political” strikes reliable deliveries to international customers were guaranteed since operative factory management could maintain pragmatic labor relations in spite of “political” strikes.

In 1975–1976 I worked in **Kone Oyj**, a global engineering company founded in 1910 and employs over 30,000 persons. I had an opportunity to make the acquaintance **Pekka Herlin**, the CEO as the architect of internationalization. He was an excellent strategic leader. He used his time to solve the bottlenecks of internationalization. **Pekka Korhonen**, the Group Controller in Kone Material Handling Group in 1988–1999 comments: “Kone’s modus operandi which was often reflected in the saying: The Best is the Enemy of Good. In the early days one of the launched successful business concepts was after sales marketing, (e.g. maintenance and modernization of lifts and cranes) adding profitable service business to the traditional engineering and manufacturing business.” This kind of practical system thinking is particular to the German firms. Kone’s culture was encouraging. In the implementation of data systems “young men” such as me and **Hannu Bergholm** were allowed to work independently. I admired **Arvo Tuononen**, the economic director, who as a “spider man” controlled operative managers. He was calm and positive although his work load was huge. I did my first scientific research (Master’s Degree Research) in which I constructed the mathematical optimization model of currency risk.

The forth family company in Finland that I know in-depth is **Nanso Group Oy** that produces knitted products, tights and socks. It was established in 1921. The current family owners who represent the fourth generation of **Emil Aaltonen** family are committed to the family company. Nanso's best-known brands are Nanso, Finnwear, Black Horse, Vogue, Amar, Norlyn and KS Socks. **Hannu Jaakkola** was the CEO who navigated the company through its transition period in 1987–2001. In 1987–1990 I was a board member. I advised the company to orientate towards the top quality fashion business in which I replicated the Friitala success recipe from the early 1970s and some research findings. However, the hero of drama was Hannu Jaakkola who was skillful in system thinking and a highly appreciated specialist in material and production technologies. Nanso Group's chairman of the board is **Juha Berglund**. I coached him to Nanso's strategy during my last year as a board member.

Each of these four family business stories is unique. Kone might be a "Big Champion" in Hermann Simon's conception. The company has been highly successful and is the global market leader in the elevator business. Nanso is a story of a successful turnaround. When I was a board member Nanso was an export winner and a potential Hidden Champion. Today, Nanso is the domestic market leader. Porin Puuvilla and Friitala were internationally well-known and profitable companies in the 1970s. The future success was jeopardized by two main factors. The most important was owners' inability to commit to the company in the way as Nanso's owners did. In the case Porin Puuvilla the main reason might have been that the Ahlström family had much better business opportunities in engineering industries in which their company (Alström Oy) is a potential Hidden Champion. Friitala was dependent on the top design. The marriage couple **Kaarina and Pertti Hellemaa** was the team. Kaarina was an internationally recognized design manager and Pertti was a business manager. Friitala lost its vitality at the moment when Kaarina and Pertti Hellemaa were divorced. Another factor was continuous "political" strikes that have been common in Finland during past decades.

Family businesses in Germany have been a success story. The success rate has been about 90% as Hermann Simon reports (Hidden Champions of the 21<sup>st</sup> century). In Finland the family business success rate is low as it was in Britain a century ago by Alfred Chandler (Scale and Scope. The Dynamics of Industrial Capitalism). Chandler has been influential. His conclusion was that family-ownership was the main reason why Britain came in late to the second industrial revolution. Because of Chandler's view, the **personal capitalism was generally thought to be the old-fashioned model in comparison to the stock market capitalism**. As a part of my analysis of Germany's economic miracles I started to read Hermann Simon's book of German Hidden Champions once more and suddenly I started to think that Chandler's conclusion is wrong. **The family-ownership is perhaps the most sustainable governance model in the global economy?** The US is the winner of Chandler's stock market capitalism. However, the majority of US firms are domestic-market-oriented. In Germany **about 100,000 mid-sized firms have experiences about FDI operations**.

In 1977–1979, I worked for the **Federation of Finnish Technology Industries** that represents the biggest industrial sector in Finland: 55% of total Finnish exports and 80% of total Finnish R&D-investments. The total employment effect is around 700,000, equaling 1/4 of the Finnish workforce. In 1977–1979, the major challenge was the internationalization in which we collaborated with the Nordic sister organizations. During that time I got to know how Finland's government made decisions of the devaluation of the Finnish currency – “Markka”. The decision process was instructive. In the 1970s, **the US management method (e.g. PIMS and BCG)** became popular in Finland. I started to analyze the PIMS method since companies as Nokia had problems of getting reliable information on the US methods. Since that I have studied carefully the US dissertation data-bases. I was employed in 1980–1982 as a researcher at Helsinki School of Economics where I doctorated in 1983.

In the early 1980s, had an opportunity to make the acquaintance of **Howard Thomas** (Dean of Warwick Business School in 2000–2010). He encouraged me to continue to study the theme of my dissertation that was related to the Purdue IO studies (Hatten and Patton) and to the new Harvard IO (Hunt, Newman and Porter). Howard organized a seminar in Brussels about the emerging **European IO doctrine**. The results are summarized in Strategic Management Journal's article in 1986 (Strategic Groups: Theory Research and Taxonomy). Thomas provided me a research fellow position to develop further the European IO with him. Because of family reasons, I stayed in Finland and started my carrier as a professor in two broad areas (marketing and entrepreneurship), and qualified in both. I motivated my students (e.g. Salimäki, Killström and Luukkainen) to doctorate in the IO. I like to work with master students and I guided about 1,000 master's degree researches during four decades and wrote near 100 large working papers and books. As the chairman of the **Finland's Federation of Scholarly Association of Management** I had the position to coordinate the collaboration of Finland's big companies and business schools. Besides that I have been a board member in 30 SMEs, a specialist for organizations, such as the Council of Nordic Governments, OKO Bank, Electrolux and TeliaSonera. Since 1983 I have analyzed and partly consulted about 300 growth companies in ten EU countries.



Internationalization paths of SMEs are not straightforward. There are obstacles, barriers in the markets. The existence of a market failure is seen a justification for manipulating or regulating market forces. Market failures are difficult to avoid or correct. I have been collaborated with Nordic SMEs since the mid-1980s. In most cases, SMEs have only one option, to succeed first in the beginning. The first failure in an international operation in a certain market can be interpreted as a dead-lock. This interpretation can lead to withdrawal from the market and operation in question. In Finland this type of behavior can be seen in the past decades. In many cases, the reason behind is the involuntary operation, where the foreign market entry is initiated by customer interest or by market forces. In terms of entrepreneurial strategy making, this means the lack of intrinsic motives for internationalization. However, a market failure in foreign operations is the only means to gather real experience about the foreign markets.

In 1988 Finland arranged the International Small Business Conference, ISBC88 in Helsinki (Finlandia House). I was one of the key persons in the conference team. To activate Nordic countries to participate in the ISBC88, I did the **Nordic Small Business Research** with **Hannu Pirnes**. The study from the year 1987 included analyses of 60 companies in three Nordic countries (Finland, Sweden and Denmark) and in four industries (clothing, furniture, metal and engineering and the IT-industry). The collected extensive database contains information on the entrepreneurial background and the company's strategy and performance. An opportunistic entrepreneur characterised by broadness in openness in mind is the winner-type. Based on the research, positionistic behavior with about 80% opportunism and 20% craftsmanship is identified as the potential winner.

Networking, cooperation in international operations, such as joint ventures or industrial franchising or licensing, can be considered to accumulate social and trust capital for entrepreneurs without hazarding the cash flow. SMEs do need mutual collaboration to avoid the obstacles of internationalization. The **Furniture Excellence Club FEC** is the master work of **Mårten Johansson** who was working for the Council of Nordic Governments. We organized the FEC that had about 20 Nordic furniture firms four Nordic countries (Finland, Sweden, Norway and Denmark) firms as its member. The project stage was in 1988–1991 but the Club has continued its work since that. Our program was challenging since we organize EU-research that was my main obligation when travelled in the EU countries. One of the working methods was to organize four mutual meetings per year. This was wonderful project. Mårten Johansson was a real Cosmo politician who knew in-depth Nordic culture. I learned a lot of this project. Together, I have done some 20 field research trips to Nordic countries and I highly appreciate our common history and culture – we are civilized Vikings.

**Subcontracting Excellence Club S.E.C ry**<sup>1</sup> is a network of SMEs which have their special field of expertise in metal based industry, mechanical engineering, technical planning and industrial design. The SEC was established in 1993. **Pertti Kajanne** (director, Federation of Finnish Technology Industries) and **Timo Parmasuo** (chairman, Meconet Oy) both owned excellent social skills that was needed start this sort of Club. The S.E.C ry is the basis which the cooperation is built on and where the versatile skills of the members speed up the development of new ideas. The vitality of S.E.C ry is based on the prevailing synergy between the members and on the flexible cooperation of member firms. The ultimate goal of the S.E.C ry is to create added value for clients by means of networking and achieve competitive advantage for the members. The characteristic features of S.E.C ry are open communication and exchange of information between the members.

**Joseph Schumpeter** described capitalism as developing by gales of creative destruction, by which new technologies supplant the old ones. My mission in teaching and writing is: The future challenges in the global economy can best be solved through a better understanding of Schumpeterian entrepreneurship in its modern, global contexts. A paradox of the literature on entrepreneurship is that the process of opportunity recognition and exploitation is supposed to happen in a vacuum, separate from the market structure elaborated by the modern IO. However, about 100,000 multinational corporations dominate the international trade of commodities worldwide. There are rational reasons for that dominance. The main reason is the huge economies of scale available in the globalized markets. Another reason is the evolution of institutions that protect intellectual or immaterial properties in global context.

**Hermann Simon's** writings on Hidden Champions are useful and **important contributions to contemporary management theories**. I have read thousands of books and articles about management and applied economics. They are mainly nonsense. I came to life as a researcher when having read Simon's books that in my view revolutionize the US-dominating business theories and practices. Schumpeter's writings illuminate the difficulties that a company has in its efforts to combine market-driven business processes and radical innovations. Hidden Champions are doing that. These companies have occupied global leadership positions despite their small size. In general terms, the greatest innovations are likely to occur from the cross-fertilization of ideas and professions. This is how German Hidden Champions are acting. They are highly Schumpeterian in their action as Hermann Simon has noticed. The family leadership is highly authoritarian. In Kone the family leader was Pekka Herlin who could tolerate "young men" who liked to work highly independently and the "spider man" who controlled operative management in global contexts. Why family leaders can motivate their personnel better than average leaders? I think that the main reason is that family leaders have no need to compete away competent persons. They may favor the long-term thinking. A listed company is often stacked into a devastating internal power game of top management positions.

Today, Finland is in an economic crisis. Finland has only some 30 big export companies of which the majority is downsizing their activities in Finland. I believe that Finland needs to learn about the German management doctrine. Hermann Simon has found that the **Hidden Champions method is perhaps one of the most important element of Germany's global competitiveness**. Simon's view of Erich Gutenberg helped me to understand why German companies e.g. Volkswagen in the automotive sector tends to outperform other big companies such as Fiat in international competition. In Gutenberg's solution, the individual price-sales function (Preis-Absatz-Funktion) is assumed to be doubly kinked. In the monopolistic scope (monopolistische bereich) of the price-sales-function a firm can plan its marketing parameters (marketing mix), without having to fear reactions of competitors. German companies are able to interpret correctly the rules of the game of global pricing. Only some Finnish companies (e.g. Kone) are good in that. Most of Finnish SMEs do not know how to construct a realistic pricing policy in global context.

Paul Krugman (New Trade Theory) combines the industrial structure with the production function and assumes significant economies of scale. About 99% of Finland's SMEs are in the size-class under 50 employees. According to my studies, the critical size-class of having some economies of scale is **500–1,000 employees**. In that size-class there are some tens of companies and Finland is seriously stagnated. Finland has only some hundreds fully internationalized companies that can utilize significant economies of scale and about 300,000 small companies operating mainly in the domestic markets. Finland's large internationalized companies are investing in Asia and most of them have downsized their activities in Finland. So how to solve Finland's economic crisis? Finland has about  $\frac{1}{3}$  of work force out of job when Germany has only  $\frac{1}{4}$  of work force out of job. Germany has the world's best infrastructure when Finland's infrastructure is inefficient, old-fashioned. Germany is the leading country in the EU's TENT-program. Finland is not investing in TENT traffic corridors although they could be important to Finland since Finnish export companies are paying much higher transportation and logistical costs of international trade of goods as German companies.

I would like to express my gratitude to all those who have contributed to this book. First of all, I would like to thank Prof. Dr. Dr. h.c. mult. Hermann Simon who is the highly appreciated specialist of Hidden Champions and the very person who firstly coined the concept. Professor Simon gave me the idea that the monopolistic competition theory by Chamberlin and Krugman is related to Gutenberg, and, thereby, to his own writing about Hidden Champions. I have also discussed with Adjunct Professor Dr. Bernd Venohr who is an active writer of Hidden Champions. He emphasized the niche concept and certainly Hidden Champions use to select their target markets bottom-up relying more on the learning-by-doing than on abstract economic models. I will express my thanks to family business owners, e.g. Heimo Aho, Jarmo Hallikas, Tomas Hedenborg, Risto Käkälä, Jari Paasikivi, Timo Parmasuo, Antti Zitting and managers, e.g. Ilpo Helander, Arvo Tuononen and Pauli Komi, in Finland, and many hundreds others in other EU countries, with whom I have had the honor to collaborate. I have noticed that family ownership is the most sustainable and progressive sort of capitalism of global markets. Professor Howard Thomas has been important since he encouraged me to continue my post-doc-studies around the topics of industrial economics.

February, 2017

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# 1 NEW GROWTH THEORY

## 1.1 NEO-SCHUMPETERIAN CONTRIBUTION

### *From the exogenous and endogenous growth theory*

Economics has its underpinnings in the growth of markets. This was the main standpoint of famous British economics from Adam Smith to David Ricardo to Alfred Marshall. The Walrasian System was laid down in the early 20th century. Since that neoclassical theorists have been reluctant to expand their models. In the neoclassical, exogenous growth theory, the main determinants of long-run economic growth are not influenced by incentives of human agents that are the core ingredient in Schumpeter (1939). Robert Solow, a Nobel Prize-winner, advanced the neoclassical growth model. Solow (2000) found that technology progress has in the western countries been the most important input factor allowing long-run growth in real wages. In Solow's model, the growth is caused by capital accumulation and autonomous technological change.

$$Y = F(K, L)$$

Where

**K** = the capital stock and

**L** = the labor force

### **Formula 1: Solow model**

Solow postulated that the production function displays constant returns to scale, so that doubling all inputs would double output. This kind of assumption is particular to the neoclassical growth theory, since holding one input constant (labor) and doubling capital will yield less than double the amount of output. This is the famous law of diminishing marginal returns. Solow's model is a typical example of the ones of the **exogenous growth theories**. A paradox is that the model itself is purely theoretical and trivial. What is interesting is Solow's residual analysis in which Solow broke down changes in labor productivity into two parts:

1. **Increase in the amount of capital per unit of labor** and
2. **Technological progress** that includes improvements in the human factor.



Robert Solow has addressed that the technology progress has in the Western countries been the most important input factor allowing long-run growth in real wages and the standard of living. In his Nobel Prize lecture, Robert Solow even referred to the rivalry (or occasional complementarities) as the main catalyst of innovations. Robert Solow admitted in his lecture in 1987 that, over the long run, countries appear to have accelerating growth rates and, among countries, growth rates differ substantially. This cannot be explained by the neoclassical growth theory. William Baumol (1990) has remarked, that studies of growth theories are biased without understanding of the real entrepreneurship.

The **new or endogenous growth theory** has become popular during the past decades. The theory has been advanced by some neo-Schumpeterian writers, like Kenichi Ohmae (1995) and Tom Peters (1990). They offered a perspective on economic growth that differs in important ways from the traditional view. Growth theorists strongly believe that the human incentives created by the markets affect profoundly on the pace and direction of economic progress. When humans do set to work in an unexplored area, important new discoveries will emerge. The key in the growth process is the market system, supported by the hybrid institutions like universities or R&D labs and by other more informal networks like consultants and technology parks. Paul Romer (1989, 1990) recognized that technology (and the knowledge on which it is based) has to be viewed as an equivalent third factor along with capital and land in leading economies, and that a nation's increased openness raises domestic productivity, and hence must have a positive effect on the living standards of a nation (GNP).

**Endogenous growth theory is based on the idea that the long-run growth of nations is determined by economic incentives that were earlier been excluded from the models of the neoclassical, exogenous growth theory.**

**Neo-Schumpeterian writers, e.g. Paul Romer, Kenichi Ohmae and Tom Peters claim that inventions are intentional and generate technological spillovers that lower costs of future innovations. An educated work force plays a positive role in determining the rate of long-run growth.**

Traditionally, social scientists and policymakers saw economic progress as a result of progress in knowledge or technology (Kuhn's paradigm). Revolution instead of evolution is the content of neo-Schumpeterian writers. An example of neo-Schumpeterian discovery is the famous **Gordon Moore's law of the new cost curve**. In 1965, Gordon Moore, co-founder of Intel, declared the law that the number of transistors on a chip doubles every 24 months<sup>2</sup>. A similar law has held for hard disk storage cost per unit of information and to some extent for many other technical devices. This law has remained true through countless cycles of high-tech development. It predicts technological progress and explains why the computer industry has been able consistently to come out with products that are smaller, more powerful and less expensive than their predecessors. Ilkka Tuomi<sup>3</sup> has noticed that the semiconductor technology has evolved during four decades under very special economic conditions.

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The rapid development of microelectronics implies that economic and social demand has played a limited role. Contrary to popular claims, the common versions of Moore's Law have not been valid during the last decades. The same problem concerns other law like relationships. Moore's law as well as the BCG's experience curve has been assumed to be a valid indicator of competitive advantage indefinitely. However, the time span to earn temporary monopoly profit is becoming shorter. Nowadays, semiconductors are the building blocks of the modern information society. They are undifferentiated mass-components (commodities) that are traded based on their reasonable market prices. The relevant theory to predict demand and supply is the neoclassical price-theory, not Moore's Law. Many products that were hyped as high tech in the 1960s and 1970s are now to be considered as commodities.

**For over four decades applications of Moore's law have expanded, often far beyond the validity of the assumptions made by Moore. However, Moore's Law is a commonly used benchmark for technology revolution and an empirical testimony of Schumpeterian creative destruction.**

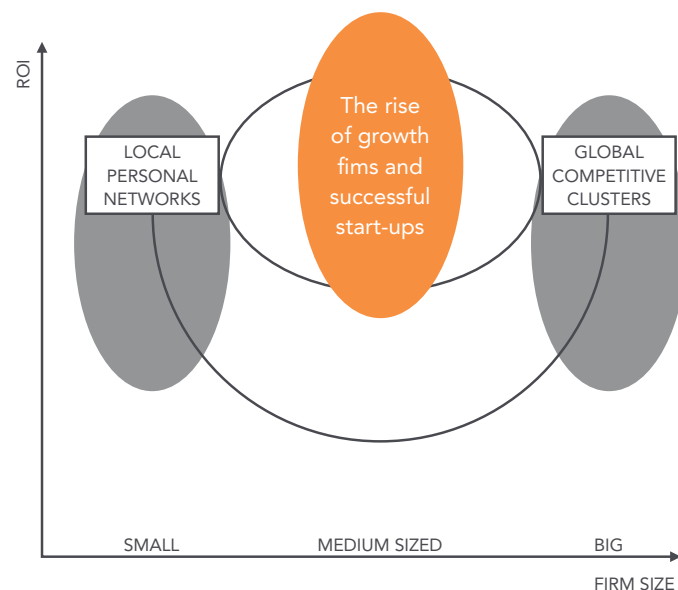
The new or endogenous growth theory has been popular in newly industrialized countries such as Korea, China and India that invest heavily in innovations. Multinationals expect that the EU should follow the guidelines of the new growth theory in its policy making like Asian nations have done as the main winner recipe in the global game. As an alternative to the new growth theory, the EU doctrine has relied on **the Stability and Growth Pact**<sup>4</sup>. The EU's view on growth factors is mainly exogenous according to the neoclassical, exogenous growth theory. The EU is lagging behind in the growth policy<sup>5</sup> and is feared to be losing the global race in the same way as it lost the race against the US in the second industrial revolution.

Michael Jensen (1993) has made an elegant contemporary interpretation of the Schumpeterian creative destruction process. Comparing the growth of GNP with R&D statistics, Jensen predicted the dynamics of the modern industrial revolution. Because of the shock of the oil crisis in the mid-1970s, the Western countries invested in R&D. The growth of R&D expenditures has been twice as high as the growth of GNPs. The revolution of information technology (ITC) has been the major source of Schumpeterian creative destruction and innovation in the industrialized countries. But a Schumpeterian global shock means that the inefficient firms are being divested<sup>6</sup>. The driving forces of global markets are:

1. **Schumpeterian dynamics** that requires policies which nurture processes of catalyzing investments in innovations, venture capital, startups, etc. The Silicon Valley region is an example of entrepreneurial, proprietary capitalism, personified by Bill Gates. One of the bottlenecks of the EU is weakly developed private venture capital markets, especially, compared to the USA<sup>7</sup>.

2. **Formation of globally competitive clusters of multinationals.** Geographic concentration of firms has been particular to Europe, as Alfred Marshall (1920) wrote, and later to the US. Michael Porter's (1990) book proposes the diamond model as a doctrine for clustering that incorporates the determinants of a company's environment, which influence the firm's ability to create and sustain competitive advantage in the global markets.

Multinationals have certain elements of collective capitalism that Schumpeter (1942) proposed. They invest heavily in their global R&D programs and in brand marketing campaigns signaling market power in the markets and countervailing power in politics. Multinationals dominate the global markets of commodities, and they can collectively determine the rules of the game in the global economy. There seems to be some measures that can be used to anticipate the origin and initial location of new geographical clusters of firms, and, thereby, new creative destruction is the only countervailing power to multinationals. The most important is the existence of growth firms and successful new start-ups (Saxenian, 1994). If there are several new firms' spin off from a common parent, or a set of parents, then a cluster of firms could begin spontaneously. Schumpeterian entrepreneurship as a combination of **proprietary** and **collective capitalism** is functioning in regional clusters like Silicon Valley somewhere between local networks and global clusters (Figure 1).



**Figure 1:** Two poles of the Schumpeterian dynamics

Competition arises from the **scarcity of economic resources**. Most of classical economists, e.g. Smith (1776) and Ricardo (1817), felt no need for a precise definition of competition because they viewed monopoly as highly exceptional (Stigler, 1968). The model of perfect competition emerged as the main standard model in microeconomic studies in the early 19th century when Leon Walras initiated the revolution of marginalism (Sandamo, 2011). Joseph Schumpeter was the most famous member of the German Historical School of Economics. Schumpeter tried to introduce his concepts into the set-up of the Walras' system but found it difficult since economic evolution is a slow wave-form process. Schumpeter (1934, 1942) appreciated Walras and his use of mathematics in economics. However, he thought that the **marginal cost concept** could be more realistic as **the average cost function concept**. Schumpeter insisted on the discontinuity between the mathematically perfect theory and entrepreneurship.

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***Schumpeter (1939): The theory of business cycles***

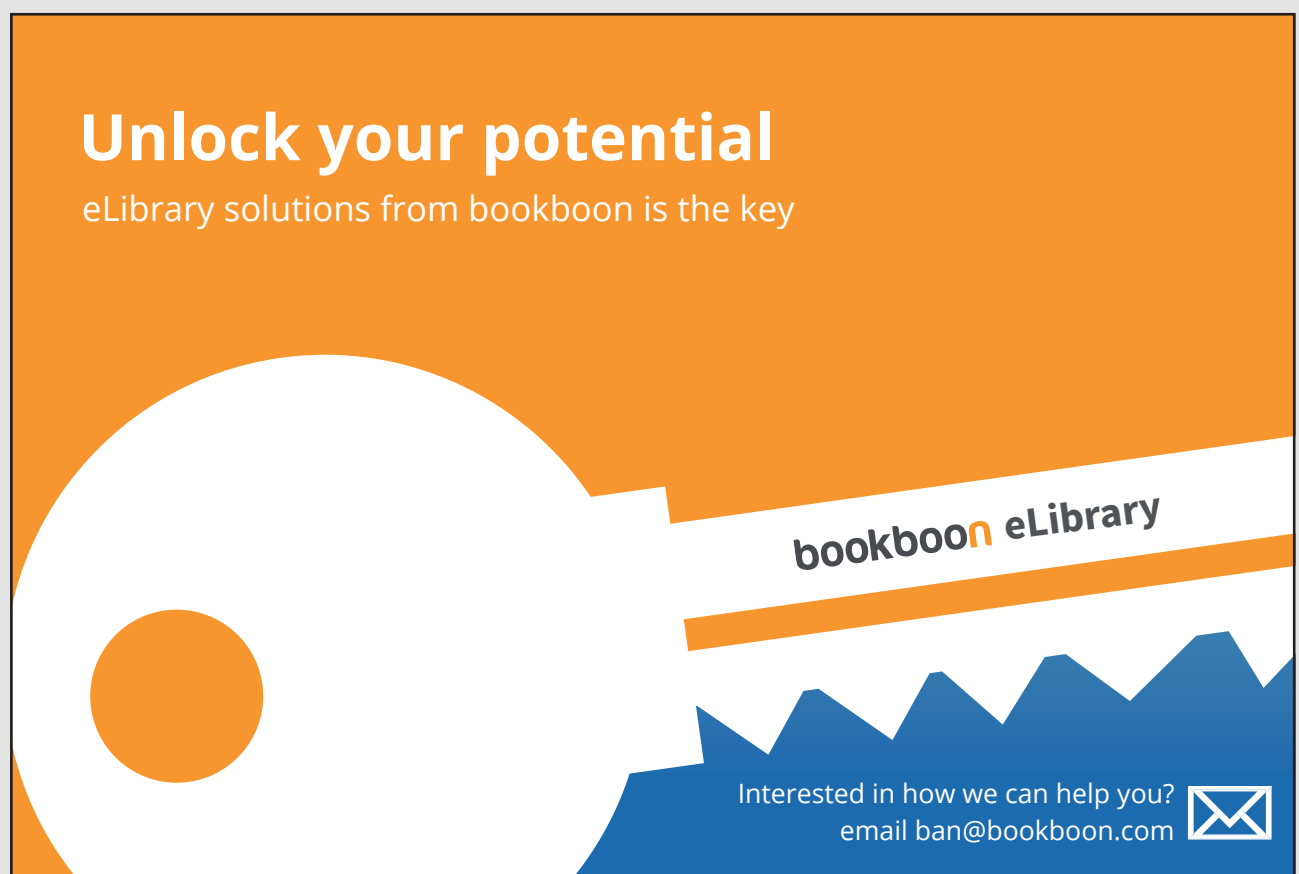
Schumpeter redefined the function of entrepreneurs in a society. He believed that entrepreneurs are motivated by **temporary monopoly** profit that is the return on the entrepreneur of the innovation that leads to increased productivity and is the fundamental source of wealth in a society. (Lahti, 1991; Lintunen, 2000) Innovations are considered to be the major driver of economic growth. Since the social returns of innovations exceed the private returns the factors that facilitate innovations are considered to be critical to policy makers in any nation. The key to innovativeness is to allow firms to appropriate more of social benefits of their new products or processes, as through broadening intellectual property rights or relaxing post-innovation antitrust enforcement. This is what happened in the US in the 1980s. Contributors to the scholarly literature on innovation distinguish inventions, ideas from innovations, applied successfully in practice.

**Innovations are not continuously distributed in time, but proceeds by leaps which upset the existing equilibrium in markets and generate (irregular) economic growth (Schumpeter, 1939).**

A parallel explanation of long waves lies in the Kuhn's (1970) model of scientific development. Kuhn used the term paradigm shift to refer to the mark of maturity of a science or techno-economic paradigm that refers to an innovation chain that affects the whole economy, e.g. electric power or computers (Freeman and Perez, 1988). Schumpeter defined the innovative transformation as a relatively slow and conflict-ridden process. This reinterpretation helped him outline the **theory of business cycles** as reflecting the wave-form process of economic growth. Schumpeter regards technological uncertainty as neither a sufficient nor a necessary determinant of fluctuations but postulates that fluctuations are caused by supply shifts based on uneven technological changes. Schumpeter argued that **entrepreneurs create radical innovations in the face of competition**. His view is that business cycles, waves are a catalyst of economic growth. This view has been generally accepted. Schumpeter (1939) proposed a typology of business cycles according to their periodicity, so that a number of particular cycles were named after their discoverers or proposers:

- 1) **Kitchin inventory cycle, 3–5 years** is related to time lags in information movements affecting the decision making of firms. Andrew Tylecote who contributed to the wave theory viewed the Kitchin cycle as endogenous (Tylecote, 1992). Firms build up their inventories to anticipate future sales, but as sales sink over time the stocks pile up. As a result, within a time period markets get flooded with products whose quantity becomes gradually excessive. The demand declines, prices drop, the produced commodities get accumulated in inventories, which informs firms of the necessity to reduce output. After the balance is achieved and demand grows, a firm will again build up its inventory. Since the 1980s, the wide adaption of the “Just in Time” production strategy (or modification) has helped firms to improve their financial returns on inventories by reducing in-process inventory and associated carrying costs. The e-commerce makes it easier to balance inventories even in consumer industries.
- 2) **Juglar fixed investment cycle, 7–11 years.** Clément Juglar (1819– 1905), a French statistician was one of the first to develop a theory of business cycles (Besomi, 2005). Schumpeter adapted his idea, and noticed that a Juglar cycle can be observed in periodic fluctuation of investments into fixed capital and not just changes in the level of employment of the fixed capital and respective changes in inventories. The firm behavior is based on their mutual dependence (strategic group explanation). In this respect the Juglar fixed investment cycle can be viewed as endogenous. Firms in the same business use to invest in their infrastructure with the desire to expand and modernize their capacity. In the end of the cycle, firms’ infrastructures need to be modernized again. A reason for this kind of periodic fluctuations in investment is the strong believe in technology as a main competitive edge. In Solow (2000), technology and know-how are important contributors on GDP growth. Neoclassical economists often view technology as the exogenous production factor. Robert Solow (1987) and Paul Romer (1989, 1990) are examples of economists who accepted Schumpeter’s view that certain elements of technology are endogenous. A research employing spectral analysis has confirmed the presence of Juglar cycles e.g. in the EU (Sellaa et al, 2012).
- 3) **Kuznets infrastructural investment cycle, 15–25 years.** Simon Kuznets (1901– 1985) was a Russian economist who won the 1971 Nobel Prize “for his empirically founded interpretation of economic growth which has led to new and deepened insight into the economic and social structure and process of development”<sup>8</sup>. As the professor at the Wharton School in the US. Kuznets connected these waves with demographic processes, in particular with immigrant inflows and outflows and the changes in construction intensity that they caused, that is why he denoted them as demographic or building cycles. The Kuznets cycles have been also interpreted as infrastructural investment cycles that are primarily exogenous. Referring to his studies of the US history, Kuznets (1940) suggested that US population growth, with its large immigration ratio between the 1870s and the 1920s, caused fluctuations in the construction of houses and investments in the railways.

- 4) **Kondratieff long cycle, 45–60 years.** Schumpeter used the findings Nikolai Kondratieff (1892–1938) who was a major proponent of the New Economic Policy (NEP) in the Soviet Union. He proposed a theory that Western capitalist economies have long term (50 to 60 years) cycles of boom followed by depression. The logic of long waves is that in times of slow growth entrepreneurs are reluctant to apply new innovations and so they pile up. When growth picks up new innovations are exploited and inserted into the production process causing a rapid growth in business (Kondratieff, 1935; Barnett, 2002). In this way, the main ingredients of Kondratieff long cycles is seen as endogenous. Kondratieff himself could not enjoy of a long life. When writing his major publications, he was the director of the Institute of Conjuncture, and he worked on a five-year plan for the development of Soviet agriculture. During that time, he was allowed to visit universities travel in England, Germany, Canada and the US. During the dark 1930s, Kondratieff was arrested and executed.

The advertisement features a large white gear on an orange background. The gear has a smaller orange circle in its center. A white banner with the 'bookboon eLibrary' logo is positioned across the middle of the gear. Below the gear, there is a blue silhouette of a mountain range. In the bottom right corner of the graphic, there is a text box with the text 'Interested in how we can help you?' and 'email ban@bookboon.com', followed by an envelope icon.

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The business cycle refers to the ups and downs in economy, measured using mainly the Gross Domestic Product (GDP). The cycle involves shifts between growth periods (recovery and prosperity), and stagnation periods (contraction or recession). To call fluctuations cycles can be misleading. Cycles do not tend to repeat at regular time intervals. As Chiarella et al (2008) pointed out the word **fluctuations should be used instead of cycles** since in capitalist economies there are not similar mechanisms that generate recessions and/or booms. Business cycles in the OECD countries after the World War II have been more restrained than the earlier business cycles. Economic stabilization policy using fiscal policy and monetary policy have together dampened some of the worst recessions, and automatic stabilization due to the aspects of the government's budget also has helped mitigate the cycle even without conscious action by policy-makers (Elwell, 2011). An exception is Russia that experienced prolonged depressions, following the collapse of the Soviet Union in 1991. **Business cycles are a type of fluctuation found in the aggregate economic activity of nations.** Business cycles are not merely fluctuations in aggregate economic activity. The critical feature is that fluctuations are widely diffused over the economy.

***The economy of the western world is a system of closely interrelated parts. The problem of how business cycles come about is therefore inseparable from the problem of how a capitalist economy functions.***

The main framework for explaining fluctuations is Keynesian economics (Minsky, 2008). **The Keynesian school argues for endogenous causes of fluctuations.** In the Keynesian view, business cycles reflect the possibility that the economy may reach equilibrium at various levels of employment. If the economy is in recession and unemployment is high, the Keynesian theory states that monetary policy and fiscal policy can have a positive role to play in smoothing the fluctuations of the business cycle. The neoclassical school is mainly arguing for exogenous causes of business cycles. Neoclassical economists and Nobel-prize winners, such as Paul Krugman and Joseph Stiglitz, argue for minimal government regulations (laissez faire) since efficient markets and competition are the best ways to win a recession. The Keynesian economists largely argue for larger government policy and regulation, as absent regulation, the market will move from crisis to crisis.

Although Schumpeter's (1939) theory of business cycles is difficult to apply today to the complex, global economy, there is no doubt of the fact that the ongoing technology revolution will impact on the global markets, although we may not know the full implications (see Peters, 1990). Michael Jensen (1993) made an elegant study of the Schumpeterian dynamics. Comparing the growth of GNP with R&D statistics, Jensen noticed that **since the chock of the oil crisis, in the mid 1970s the growth of R&D expenditures in the industrialized countries has been approximately double higher than the growth of GNPs in the world.** This trend has accelerated during the two decades of globalization, the 1990s and the 2000s. The revolution of information technology (IT) was the major source of Schumpeterian dynamics in the industrialized countries in the 1990s.

**The Schumpeterian market chock stimulate new waves of innovative growth firms, and destroy the obsolete ones.** In the early 90s, Finland was hit by serious crisis in the bank industry and about 20% of the firm population was lost. During the crisis the positive entrepreneurial event was the unexpected global success of Nokia. Two decades later Nokia was in a crisis signaling the new kind of creative destruction of today. In the EU crisis countries (Greece, Italy, Spain, Portugal and Ireland) the Schumpeterian market chock may be in full force. The negative end results are already known by economists. Hopefully, the positive end results are somewhere waiting for the growth boom in the near future.

Following the guidelines of Schumpeter (1939), we believe that a major part of the dynamics of technological revolutions can be explained by the Kondratieff's

Long-wave theory (Table 1).

Period Description	Period	Key factors of technological change
First Kondratieff	1780s–1840s	Industrial Revolution: factory production for textiles Cotton
Second Kondratieff	1840s–1890s	Invention of steam power and its application in railways
Third Kondratieff	1890s–1940s	Invention of electricity, steel, etc. and their applications in the process industry
Fourth Kondratieff	1940s–1980s	Mass production of automotives and synthetic materials, especially petroleum
Fifth Kondratieff	1980s–2010s	Digital information techniques, the internet and micro-electronics
Sixth Kondratieff	2010s–???	Nano-engineering and nano-manufacturing

**Table 1:** An illustration of the Kondratieff's long-wave theory



The internet (Katzman, 2006) as a core area of digital revolution has had a profound effect on markets and societies worldwide. **Nanotechnology**, the sixth Kondratieff, is different from the Fifth (Digital techniques, the internet and micro-electronics) providing multiple externalities (Aghion & Howitt, 1998). Relying on Nano-engineering and nano-manufacturing, scientists and inventors have almost infinite options to reconfigure physical objects (Aghion et al, 1999) and to contribute strongly to sustainable development resulting in less waste. The question marks are needed because no-one can a priori know how efficient the diffusion process will be in product markets (Aghion et al, 1999, 2001, 2005). A new technology is at first adapted by a few pioneering firms, but as soon as the monopoly profits become evident to others, many firms and sectors adopt it.



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The upswing of the Schumpeterian long wave will be the phase in which the innovations start to diffuse to other firms and sectors. When multiplier process sets in, the effects on the whole economy become stronger, and the rate of growth is high. This is a time of radical changes in the structure of economy when new methods diffuse, new sectors become dominant and old industries decline (Castellacci and Zheng, 2010). Following Schumpeter's notion, the evolutionary economics has primarily been based on the growth of knowledge, not on the mathematical models (Loasby, 1999). Schumpeter not only recognized the need for a theory of economic development, but also came to understand that such a theory would have to account for the **process of technological change** (Lazonick, 1991). Robert Solow, the Nobel-Prize winner, is the main developer of neoclassical, exogenous growth theory (Solow, 2000) that dominates public policies in industrialized countries. Later, Solow found that "Schumpeterian" technological progress in western countries has been the most important input factor allowing the long-run growth in real wages and the standard of living. **In his Nobel Prize lecture in 1987, Solow, referring to Schumpeter's thinking, called for a new theory of economic growth** (Solow, 1987).

## 1.2 MECHANISMS UNDERLYING INNOVATION

Schumpeter held two different approaches. Schumpeter (1934) emphasized the role of private entrepreneurs entering niches of markets. By innovating, entrepreneurs use to challenge existing firms through a process of creative destruction, which was regarded as the engine of economic progress. Schumpeter (1942) paid attention to the **key role of large firms as engines for economic growth by accumulating non-transferable knowledge in some specific technological areas and markets**. There is a strong positive feedback loop from successful innovation to increased R&D activities leading to renewed impulses to increased market concentration (Gilbert, 2005, 2006, 2007).

In the neo-Schumpeterian approach analyses, the **generation, implementation and diffusion of knowledge and technology** means putting emphasis on the decisive role and impacts of entrepreneurship and innovation on dynamics and qualitative changes in market structures of industries or to which the innovation dynamics is targeted and, thereby, to the society as the whole (Freeman, 2008). Unfortunately, most of Neo-Schumpeterian economists scarcely analyze the "destructive" part of the "creative destruction" processes nor consider the destinies of the people who are not lucky or able to take advantage of innovation dynamics (Hartmann, 2009). A paradox of the literature on entrepreneurship is that the process of opportunity recognition and exploitation is supposed to happen in a vacuum, separate from the market existing structure elaborated by the applied economics. However, about 100,000 multinational corporations dominate the international trade of commodities worldwide.

Looking at Schumpeter writings (1934, 1939, and 1942) it is possible to distinguished two different types of mechanisms underlying innovation by firms:

### 1. *Creative destruction*

Schumpeter (1934, 1942) gave economists food for thought with the concept of creative destruction. Creative destruction creates economic discontinuities, and in doing so, an entrepreneurial environment for the introduction of innovation, and earning monopoly profits. Competition is a self-destructive mechanism that normalizes profits when the innovation effect has been fully utilized. Creative destruction is associated with innovation of entrepreneurs (or small firms) entering unexplored market where there are low entry barriers for new entrants utilizing the common pool of knowledge stock.

Creative destruction is a **microeconomic process by its nature** but has many considerable macroeconomic implications for economic growth (Aghion and Howitt, 1992, 1998). In the creative destruction competition between firms and various industrial sectors is mainly driven by technological factors (Creative destruction) when technological innovations overturn the existing dominant technologies and shakes the status quo in the market (Christensen, 1997; Hart, 2005). An example is the meteoric rise of Linux operating system, which can be traced to **Linus Torvalds**, and the subsequent creation of the dynamic Linux community. The Linux community of volunteers, like ad hoc programmers, has fostered the rapid development of the Linux software without the firm-centric product development budgets.

### 2. *Creative accumulation*

Schumpeter's (1934, 1942) creative accumulation is closely associated with **institutionalized or organized innovations** by multinational corporations, MNCs that carry out innovation along established technological trajectories and even try to prevent the entrance of newcomers (Schumpeter, 1942; Pavitt et al, 1989; Malerba and Orsenigo, 1995; Paap and Katz, 2004). MNCs dominate global commodity markets (Karlinger, 1997, 2005; Kumar, 1994, 1998). By providing world-class technologies and logistics, MNCs are important partners for local entrepreneurs (Markusen and Venables, 1997; Lööf, 2009), MNCs are claimed to utilize their monopoly power to create high barriers to entry of new entrants (Scherer and Ross, 1990), and to impact on industry life cycles (Klepper, 1996) and market structures (Scherer, 1999; Chandler, 1990).

When entrepreneurs under creative destruction draw from the public domain only to place their own innovations within the reach of imitators, large firms under creative accumulation appropriate and **build on proprietary knowledge stocks** through their in-house R&D departments. **Thomas Edison** (1847–1931) owned over a thousand US patents. Edison himself was a pioneer investor creating technological breakthroughs. In the 1890s he established General Electric (GE). GE was among the first ones organizing creative accumulation. GE built on its proprietary knowledge stocks through well-organized R&D departments, including lighting, transportation, power transmission, and medical equipment. (GE) GE is still continuing the infinite quality-improvement process (Cheng and Dinopoulos, 1996; Bingham, 2003).

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The Schumpeterian analysis is strongly confined to the **influence of the degree of concentration on R&D expenditure** (Cohen and Levin, 1989; Cohen and Klepper, 1996). The heterogeneity of industries and markets is the reason why the relation between concentration and innovative output has often found to be non-significant (Scherer, 1999, 2001, 2003) or even negative (Koeller, 1995; Koeller and Lechler, 2006). Relying on his historical analyses, Chandler (1962, 1990) claimed that the strategy process is the **key managerial innovation** by which large firms integrate the core elements of vertical production system or value chain (Porter, 1985). Large firms with integrated manufacturing and R&D can be highly successful in generating radical product and process innovations (Freeman, 2008; Mowery and Rosenberg, 1989; Greenstein and Ramey, 1998; Gilbert, 2006, 2007) although **the “escape competition” strategy is common in the global patent race by MNCs.**

As Buckley and Casson (1976, 1985) have noticed, **internalizing, e.g. vertical integration is the most valid strategy for MNCs.** Schumpeter's (1942) argued for a positive relationship between the rate of R&D investments and the firm size. According to the prediction of Schumpeter (1942), large firms would inevitably gain dominance over small firms, and thus slow the rate of radical inventions in the overall economy. His contradictory claim was that **monopolies favour innovations** (Baldwin and Scott, 1987; Baker, 2007). In broad terms, this is true still today. Big MNCs are the major suppliers in global innovation and technology markets. The quality of supply is important to assess. The common competitive model for global commodity supplier, MNCs, is oligopoly, and the “escape competition” strategy is commonly used. Referring to the neoclassical standard doctrine, Kenneth Arrow (1962), the Nobel Prize-winner, claimed that a market leader in oligopoly is not ready to take the risk of radical or drastic innovations since the firm might jeopardize its dominant market position. Market leaders can earn profits by replacing itself (the “Arrow effect”) what small firms in monopolistic competition, by definition, cannot do. A market leaders inventing in new products or processes can:

- 1) **Pre-empt potential rivals** (Gilbert and Newbery, 1982; Gilbert and Sunshine, 1995; Gilbert and Willar, 2001; Gilbert and Weinschel, 2005);
- 2) **Slow down the diffusion of radical technological inventions by entrants** (Gilbert and Riordan, 2005);
- 3) **Maintain a permanent leadership** (Denicolo, 2001). A classical case is Microsoft being the subject of antitrust investigations in the US and in the EU. Federico (2008) has analyzed the case Microsoft. He could not find an evidence of the misuse of monopoly power although he noticed that Microsoft's aggressive product strategies do harm competitors.

Chandler (1990) compared the history of the corporate capitalisms in the US, Britain, and Germany. He noticed that the **US managerial capitalism was the winners for about one hundred years, from the 1880s to the 1980s**. As Chandler remarked the hated US trusts were the ones that succeeded to increase output, lower costs, compete vigorously, and expand into more distant markets leading to the growing population of US MNCs internationalized and developed the standard model of the multiproduct enterprise. **Large vertically integrated firms replaced fragmented structures of production and distribution and started to agglomerate their competitive capabilities over industrial districts**. Chandler has been the most influential writer of economic historians since Schumpeter. His writing opened the Marshall's (1920) black-box of managerial decision-making in large firms (see Chandler, 1962, 1978, 1990). Some writers have continued to deal with dynamic transformation process in economies driven by the introduction of innovations (e.g. Freeman, 2008; Dosi, 1982, 1988; Anderson and Tushman, 1990).

**Schumpeter strongly believed in human incentive in innovation dynamics**. This notion is well elaborated by Robert Lucas (1981, 1988) who is a Nobel Prize-winner. Following the notion of **increasing return**, Romer (1989) started to claim that every generation has underestimated the potential for finding new recipes and ideas. Romer (1990) argued that technology is not a mysterious outside force, as economists thought in the past, but an internal one that can be cultivated to increase growth. His main slogan in terms of Schumpeter has been: "The emerging economy is based on ideas more than objects". **The greatest innovations are likely to occur from the cross-fertilization of sectors and professions**. For example, artists/scientists and businessmen work models are interrelated but different. A major difference is that artists and scientists are more likely to think laterally and holistically, businessmen are linkers of people, concepts and strategies whilst businessmen involve a linear thinking pattern.

Schumpeter (1934, 1942) introduced the **concept of temporary monopoly profit** as the lifeblood of innovativeness since he noticed that the so-called normal profit is not a satisfactory compensation of innovations and risk-taking under uncertainty. Parallel to Schumpeter, Frank Knight, the founder of the new (institutional) Chicago School wrote about risk-taking. Knight's (1920) risk theory distinguishes between the objective probability that an event will happen, and, the immeasurable unknown, such as the inability to predict the demand of a new product. Knight expected that an entrepreneur would make his profit in the market with immeasurable unknown or **true uncertainty**. Knight argued that perfect information on future events was not necessary or not even possible. Knight corresponded closely to Schumpeter's ideas.



The conceptualizations of Schumpeter and Knight are still valid and even more so in the time of globalization. Schumpeter and Knight were the forefathers of the entrepreneurship doctrine. They could identify the timeless function of entrepreneurs in a capitalistic society. Solow highly appreciated Schumpeter's thinking.

*The Nordic countries as early adapters of the new growth theory*

The Nordic countries are an example of the applications of the new growth theory. Since the end of the 80s, the Nordic countries have been a test laboratory for the emergent so-called **mCommerce** that is a part of the ICT cluster. Mobile phones that were previously meant just for talking are becoming symbols of the global network economy. The Nordic corporate culture has been improved by the penetration of mobile phones, because employees can work quite independently, irrespective of the hierarchies. Entrepreneurs are, of course, heavy users of mobile phones. The Nordic countries have succeeded to handle the creativity challenge and utilized a good combination of clustering and networking described in Figure 1. The prevailing profession includes an academic education and on-the-job training of high-tech devices as a hobby.

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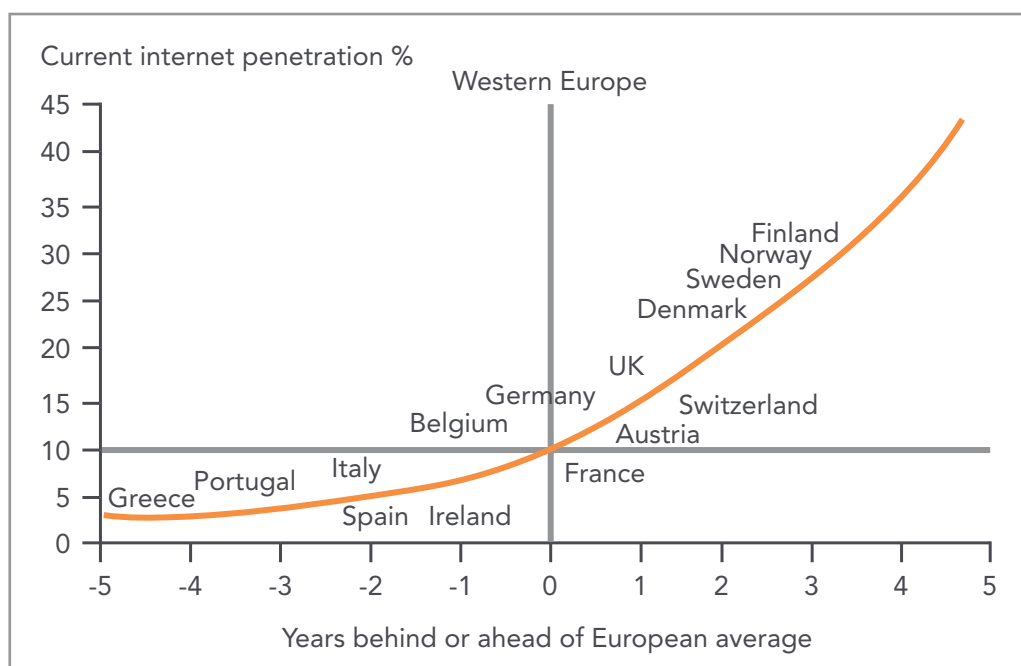
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**Creativity is a powerful competitive advantage. Creativity is one explanation why the Nordic countries, especially Finland and Sweden, have the leading position in one of the world's fastest-developing sector, mCommerce, and, thereby, in global networking.**

Referring to the Nordic countries, there is no doubt that existing and future technologies will impact people and tasks, although we may not yet know the full implications. The greatest innovations are likely to occur from the cross-fertilization of sectors and professions. For example, artists/scientists and businessmen work models are interrelated but different. In the Nordic countries the inevitable successes of regional ITC clusters (like Kista or Oulu), has much to do with **two fast-growing and successful firms – Ericsson and Nokia**. Both firms are early adapters of bounderless organizations, a model that allows collaboration of large and small organizations and the mobility of human capital and its attendant tacit knowledge across these boundaries that are responsible for the creation and innovations. The Nordic countries are the 3G or 4G laboratories of mCommerce. The social capital is generated parallel with the technological superiority. Four Nordic countries are in the leading position in the Internet penetration in Europe as demonstrated in Figure 2.



**Figure 2:** Internet penetration in Europe

An essential element of modern IO theory is to redefine the concept of entry barriers into mobility barriers. When mobility barriers (e.g. Bain, 1951, 1956) are a relatively compact mobility barriers are a relatively complex construct to any IO economist who tries to draw implications on a possible monopoly power of a firm. A positive aspect is that the redefinition of entry barriers into mobility barriers allows a richer and a realistic portrayal of the process of entry and the motives for diversification (cross-entry). McGee & Thomas (1986) collected lists of relevant mobility barriers and divided them into three categories (Table 2).

Market-related strategies	Industry supply characteristics	Characteristics of firms
<b>Product line</b>  <b>User technologies</b>  <b>Market segmentation</b>  <b>Distribution channels</b>  <b>Brand names</b>  <b>Geographic coverage</b>  <b>Selling systems</b>	<b>Economics of scale:</b> <ul style="list-style-type: none"> <li>• <b>production</b></li> <li>• <b>marketing</b></li> <li>• <b>administration</b></li> </ul> <b>Manufacturing processes</b>  <b>R&amp;D capability</b>  <b>Marketing and distribution systems</b>	<b>Ownership</b>  <b>Organization structure</b>  <b>Control systems</b>  <b>Management skills</b>  <b>Boundaries of firms</b> <ul style="list-style-type: none"> <li>• <b>diversification</b></li> <li>• <b>vertical integration</b></li> </ul> <b>Firm size</b>  <b>Relationship with influence groups</b>

**Table 2:** Sources of mobility barriers

In the global markets there are about 100,000 multinationals that take advantage of most potential market segments. Multinationals are famous of their marketing capabilities, e.g. selling systems. Serving their customers worldwide with highly standardized products offers substantial **economies of scale** for multinationals that dominate commodities in international trade. Their high diversification/integration rates make it difficult for domestic firms to compete away in the same segments. Multinationals may take advantage of the high mobility barriers but they do not aim to monopolize markets since it is not possible in global contexts without high transaction costs. Advances in the international communication systems in terms of Internet has challenged the Nordic ITC clusters and the two **successful firms – Ericsson and Nokia**.

Looking at the list of 18 leading brands, most of them are owned by big multinationals (Table 3). Apple is on top for the first time (brand value 98,316 \$m). Apple has been a amazing success story. The big loser was Nokia from Finland. Nokia was the 5<sup>th</sup> best in 2009 (brand value 34,864 \$m) and in 2013 the 57<sup>th</sup> best (brand value 7,444 \$m). Nokia's brand value has crossed **468%** in four years. In 2009 Apple was 85<sup>th</sup> best (brand value of 3,563 \$m). Apple's brand value has shot up **27,593%** in four years. What happened in mobile-phone markets worldwide? The main reason for Nokia's market failure has been a rapid move from oligopoly to monopolistic competition in which product differentiation is the critical element. Today, over 50% of new cell phone subscriptions globally are smartphones<sup>9</sup>. In the global markets, even 60% of firms follow the principles of monopolistic competition. Apple was the global innovation driver of smartphones and Nokia a challenger. In the 2010s, Microsoft was able to overtake Nokia's mobile-phone business. Why Nokia could not cash its huge innovation capacity? The problem was the misleading perception of the global markets. Nokia could not defend its market position by adaptations in product strategies. Nokia was not able to implement the revolution in its product concept.



The advertisement for Factcards.nl features a dark blue background with the logo 'FACTCARDS' in white and blue. Below the logo, a question is posed: 'Are you working in academia, research or science? And have you ever thought about working and moving to the Netherlands?'. Five colorful cards are displayed, each representing a category with an icon and a page count: 'Arriving' (yellow, 33), 'Living' (green, 50), 'Studying' (red, 51), 'Working' (orange, 101), and 'Research' (purple, 50). To the right, a light grey box contains text about the website's offerings and a blue button labeled 'VISIT FACTCARDS.NL'.

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Brand	Country	Industry	Value \$m
1. <b>Apple</b>	United States	Technology	98,316
2. <b>Google</b>	United States	Technology	93,291
3. <b>Coca-Cola</b>	United States	Beverages	78,808
4. <b>IBM</b>	United States	Business Services	78,808
5. <b>Microsoft</b>	United States	Technology	59,546
6. <b>GE</b>	United States	Diversified	46,947
7. <b>McDonald's</b>	United States	Restaurants	41,992
8. <b>Samsung</b>	South Korea	Technology	39,610
9. <b>Intel</b>	United States	Technology	37,257
10. <b>Toyota</b>	Japan	Automotive	35,346
11. <b>Mercedes-Benz</b>	Germany	Automotive	31,904
12. <b>BMW</b>	Germany	Automotive	31,839
13. <b>Cisco</b>	United States	Technology	29,053
14. <b>Disney</b>	United States	Media	28,147
15. <b>HP</b>	United States	Technology	25,843
16. <b>Gillette</b>	United States	FMCG	25,105
17. <b>Louis Vuitton</b>	France	Luxury	24,893
18. <b>Oracle</b>	United States	Technology	24,088

**Table 3:** Brand values of 18 leading firms (2013)

Source: <http://interbrand.com/best-brands/best-global-brands/2013/ranking/>

## 1.3 NEW ECONOMIC GEOGRAPHY

### *Marshall-Krugman-paradigm*

Alfred Marshall, the most influential British economist in the era of the second industrial revolution from the 1880s to the 1930s, advanced David Ricardo's analysis. Marshall (1920) analyzed externalities of specialized industrial locations. His prototypical industrial district was Manchester. In the Marshallian **industrial district** the concentration of firms enjoys the same economies of scale that giant firms normally get. In that sense, a Marshallian industrial district is an alternative to giant firms that nowadays are multinational. Marshall highlighted the presence of the so-called **industrial atmosphere**, although he did not elaborate its social foundations. Marshall was aware of the fact that there is the overlapping between the social and the productive systems.

**Marshall was an exceptional economist. He was highly analytical but not willing to accept that mathematics is the only reliable method as most of neoclassical economists use to think. Marshall was aware of the fact that the overlapping between the social and the productive systems is needed to motivate firms' personnel to a high performance.**

In Marshall's conceptualization of industrial district, the possibility to benefit from external economies, due to **spatial contiguity** that refers to the fact that things that occur in proximity to each other in time or space are readily associated. This is the main reason that induces firms to locate near each other's. The concept of **externalities** refers to the benefits that a firm takes from being located in an industrial district. In Marshall's analysis, industrial districts can contribute to the external economies of regionally concentrated firms. In the theory, geographical agglomerations and regional imbalances result as the equilibrium solution of the tensions between (1) **centripetal forces** that tend to promote geographical concentration and (2) **centrifugal forces** that tend to prevent geographical concentration. Marshall described the three important centripetal forces, called the **Marshallian triad**, that are the key factors at the base of the existence of agglomeration:

1. Effects resulting from specialization due to the division of labour with an industrial district
2. Effects resulting from the creation of infrastructure, information, communication and R&D that a firm uses
3. Effects resulting from the availability of high specialized labour force



Paul Krugman's (1991, 1995, 1998), the leading economist, has completed the Marshallian triad. Krugman has made following summary of the centripetal forces or agglomeration economies that are relevant in the global economy:

1. **Market-size effect** (demand and cost linkages). A large local market creates a large local supply of goods and services that in turn creates demand linkages (sites close to large markets are preferred locations) and cost linkages (local production of intermediate goods lowers production costs), e.g. metropolises New York, London and Tokyo.
2. **Thick labour markets.** A local concentration supports the creation of a thick labour market, especially for specialized skills where employees and employers are matched and spatial externalities, the extensive division of labour or industry-specific co-dependent innovations, so that employees find it easier to identify potential employers and vice versa.
3. **Pure external economies.** A local concentration of economic activity may create pure external economies through information spill overs.



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But Krugman identifies also centrifugal forces:

4. **Immobile factors.** Certainly land and natural resources are immobile, and in an international context, people. Some production must go to where the workers are and, and some production will have an incentive to locate close to the consumers.
5. **Land rents.** Concentrations of economic activity generate increased demand for local land, driving up land rents and thereby providing a disincentive for the further concentration. For instance in Los Angeles high land rents may be a centrifugal force.
6. **Pure external diseconomies.** Concentrations of activity can generate more or less pure external diseconomies such as the traffic congestion. Congestion is a state of excessive accumulation or overfilling, like the lack of land for the infrastructure and green areas. Germany's ten metropolises have solved their land use problems by a sustainable way. The car traffic is moved out of the historical city centres where people are willing to walk and bike and to use public bus/train traffic.

**Krugman uses the name *New Economic Geography* that has been driven by considerations of modelling strategy to concentrate on the role of market-size effects in generating the linkages that foster geographical concentration, on one hand, and the opposing force of immobile factors working against such concentration, on the other hand.**

Gunnar Myrdal, a socio-economist, developed the **core-periphery model** to be used at different geographical scales (global, national, regional, etc.). Myrdal (1957) proposed that the key concept of spatial development is **cumulative causation** that can be explained by the **spread** and **backwash** effects. In relationships between core and periphery countries, there are the spread and backwash effects. The spread effects may be positive benefits of technology transfer from core countries to periphery countries. A brain drain happens when highly educated citizens in periphery countries to migrate to core countries. It can be considered as a negative backwash effect (Braudel, 1981). In the 21<sup>st</sup> century, core countries are rich. An average citizen achieves a high standard of living in the US or the EU or Japan. Periphery countries in Africa and Latin America have a low economic growth and poorly educated and fed population. Newly industrializing countries (NICs) such as the 'Little Dragons' (Malaysia, Thailand, Indonesia and the Philippines), owing to impressive economic growth rates in recent years, can be classified as semi-periphery.

In the EU, the economic integration has created new economic regions that are rich in the global perspective, e.g. Stockholm, Copenhagen, Oslo and Helsinki.

In the European context, in the deepening and enlargement process of the EU the economic integration includes institutional development, which requires that participating countries have similar levels of economic policies (Robson, 1993). Economic integration is divided into stages depending on how far the member states have advanced in cutting down barriers of economic activity among each other and how far the implementation of common policies has advanced<sup>10</sup>.

The economic integration and globalization are the two trends of the world economy, and the role of states has been declining. Economic decision making has been devolving downwards to sub national units. At the same time some part of this power has also moved upwards to multiregional organizations (Strange, 1996). **Trade creation** occurs when domestic production is replaced by importing from a member country. **Trade diversion** means that original imports from world markets are replaced by imports from a more expensive member country. Due to liberalization of trade, Krugman's agglomeration economies are relevant. Market-size effect in the core areas of the EU markets is big. Demand linkages mean that the area from Milan to London is a preferred location for the production of high value-added service industries like financing. Some growth areas have historical grounds as Baden-Württemberg and London. There are new local, regional and supra-national location alternatives for firms to build up their competitive position and develop networks.

Referring to Albert Hirschman (1958), it is possible that core cities grow through increasing returns (to knowledge), with satellites of technology innovators' spread by knowledge exploitation nearby. Urban ghettos, research labs, R&D facilities (military) are parts of the **Silicon Valley production system** (Saxenian, 1994). In the US, the reason for the clustering around universities has been the availability of government-fund in science-based industries. Today, universities and their related research laboratories spread throughout most regions in the US. Geographical proximity can be expected to serve the incubation of new technologies. As firms expand their competitive edges, their activities may move out of the region generating 'spread' of technological innovations globally.

According to Krugman (1999), differences in economic development are not associated with location. Those countries that locate close to the equator tend to be poorer than those in colder temperate zones. Krugman has found that per capita income within Europe seems to follow a downward gradient from the northwest corner of the continent. The Nordic countries are success stories of the EU and the global economy. How much this fact is dependent on geography is the key issue in application of cluster models. It is apparent that there are both large regional inequalities in development within countries and, often, a powerful tendency for populations to concentrate in a few densely populated regions. The problem of countries that are located close to the equator is not the tropical climates. It is more or less a political history. These countries were colonies during the time from the 1880s to the 2000s when the technological and commercial dominance of Northern Hemisphere regions, especially the US, the EU and Japan, was created.



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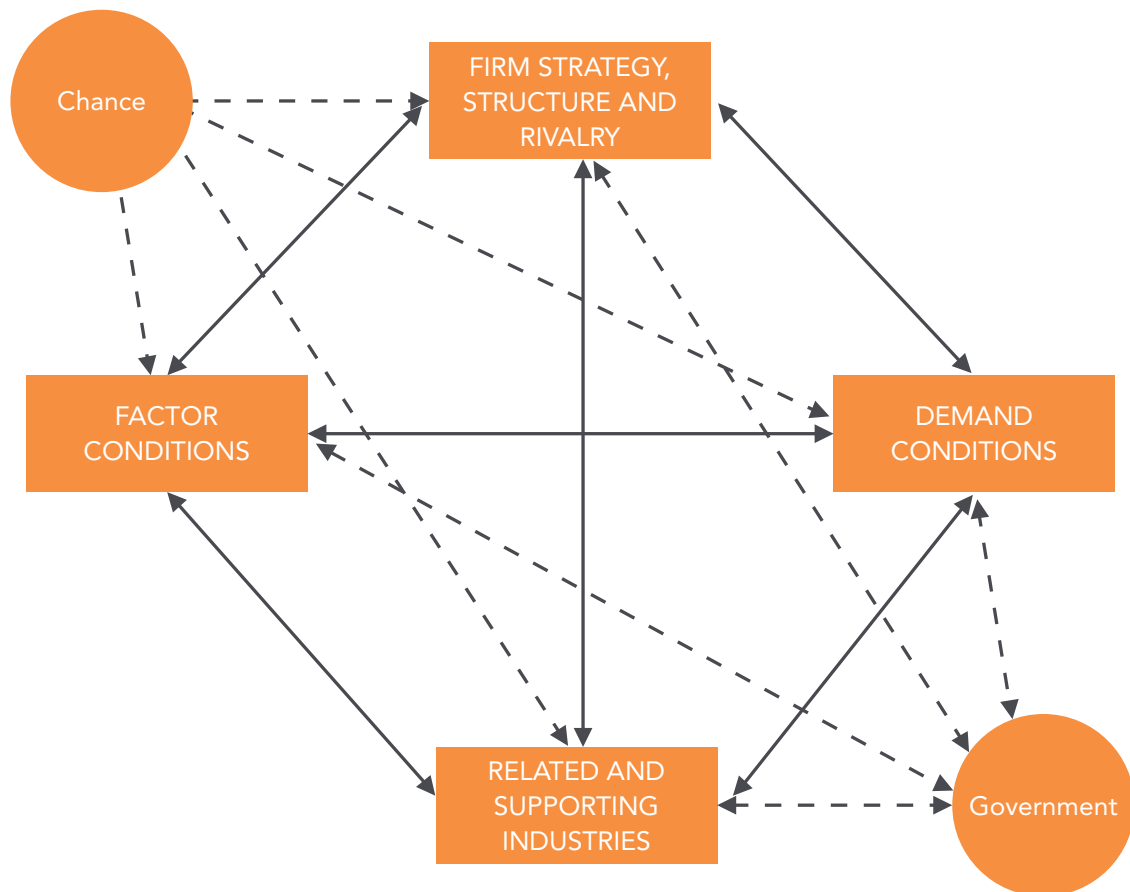
***Porter's (1990) model***

Porter (1990) proposes the diamond model as a doctrine for clustering that incorporates the determinants of a firm's environment. Porter emphasizes the domestic rivalry, local clusters, and physical neighbourhoods. The proximity of firms intensifies the competitive pressure on firms. Innovations are created and sustained through localized processes. The importance of geographic proximity is clearly shaped by the academic people who are more likely to be located in the same region as their universities, and this makes possible the rapid transfer of the latest scientific knowledge. Many of the new technology parks in Europe have failed to attract the critical mass of growth firms. The oldest technology parks in the U.S, e.g. the Research Triangle in North Carolina, the Stanford Industrial Park and the University of Utah Research Park, have succeeded relatively well (Harrison, 1994). So history matters in institution building.

**Innovation-based clusters, e.g. the Silicon Valley (Sassen, 1991) the triad of New York, London and Tokyo (Ohmae, 1995) and German metropolises have succeeded to attract innovative and highly educated people.**

Porter's (1990) view is that differences in cultures, structures, institutions, and histories all contribute to the success of nations. A firm's home base is the nation in which the essential competitive advantages of the enterprise are created and sustained. Porter's (1990) epistemological standpoint is **normative**. He argues for what firms and nations should do, and less why they do what they do. **Porter focuses characteristics of the home base as the primary source of competitive advantage.** The pressure and the proximity together explain Porter's views on innovation. The national rivals are good but rivals in the same region are better. The core concept of Porter's diamond is the centrality of success. Porter analyses the national characteristics of the firm's environment through the **diamond model**. The model incorporates the determinants of firms' (general and industry) environment which influence the firms' abilities to create and sustain key competitive advantages in the global markets (Figure 3).





**Figure 3:** Diamond model

The diamond model is made up of four determinants:

### 1. **Factor conditions**

Factors of production can be divided into basic and advanced as well as generalized and specialized. The advanced factors, like the availability of educated personnel or the industry-specific research institutes, are important to the global industries. Their development requires long-term investments at three levels: (1) Individuals develop their skills, (2) Firms provide educations and training, and (3) Governments support upgrading.

The specialized factors, like the experienced and skilled personnel in the key industries, are crucial for innovations. Factors that are specialized are the most desirable, but they require continuous reinvestments to upgrade them, because the standards of what constitute specialized factors rise continually in the global markets. Markets of specialized factors, such as the highly professional labour force and the advanced technology, are likely to be imperfectly distributed among firms.



## 2. Demand conditions

The size of the home market is the main determinant of firms' international competitiveness. This is the combination of the **economies of scale** by Adam Smith and the economies of scope by David Ricardo. In modern terms, **sophisticated and demanding buyers or consumers put the high pressure on local firms for a better product quality**. The geographical proximity allows for better communication between firms and their customers, thus, the product development process is faster. The buyers are more focused on the cost-quality relationship, if they themselves face the competitive pressure. The home demand influences on the rate of product innovations by firms as Linder (1961) claimed: 'Any export product has its domestic country'. There are three important characteristics of home demand (Sölvell, Zander & Porter, 1991): (1) Composition of home demand (or nature of buyer needs), (2) Patterns of demand growth, and (3) Ability of domestic needs to be transmitted internationally.



### 3. Related and supported industries

Globalization has increased the interdependence of firms. The rapid growth of the global markets and economies and the information technology revolution have accelerated networking. The specialization of firms has increased firms' dependencies on each other's, especially those SMEs that are B2B-suppliers of large firms. In Porter's model, related industries consist of strategic groups of firms which can employ the same technology in manufacturing as the core industry. Thanks to the proximity, there are better opportunities for a vast collaboration that can lead to joint (product or process) development. A sort of strategic group of firms in related industries consists of joint ventures of competitive firms that act as system suppliers for other manufacturing firms worldwide, and also provide complementary resources, like product-related technological know-how to their owners.

### 4. Firm strategy, structure and rivalry

Porter claims that a nation's ability to answer to the global challenges (positive or negative effects) and to mobilize its factors of production across national borders is essential. Porter assumes that a firm's strategy is based in the IO economics. This approach is decidedly less successful when applied to the firm than when applied to the industry. Porter's 'Firm strategy' is basically the same in context than 'Conduct' in the SCP paradigm. **Porter's five forces (suppliers, substitution, entry, customers, and rivalry) have an obvious affinity with the SCP model that would have been more comfortable and familiar.** What is worth noticing is that Scherer's SCP model is more dynamic, starting from markets and ending to performance. Porter's diamond model is static and, therefore, difficult to be used in global contexts.

In addition to these 'inside' determinants, there are two outside forces shaping the environment of firms and industries, namely:

### 5. Government

In Porter's reasoning, 'Government', through its policies, can affect any of the four determinants of competitive advantage. Government is involved in the creation and upgrading of certain factors of production, e.g. building projects around transport infrastructure and education of qualified people. The main task of the government is to assure that the **investments in the infrastructure** are maintained in order to sustain the formation of the dynamic comparative advantage of firms. However, Porter's home-country, the US, is not the best possible example of investments in the traffic and energy infrastructure. The best example is certainly **Germany**. Instead, the US is a glorious example of immaterial investments in the R&D infrastructure, education and development of information systems. The SCP paradigm uses the concept 'Public policy'. There is a major difference in the context. **Porter accepts government's intervention as a Harvard professor that is not in line with the long tradition of the Harvard as the main advocate of market liberalism.** The counterargument is given by Paul Krugman who does not regard nation states as subjects of global competition (Krugman, 1999).

## 6. Chance

Chance events include breakthroughs in technologies, discontinuities in input costs (e.g. energy price shocks), external political shocks, etc. Such events create discontinuities that reshape structures of existing industry and, thus, create new ones. By including chance as a model element, Porter tries to make his model more dynamic. This is not probable because the context of chance is about the same as the residual of the econometric models of neoclassical economists, e.g. the neoclassical growth model of Solow (2000). From that perspective breakthroughs in technologies that are Schumpeter's prototypical innovation and the sources of creative destruction, are exogenous to the core elements of Porter's model. **The Schumpeterian entrepreneurship is fully excluded from Porter's model.**

The primarily reason for the regional clustering of firms is not firms' intended strategic decisions of location but the **global trend of urbanization**. Porter views collective decisions of location as a part of the empire building of multinationals (endogenous) when the models of Marshall and Krugman assume that the growth of industrial district is primarily **exogenous**. The world-famous **Silicon Valley production system** is a good combination of the US government's military R&D policy since the World War II. The US federal government's military budget is exceptional worldwide. Geographical proximity can be expected to serve the incubation of new technologies. As firms expand their competitive markets scope, their activities move out of the region generating 'spread' of technological innovations, e.g. in the form of outwards FDI, globally. Krugman (1991, 1995, 1998) has proposed the increasing returns to scale (through backwash) and the expansion to other nearby areas (through spread). Today, universities' research laboratories are 'spread' throughout regions worldwide. This can be done to reduce production costs, to create distribution and logistical channels, and to outsource non-core production of e.g. components worldwide.

Globalization has certainly enabled firms' **global geographical reach** in trade, investments, and competition. The globalization process in this form is driven by the advances of information technology (IT) that makes it easy to maintain the global, real-time information exchange. One example of that is Linus Torvalds, the famous Nordic actor, who has opened windows of opportunities for the open-source software. The growth of transnational organizations of states, such as the EU and the UN, have not created such conflicts between national identities and the evolving transnational or global identities that many socio-economists have expected (Karliner, 1997; Korten, 1995). To certain extent, the global super culture exists. Businessmen, politicians, scientists, pop-stars and students are examples of groups of people that are global in their minds. **The multiculturalism has been a strong asset for multinationals.** For instance, Nokia's slogan "connecting people" and the related globalization process in the 1990s was the best sort of multiculturalism. Still today, mobile phones are very popular in the Sub-Saharan Africa where they are widely used to complement market deficits.

The required dynamism in Porter's model is achieved only through positive interactions between all of the diamond elements, since the elements are mutually reinforcing. For instance, Porter uses to claim that the geographical proximity of firms enhances the interactions between the four determinants of the diamond and promotes competition and cooperation. These kinds of ideas are not unique, since they have been known since Marshall (1920) and been replicated in the New Economic Geography (Krugman, 1991, 1995, 1998). Porter claims: **Localization economies, not urbanization economies, draw on information flows.** Being near competitive suppliers, a firm may enhance its knowledge of industry operations.

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Porter's approach for clustering is relevant to the US in which most of firms are domestic-market-oriented. German companies are far more global. The **Transnationality Index** (share of foreign operations in personnel, assets and sales) is for **ABB** and **Linde** over 85% and for famous US firms much lower: General Electric 52% or General Motors 48%. In the US only some SMEs are internationalized, e.g. Gibson Guitars and Harley Davidson (Schuman & Himmelreich, 2011). In Germany there are near **400,000** internationalized SMEs (Mittelstand) and about **100,000** of them have production operations (FDI) (Venohr & Meyer, 2009). They are the main architects of German regional clusters by the **bottom-up-approach**. Canada besides the US is far more internationalized than the US. Canadian companies are integrated with the US and, therefore, the home-market-based clustering in no more valid.

**The validity of Porter's diamond has been challenged by Rugman (1991) who discusses about a *double diamond*. He notes that Porter's view about firms being able to succeed with a strong home country base may still be true for the US, but it is at least 30 years out of date for Canada, whose firms are highly integrated with the US.**

The US small and mid-sized firms are mainly isolated from the global value chains (Porter, 1985). They are mainly doing business in domestic markets in the US. The US has been in crisis for past two decades because of excess home market dependence of small and mid-sized firms. Hamel (1991) has claimed that the **hollowing-out process** of the big US industrial firms, the reallocation of activities can lead to the loss of skills and competitiveness of the US economy. This is certainly the main reason why small and mid-sized in the US are not attractive partners to the US industrial giants. Hamel believes that a short-term strategic horizon may mislead firms to cut down their jobs to better their competitiveness on the expense of developing the people-embodied skills for the long-term leadership. A short-term relocation of activities hides the costs of outsourcing and raises mobility barriers to the future technology leadership in the US. The US senate, which even in normal circumstances is ready to intervene in the imbalances of international trade, has reacted to the hollowing-out process of US industry by working on bills to restrict excessive outsourcing. The argument is that the relocation is a process of knowledge codification, where knowledge becomes increasingly ripe for imitation by competitors in China and India (Reich & Mankin, 1986).

**According to Porter (1990), firms in an industry can gain a permanent competitive advantage by maintaining the diamond, the most productive use of resources. How much this was true in the case of the US financial cluster when financial executives popped the housing bubble and the US government saved banks by huge bailouts? The neo-Schumpeterian view is: It is only through innovations that an advantage can be sustained. As Krugman (1998) claimed, *nations are not the subjects of competition*.**

**Porter's (1990) diamond fit well with the US's "legitimate interest" to support big U.S firms that are "too big to fail". This is against the WTO non-discrimination rule and a sort of American nationalism. According to Porter, firms in an industry gain competitive advantage, if they can maintain the diamond, the most productive use of resources.**

However, it is only through continuous innovation that the advantage can be sustained. The required dynamism is achieved only through positive interaction between all of the diamond elements, since the elements are mutually reinforcing. What the positive interaction is like in practice is more or less of an open question. Porter only repeats some ideas of the New Economic geography and Industrial Organization Economics. For instance, the geographical proximity of firms enhances the interaction between the four determinants of the diamond and promotes competition and cooperation. This cluster hypothesis of Porter is not unique, since regional agglomeration has been the central topics in classical and neoclassical economics, especially that of the economic geography.

**The summary of the key ideas of the New Economic Geography and the Industrial Organization Economics presented by Porter is not unique since Alfred Marshall discussed of both in the first decades of the 20<sup>th</sup> century. Porter's model includes also immaterial factors of production but so do the modern economics in general.**

As Porter puts it, successful firms are frequently concentrated in particular cities or states with a nation. Porter's accepts a local or national initiative but takes pains to differentiate cluster strategy. Industry clusters are built not only on the physical flows of inputs and outputs, but on the exchange of information, technological know-how, etc. The interaction between closely located firms with some common ways of communication makes the transfer of tacit knowledge easier. Trust is important for such kinds of transactions. Porter believes that localization economies, not urbanization economies, draw on **information flows**. Being near competitors and mutual suppliers, a firm enhances its knowledge of markets and permits employees' specialization. Porter's diamond is relevant to big countries like the US. Its relevance for small and open Nordic countries is far from being verified. An alternative concept is Erik Dahmen's (1986) development block that is more entrepreneurial in terms of Schumpeter. Internationalization is vital to small and open countries like In the Nordic countries in sourcing of new radical innovations.

**The validity of Porter's diamond has, at least partly, been challenged by Alan Rugman (1991) who discusses about a double diamond. He notes that Porter's view about firms being able to succeed with a strong home country base may still be true for US, but it is at least 30 years out of date for Canada, whose firms are highly integrated with the US.**



Through sharing a common cognition of global markets, clustering of firms can maintain rigidities in terms of Edith Penrose that prevent investments in truly radical innovations, which tends to invalidate the existing pools of talent, information, suppliers, and infrastructure. The global demand for innovative products in knowledge-based industries is high and growing rapidly; yet the number of workers who can contribute to producing and commercializing new knowledge is limited to just a few areas in the world. There are two fundamental characteristics of knowledge that differentiate from the traditional factors of production in the traditional economy (Henrekson and Johansson, 1999):

1. Knowledge has increased the importance of geographic proximity
2. A great degree of uncertainty, asymmetries and transactions cost lead to an increased role of entrepreneurial activity.



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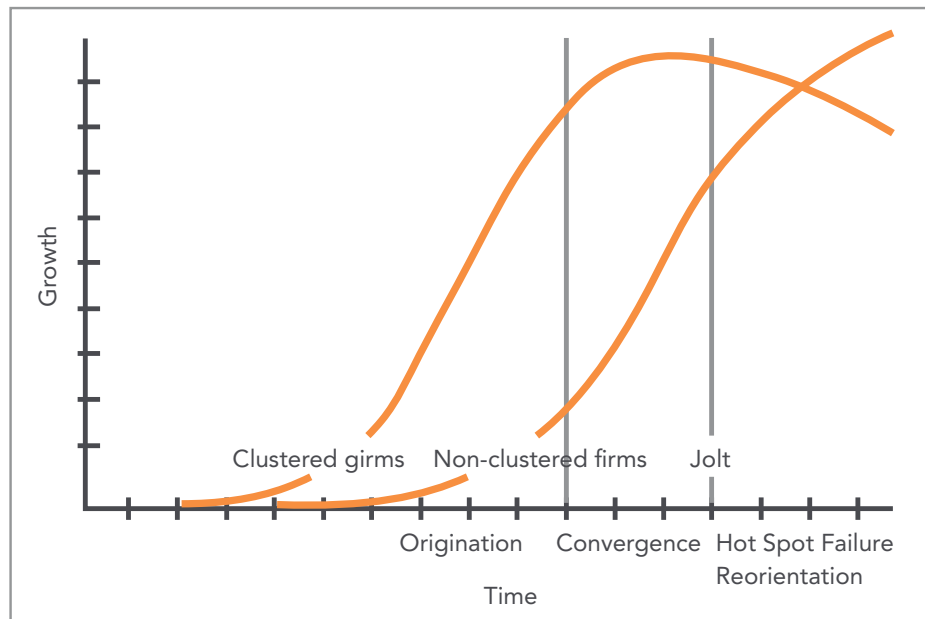
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The geographical area that seems to catalyst global growth is only a marginal part of the whole global base. The knowledge intensive or network intensive regions are potential winner of the global game. They can be called **Hot Spots**. In the same way there are regions that can be called **Cool Spots**. In order to understand the new growth theory, the hot spots are useful object of analyses. In the model, Pounder & St. John (1996) have three evolutionary phases of hot spot that pattern the model: (1) Origination of the cluster and emergence of the hot spot identity, (2) Convergence of clustered firms, and (3) Firm reorientation, which includes a decline in the performance of hot spot.

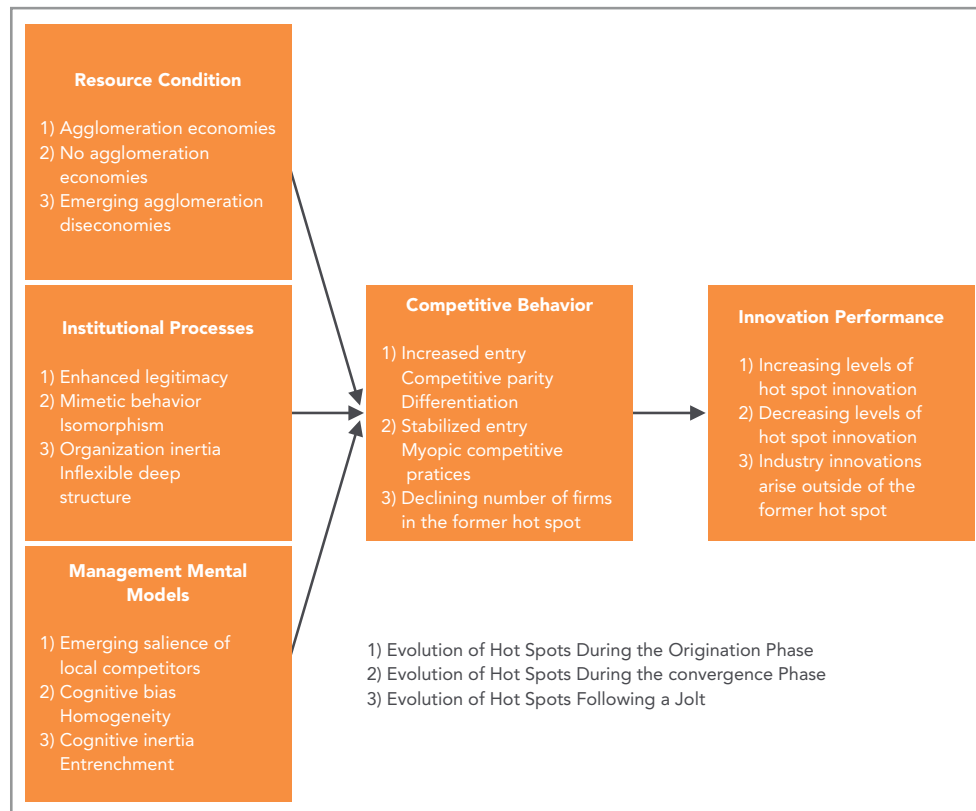
Do we have regional life cycles in parallel with technological or demand based seems evident. Evidence has shown that geographic concentration of firms or hot spots, such as Route 128 in Boston, Massachusetts (minicomputers) or the Minneapolis, Minnesota (mainframes) have experienced great declines in growth, accompanied by economic devastation. This rise-fall pattern suggests that some geographically clustered groups of competitors may experience evolutionary phases similar to those experienced by larger industrial population. The specific characteristics of hot spot is that it is regional cluster of firms that (1) compete in the same industry, (2) begin as one or several start-up of firms that, as a group, grow more rapidly than other industry participants, and (3) have the same immobile physical resource requirements.

**Not all geographical clusters of competitors become hot spots.** Firms that are located near one another in order to capture a local market opportunity would not constitute a hot spot. For example, managers of hotels, retail establishments, and restaurants consider the availability of customers when making location decisions, but these firms would not form hot spots. Hot Spots have their dynamics in the personal relationships, educational background and culture of managers, entrepreneurs or specialists. Drawing on Pounder & St. John (1996), we may assume that hot spot initially grows faster than the industry, but then it experiences declines not felt by the competitors outside the hot spot (Figure 4).



**Figure 4:** Hot Spot versus Non-Hot Spot Growth

Clustered firms are successful in the origination stage when there are a lot of opportunities for growth. But although we know that there is a kind of **economies of timing**, it is difficult to identify the emergence of a cluster before it occurs. Clustered firms are more successful than non-clustered in the early stages of life cycle of pioneering inventions. In the origination state, essential elements are agglomeration of economies, enhanced legitimacy and emerging salience of local competitors that through entry, competitive parity and differentiation catalyst innovativeness of hot spots. The theoretical framework of fast-growing, geographically clustered firms within industries can be found in Figure 5.



**Figure 5:** A Model of a Hot Spot

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## 2 GLOBALIZATION

### 2.1 INTERNATIONALIZATION OR TRANSNATIONALIZATION

#### *Some of the international trade theories*

The predominant driving force for international trade theories is interregional divergences in supplies of primary factors, technology and patterns of demand.

David Ricardo is the father of the **classical inter-industry trade theory**. Ricardo was also the first classical economist who developed the model of resource-based comparative advantage in international trade over regions. Countries tend to export goods where they have relatively large amounts of the factors intensively used in producing them, and to import goods which they cannot produce themselves. **Comparative advantage** refers to the ability of a party to produce a particular good or service at a lower marginal/opportunity cost over another (Ricardo, 1817). Even in the case when one country is more efficient in the production of all goods (absolute advantage in all goods) than the other, both countries will still gain by trading with each other, as long as they have different relative efficiencies (Baumol & Binder, 2011). **Ricardo's comparative advantage highlights the uniqueness of country-specific resources.**

It was against the supply side of the structural features alone that Adam Smith and David Ricardo set out to theorize the phenomenon of international trade and its benefits. Smith introduced the doctrine of **absolute advantage**, which is built on the economies of scale through an extended markets. Smith's notion is relevant, since globalization of markets has brought economies of scale in the front line of trade. Ricardo's **comparative advantage** has been the basic concept of international trade from the 1880s, the decade of the second industrial revolution, to the 1980s. By specializing in production and by trading, industrial countries of today (the EU, the US and Japan) have increased their BNIs. Since the mid-1990s, when the WTO was established, the industrial countries have oriented towards Smith's absolute advantage.

**Porter's (1990) model includes a hidden mercantilism (Coleman, 1980). A cluster is supposed to be a closed system of its core elements, which determines the competitive advantages of a nation. The key concept propagating openness in international trade is the Ricardian comparative advantage, which can be found in the accumulation of the factors, where the nation has the most favorable comparative costs.**

Ricardo's idea is encouraging since all countries can gain by trading in every commodity. Precisely the same logic applies to an individual firm. Ricardo's concept of comparative advantage can be interpreted as a firm's competitive advantage, the **combination of firm-specific and country-specific resources**, and as the means to positioning in markets. Ricardo used the **opportunity cost theory**. A country should specialize in production of that product (or service) whose costs for failure to produce it is higher than that of the second alternative. A country would produce more of the two products than the other countries (absolute advantage) or specialize in producing that product in which it has an advantage in the utilization of the available resources in international trade (comparative advantage). Comparative advantage is a static theory and it does not account for the possibility of advantage through innovations, and, thus, does not provide guidance for the long-term economic development. The theory of comparative advantage, and the corollary that nations should specialize, is criticized in the case of the **import substitution industrialization** (Krugman, Obstfeld & Melitz, 2012) that advocates replacing a part of the foreign imports with domestic production. It is based on the premise that a country should try to reduce its foreign trade dependency through its industrialization (List, 1841).

**According to Ricardo's famous notion, a country gets advantage from specializing in what it was best at producing and trading with other nations. *Import substitution industrialization* policy refers to a German economist Friedrich List (1789–1846)<sup>11</sup>, a development economist in the 19<sup>th</sup> century, who developed the “National System” (compare List, 1841; Freeman, 2008). List is the economist who is considered to be behind the vision of the EU common markets (Wintle, 2002).**

Ricardo's overall model was reformulated by the Swedish Nobel Prize winner Bertil Ohlin from the year 1977. The **Heckscher-Ohlin model (H-O model)** (Ohlin, 1933) is the mathematical general equilibrium model of international trade. Eli Heckscher<sup>12</sup> was credited as co-developer of the model, because of his earlier scientific ideas were integrated into Ohlin's doctoral thesis that he supervised. It was built on David Ricardo's theory of comparative advantage by predicting patterns of trade and production based on the factor endowments of a trading region. In Ricardo's model, trade is motivated by differences in labour productivity. **The H-O-model predicts trade patterns based on relative factor advantages.** A country with a relative abundance of one factor is expected to produce goods that require a large amount of that factor in their production.



The original H-O model is an alternative explanation for free trade to Ricardo's model, rather than a complementary one<sup>13</sup> since each country has its natural advantages in the production of various products in relation to one another. The infrastructure, education, culture, and know-how of countries differ. The idea of identical technologies is a theoretical assumption. Ohlin understood the **critical importance of the economies of scale** that are external to the firm but internal to the industry or the region. Examples are skilled labour force, specialized suppliers and technological know-how. When economies of scale are significant, countries with few differences in technology, and hence in production costs, will gain from specialization in **intra-industry trade** in which countries trade similar, but often highly differentiated products with each other, e.g. simultaneously importing and exporting different marks of cars. Ohlin's model has been of critical importance to the Nordic countries in their success in international trade from the 1880s to the 1980s.

**Intra-industry trade means an increasing dependency on international markets when countries and industries source at lower costs making them more competitive<sup>14</sup>. Ohlin introduced the concept of variable capital endowments, recreating endogenous inter-country variations in labour productivity that Ricardo supposed to be exogenous.**

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Intra-industry trade has evolved as an important macro-economic practice, promoting innovation and increasing the number of differentiated versions of the same type products in markets of the trading partner countries. The H-O-model is generally accepted as a theory of trade. Empirical research has produced a number of results. Some of them do not match the expectations of the model. In the 1950s, Wassily Leontief<sup>15</sup>, a Nobel-prize winner in the year 1973, tested the model in the US and found that **a capital-abundant country exported labour-intensive and imported capital-intensive commodities** (see Leontief, 1986). However, the problem of the so-called Leontief's paradox is not the H-O theory as such, but perhaps the concept of capital of orthodox economists. The US has its advantage in the highly skilled labour. This can be seen as the intellectual capital. Using this definition, the exports of the US is human capital abundant, not particularly unskilled labour abundant. During the wartime the US economy oriented towards innovations and human capital, which is the historical reason for the **Leontief's paradox**.

Staffan Burenstam Linder is a Swedish economist who tried to solve the Leontief's paradox, which questioned the empirical validity of the H-O-model. Linder did not succeed in that. Linder (1961) hypothesized: **Demand plays a more important role than comparative advantage in trade**. In Linder's model, a pattern of trade is determined by the aggregated preferences for goods within a country. Demand-based international trade arises from **consumers' taste of variety**. This aggregate taste for variety arises because individuals have a different specification of their ideal variety. **Countries with similar preferences are expected to have about the same structures of industries**. In terms of Chamberlin (1933), there are many monopoly elements in international trade. Aggregated tastes for certain product can emerge simultaneously worldwide which provides huge prospects for certain commodities (e.g. Nokia's and Ericsson's mobile phones in the early 90s).

**Linder's (1961) demand-driven explanation is a complement of factor-driven explanations (Ricardo; Ohlin). Historically, the supply side view has dominated international trade theories.**

Although the wording of the terms 'inter-industry' and intra-industry' trade is very similar but they have a different meanings. Inter-industry trade is a trade of products that belong to different industries. Countries engage in inter-industry trade according to their competitive advantages. Intra-industry trade, a trade of products that belong to the same industry, has been the key factor in trade growth during past decades. These trends have been attributed to the fragmentation of production (outsourcing and offshoring) as the result of globalization and the rapid adoption of new production technologies. This implies that countries become more dependent on demand from foreign countries but also that countries are able to source intermediates from different countries, an activity referred to as offshoring.

**Intra-industry trade increases the variety of products of the same industry**, which is beneficial to consumers, and gives firms a chance to benefit from the economies of scale as their comparative advantages. Intra-industry trade is important for dynamics in global markets since it stimulates innovations in the whole value chain. The main benefit of intra-industry trade can be explained in simple terms by using the car trade between Japan and Germany as an example (see Krugman, Obstfeld & Melitz, 2012). Japanese cars are mainly family cars, and German cars (e.g. Audi) are sport cars. Accordingly, when Toyota produces more family cars, the lower will be the unit cost, and similarly, when more sports cars are produced by Audi, the lower unit price of the car will be. Japanese and German car manufacturers can increase their competitive positions by collaborating in radical technologies, e.g. fuel cells. As a result the modern automotive is technically very advanced and the product assortments available for consumers worldwide are simply mazing. The modern automotive is again a highly appreciated article in trading both in international inter- and intra-industry trade and in local retailing markets.

Monopolistic competition theory of trade has been developed by Avinash Dixit and Joseph Stiglitz (Dixit & Stiglitz, 1977) who analysed increasing returns, and provided the foundations for the theoretical framework for the combined analysing of economies of scale and product differentiation. The resulting interaction between the demand for product variety and the economies of scale leads to intra-industry trade (Helpman & Krugman, 1985). To Krugman increasing returns are a fundamental cause of international trade, but the role of increasing returns has earlier been neglected because of the problem of modelling market structures (Krugman, 1979, 1980). Monopolistic competition does not predict in which country firms locate, but a comparative advantage in producing the differentiated good will likely cause a country to export more of that good than it imports. Krugman calls his of model the **New Trade Theory**.

**There are dynamic scale economies inside firms providing incentives for international specialization and trade. A firm engages in trading intermediates when it technologies are compatible but comparative with potential partners. This is the foundation of the German success model.**

Paul Krugman is a professor of the Princeton University and the London School of Economics, and a columnist for The New York Times. In 2008, he was awarded the Nobel Prize for his contributions to trade theory and economic geography. In particular, the prize committee assed as his main contribution: ‘his analysis of the effects of economies of scale, combined with the assumption that consumers appreciate diversity on international trade and on the location of economic activity.’<sup>16, 17</sup> Krugman has written vastly on international economics including international finance.

Krugman placed geographical analysis in the economic mainstream. In his theory, transportation costs are a key feature of the **home market effect** that states that, *ceteris paribus*, a country with the larger demand for a good shall, at equilibrium, produce a more than proportionate share of that good and be a net exporter of it. When there are economies of scale in production that are interpreted as the building blocks of ‘permanent’ cluster, it is possible that countries may become ‘locked in’ to disadvantageous patterns of trade (see Krugman, Obstfeld & Melitz, 2012). Economies of scale imply that more output at the firm level or inside a value chain (Porter, 1985) causes average cost to fall. Trade is beneficial even between similar countries, because it permits firms to save on costs by producing at a larger scale, and because it increases the range of brands available and sharpens the competition between firms<sup>18</sup>. The **home market effect contains an agglomeration effect of increasing returns, trade costs and factor price differences.**

**Instead of spreading out evenly around the world, production will tend to concentrate in a few countries, regions, or cities, which will become densely populated but have higher levels of income<sup>19</sup>. This is a feature in Krugman’s work on the *New Economic Geography*. Paul Krugman is one of the leading economists that has competed the Marshall’s triad<sup>20</sup>.**



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***Product-life-cycle theory of trade and investment***

Besides theories of the functions and benefits of international trade, there are theories that try to explain the dynamics or process of international trade. Raymond Vernon (1966) has proposed the **product-life-cycle theory of trade and investment** that is parallel with the concept widely used in marketing<sup>21</sup>. Vernon noticed that since the 1950s new products were initially introduced in a high-income country, notably in the US and spread to the world, first to other advanced countries, and later to developing countries. As products mature<sup>22</sup> and become technologically standardized, the US, the initial exporter, will lose its export markets and become an importer of the product. Vernon, attempting to explain patterns of international trade<sup>23</sup>, observed a Schumpeterian type circular pattern in the distribution of trade over countries in the world markets.

**Vernon's product cycle model is fundamentally production oriented and applicable for massproducts, since the model ignores trade of intangibles such as services or brand names.**

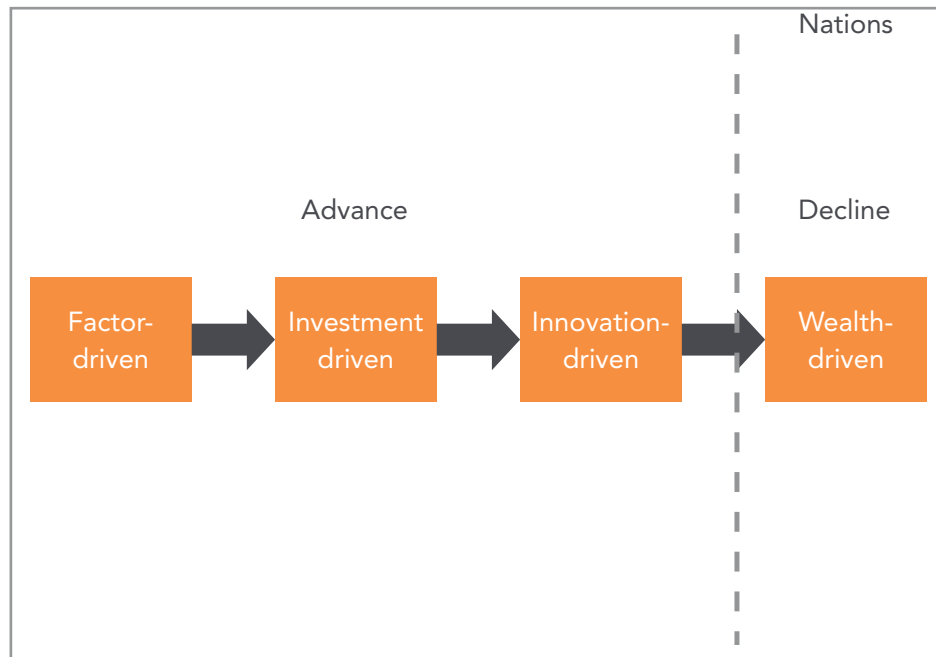
Because of the imperfection of markets, the international markets are mosaic and the country-specific characteristics only partly determine what the efficient pattern of trade is. What is generally valid in Vernon's thinking is that the comparative advantage of a country is **dynamic**. At a particular stage of economic development, a country poses a unique set of basic production factors, technologies and knowledge to which the evolution path of a country is compatible. Whether a country's life-cycle model follow a **sequential pattern of stages** is difficult to know. Liberalization of international trade and the growing amount international investments have led to a situation where a country's production capacity depends much less on the basic factors of production (i.e. natural resources, capital, and labor) included in the comparative advantage.

What is the pattern of evolution of countries in the global economy is a vital question. Porter (1990, 545–565) suggests four distinct stages of national competitive development (Figure 6):


1. **Factor-driven.** Any of the internationalized industries have drawn their competitiveness from factor conditions, such as low-cost labor and access to national resources. Firms typically produce commodities more than specialties. The rate of technology and R&D investments is low. The local economies are highly sensitive to fluctuations in commodity prices and exchange rates. There are only a few truly international firms. Domestic demand for exported goods is modest. The role of foreign firms is big, as they are channels for foreign markets and they bring foreign technology, knowledge with them to the host country. Technology is assimilated through imports, imitation, and investments.

2. **Investment-driven.** In the investment-driven stage, countries develop their competitive advantages by improving their efficiency in producing standard products and services, which become increasingly sophisticated. While the advanced technology still comes mainly from abroad, with licensing and joint ventures, local firms' invest in process technology and modernization of production facilities etc. Firms often produce under contract to foreign manufacturers that control marketing channels. Home demand is still rather undeveloped, and related and supporting industries are not functioning optimally. It is typical to this stage that wages and input prices are higher than before and employment is increasing. Public policy concentrates on long-term matters. One of the major areas are infrastructure projects. Harmonization of customs, taxation, and corporate law may allow the economy to integrate more fully with global markets.
3. **Innovation-driven.** In the innovation-driven stage, the number of industries operating successfully at international level increases and broadens. Firms create new technologies and methods and compete with low costs due to high productivity rather than low production factor costs. Home demand increases and becomes more sophisticated. Clusters are well developed, fostering innovation and technological change. A country's competitive advantage lies in its ability to produce innovative products and services at the global technology frontier using the most advanced methods. Institutions and incentives supporting innovation are crucial for further development. The economy becomes stronger against outer shocks, like cost shocks, because of its ability to compete with technology and product differentiation. Improvements related to externalities, market imperfections and incentives are important to develop the well-functioning factors, product and financial markets.
4. **Wealth-driven.** Unlike other stages the wealth-driven phase is driven by past accumulation of wealth and becomes unable to generate new wealth. Firms become more vulnerable to uncompetitiveness. They innovate less and the investment rate decreases. Employees begin to lose motivation and so on. The result is that firms lose competitive advantage compared with foreign firms and may even start to move their headquarters from their original home country to other countries. The standard of living and welfare is still rather high. The policy attempts in this stage try to increase the dynamism of the economy, innovations and profitability.





**Figure 6:** Porter's model of the competitive development of nations



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The first three stages involve successive upgrading of a nation's competitive advantages and is associated with progressively rising economic prosperity. The wealth-driven stage leads to the decline of competitive advantages of a nation, because the driving force in the economy is the wealth already been achieved. An economy driven by past wealth cannot maintain its dynamism since the motivation of investors, managers, and individuals may undermine sustained investment and innovation. The transition through the four stages is not automatic since countries may get stuck in a stage. In Africa investment-intensive economies such as South African republic are finding that their relatively high-cost labor make them vulnerable to competition from really lower-wage countries, especially China.

**Porter believes that the predominant pattern of the competitive advantage model of a country, through its firms, poses at a particular time<sup>24</sup>.**

In the factor-driven stage, the competitive advantage in the production of either primary goods or labor-intensive goods is different from the investment-driven stage or from the innovation-driven stage. Thus, the transition from the factor-driven to the investment-driven stage generates outward investments towards lower-wage countries in labor-intensive manufacturing, particularly if the critical competitive edge happens to be organization of mass production. The transition from the investment-driven stage to the innovation-driven stage brings about simultaneously inward investments in technology-intensive industries and outward investments in intermediate goods industries. In the global economy, any country, if it is serious about raising its standard of living, must open its economy so as to avail itself of opportunities of trade, interact with and learn from the already advanced. Japan's post-war structural transformation clearly demonstrates the rapid evolution through different stages (Ozawa, 1991). From US viewpoint, Rugman (1991) the identification of clusters and the four stages of economic development that are justified.

What is the validity of Porter's model of economic development is the major concern. The global economy is not only economic in its nature. These phases cannot be separated too accurately. However, they describe the main components to which a country's economic and industrial competitive development at certain stages is based on. These phases also reflect the sources of advantage of a nation's enterprises in international competition and the nature and extent of internationally successful industries. The growth firm in the EU is a major challenge to be tackled. In the global markets, the mix of relevant mobility barriers is, perhaps, different from that of the GATT period from the World War II to the year 1995. In the new paradigm based on the emergence of knowledge economy the importance of access to and the use of knowledge increases. Globalization, on the other hand, means increasing competition and also emphasizes the importance of specialization and the use of local comparative advantages. The global economy has its dark side. Substituting labor with capital and technology, along with shifting production to lower-cost locations has resulted in waves of **corporate downsizing** throughout Europe and North America (Baily, Bartelsman, and Haltiwanger, 1996).

**Michael Porter (1990) introduces his stage-theory of the competitive development of nation. Porter relies on the product cycle theory like Vernon. Both models are tentative more than empirically grounded. The key of a country's global competitiveness are firm-specific, competition-related factors and the advantages created by firms themselves<sup>25</sup>.**

Of the all the Nordic countries, Finland is a special case. In the 1860s, a part of Finland's adult population died of hunger. Later, Finland has gone through the civil war (in 1918) and to wars against the Soviet (in 1939–1940 and 1941–1944). Today, Finland is among the winners of global economy. There is much to learn about Finland's application of the Heckscher-Ohlin theory. Finland is a country that, as a whole, has benefited from specialization and international trade. One of the cornerstones of Finland's economic policy has been the **high priority given to the industrialization**. This policy was dominant from the war time to the 1970s, when Finland's export was factor-driven. The government was obliged to devalue the Finnish mark to maintain price-competitiveness. As consequence, the domestic demand was weak and wages low. Finland's export industry<sup>26</sup> was well positioned in the international trade. As the Heckscher-Ohlin theory advises, Finland's export industry invested in monopoly profits, earned by the continuous devaluation of Finnish mark, **to develop and adapt the most advanced industrial technology, and to increase productivity of processes**. The difference it made in industrial technology was extremely advantageous to Finland's export industry in the production of specialized products.

From the war time to the 1970s, all groups in the Finnish society, workers and capitalists, invested their resources to improve Finland's export industry's comparative advantages, an excellent example of the wisdom of the Heckscher-Ohlin theorem. In the 1970s and 1980s, Finland moved with a bold jump from a factor-driven nation to an investment-driven nation. Finland's international trade was planned to lead the country to specialize in producing goods that require lots of capital and little workers. But the boom in the Finnish economy, due to the specialization in export, led to huge increases in wages which decreases the income of the capital owners. In the beginning of the 1990s, the whole economy was near collapse because of the low price-competitiveness of the export industry.

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## 2.2 NORDIC SCHOOL OF STAGE-THEORY

### *Uppsala Model*

Much of the firm-specific internationalization process research done has been based on the **Uppsala-model**. The main developer of the model has been Jan Johansson who together with Finn Wiedersheim-Paul (1977) and Jan-Erik Vahlne (1975) developed the process model to include a sequential pattern of entry into successive foreign markets. Johansson & Wiedersheim-Paul (1975) have concentrated on Swedish MNEs. Their stage-model of internationalization is called the **establishment chain**. This name is logical since the model has four incremental stages:

1. No regular export activities,
2. Export via independent overseas agent,
3. Overseas subsidiary and
4. Overseas production/manufacturing.

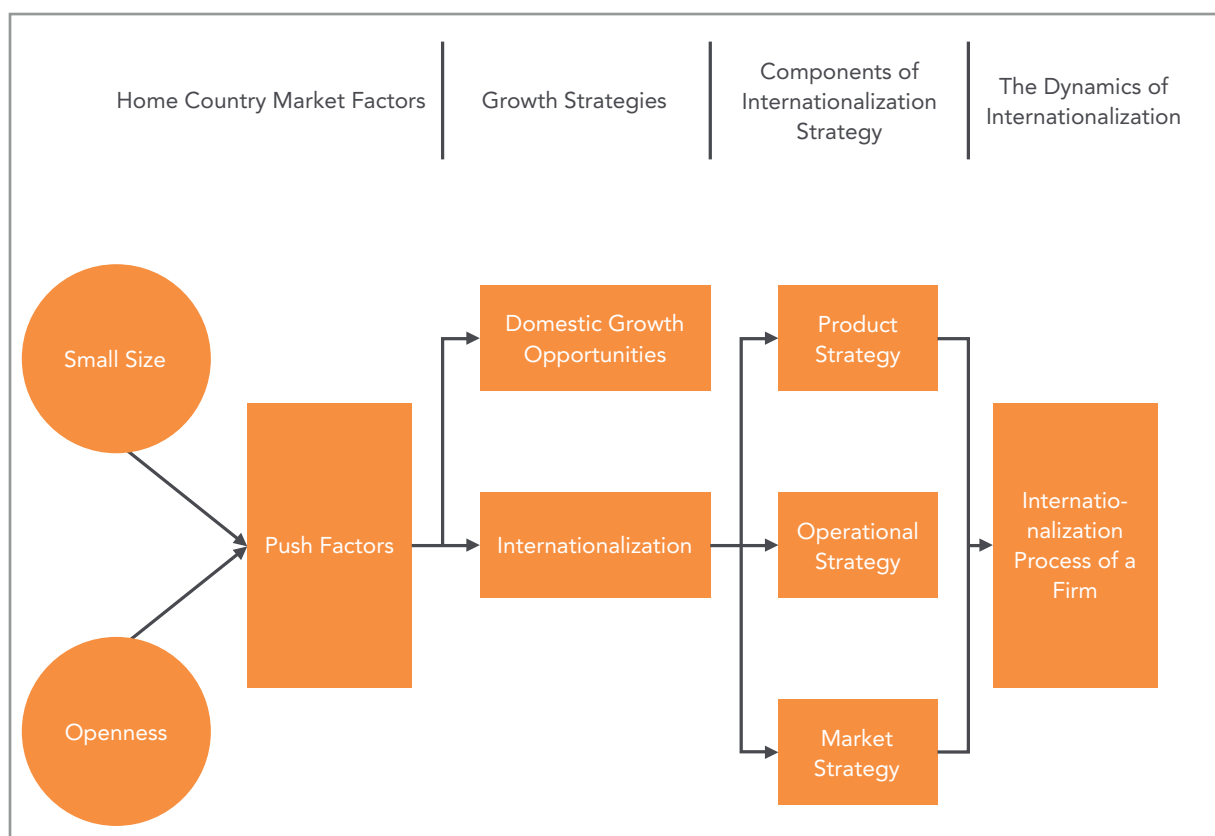
This stage-model includes very much what the Nordic industrial firms did in the first decades since the wartime. Later, Johansson & Vahlne (1977) constructed a model of internationalization known as the **Uppsala Internationalization Model**. The model is not basically deterministic. A firm's internationalization process is supposed to be a continuous process of adjustments to the ever-changing international markets. Because of the Schumpeterian dynamics and Knightian uncertainty in the international markets, a firm cannot make optimal decisions of its internationalization. The model presumes that the greatest barrier to internationalization is the lack of knowledge of foreign markets and operations. The main assumption is: Knowledge can only be acquired through experience in foreign operations.

The building block of the model is the **progressive deepening through learning-by-doing**<sup>27</sup> of a firm's commitment in each of the entry markets. Thereby, the internationalization of a firm is a **gradual and sequential expansion process** driven by the interplay of market commitment and market knowledge. As the firm increases its knowledge of the market, it may increase its commitment by entering knowledge agreements and finally by foreign direct investment (FDI). The network school of internationalization (Axelsson & Easton, 1992) is closely related to the mainstream pattern the Uppsala-model. The network model has developed the behavioral aspect of decision-making further and attempts to identify the actors, contexts and interaction modes in business interactions. Another extension of the basic model is the concept of **psychological distance** that is the sum of factors preventing the flow of information from and to the market. Examples of the factors are: language, education, business practices, culture and industrial development (Johanson & Vahlne 1977, p. 24).

### *Luostarinen's model*

Reijo Luostarinen has developed a parallel model with the Uppsala model. Luostarinen (1979) made an extensive study, including almost all Finnish exporters in that time, accounting for 92 % of total exports. Luostarinen's approach is holistic. He includes factors characterizing the domestic markets of firms. In Finland the domestic markets are small, peripheral and even open, when the situation is different in big countries, like the US. Luostarinen interprets this fact so that **Finnish firms are “pushed” into internationalization**. This country-specific stages theory is interesting, but not well theoretically grounded, since the main topic, the new Economic Geography, has never been included into Luostarinen's model in a proper way. Concentrating on the firms' product, operation and market (POM) strategies Luostarinen identified a systematic and consistent pattern of internationalization, which came to be known as the **POM-model**. It is an elaboration of how companies from small and open markets internationalize.

Luostarinen describes internationalization of a firm through three dimensions: product, operational mode and market. (Figure 7).



**Figure 7:** POM-model



With respect to the market dimension, Luostarinen's model is similar to the Uppsala approach. Luostarinen (1979) defines internationalization on a broad way to include not only outward internationalization but also inward and cooperative and later, all types of foreign operation modes (Luostarinen & Welch, 1990; Luostarinen, 1994). Luostarinen refers to Edith Penrose who stresses the importance of knowledge by experience. According to Penrose: 'One type, objective knowledge can be taught; the other, experience or experiential knowledge, can only be learned through personal experience.' (Penrose, 1959, p. 53). The Uppsala approach expects that experiential knowledge of clients, the market, and competitors constitute a subtle change in individuals and thus, cannot be transferred<sup>28</sup>. Luostarinen introduces the concept of **lateral rigidity** as being a major barrier to internationalization. As to the product dimension, the pattern of business operation is related to the export of business systems that combines (Luostarinen 1979, 95–105):

1. **Goods:** the physical output of a manufacturing firm
2. **Services:** planning, supervising, installation, testing, training, development, servicing and maintenance services
3. **Systems:** turn-key deliveries, co-production arrangements and franchising packages
4. **Know-how:** management, technological and marketing know-how, patent, trademark, pattern design and copyright.



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The product dimension is a major contribution since the nature of a product is related to the stage of internationalization. Physical goods are often introduced first by manufacturing firms based on domestic markets offerings. Services complement good providing installation, maintenance, etc. The demand for systems or know-how selling is very much export-specific, since in the home markets, there is a long tradition to include these complex services into the delivery of goods<sup>29</sup>. This affects the Finnish firm's internationalization process, as Finnish firms have no domestic demand for complex services and they are stuck in lateral rigidity.

**Therefore, the Finnish firms have had a historical tendency to gradually deepen and diversify the product offering to include all items in the product strategy (Luostarinen 1979, 94–102).**

The concept of **business distance** is relevant, since firms will tend to first invest in countries culturally similar to their own, which they find easier to understand and, as their international experience grows, move towards those which are culturally dissimilar. A firm must learn the habits, preferences, and the market structure of target countries. This experiential knowledge is a critical resource since it is country-specific and it cannot be easily transferred between firms. Knowledge and experience of international business often determines the market strategy a firm adopts. The choice of a target market country is strongly related to the business distance concept of the Uppsala school. Luostarinen's distance concept is broader and includes **physical or geographical, cultural and economic factors**. He discusses about a “hot” country with a short business distance and a “cool” country with a long distance. Luostarinen (1979) also makes an ambitious effort to further develop the establishment chain of the Uppsala school. The basic division in both is between marketing and production operations. Luostarinen renames these and presents four major steps of outward operation modes (Luostarinen 1979, 109–111):

1. **Non-direct investment marketing operations (NIMOS)**: Indirect or direct operation of goods, service, know-how and project export operations
2. **Non-direct investment production operations (NIPOS)**: Licensing, franchising, contract manufacturing, turnkey, and co-production
3. **Direct-investment marketing operations (DIMOS)**: Sales promotion subsidiaries, warehousing units, service units and sales subsidiaries
4. **Direct investment production operations (DIPOS)**: Assembling subsidiaries and manufacturing subsidiaries

These elements are incorporated into the stages model to define the degree of internationalization as a process. The development of internationalization can be divided into four stages according to the types of product, operation and market patterns used (Luostarinen 1979, 173–195):

1. Starting stage
2. Development stage
3. Growth stage
4. Mature stage

**The transfer from one stage to another requires the utilization of more demanding operation modes and much deeper commitment. This means that a company must make changes in its product, operation or marketing posture. Lateral rigidity is most pertinent in the starting stage.**

It is expected that the firm is moving to more distant markets (measured by business distance) and is using more complex operation modes, such as NIPOS. The final stage, maturity is reached by selling systems and know-how and by utilizing the DIPOS operation mode types. It is also expected that companies in this stage have foreign operations in countries with a very long business distance (Luostarinen 1979, 173–195). The stages model represents internationalization as a result of knowledge and involvement in foreign operations. Firms are expected to have deviations in their internationalization process. Welsh and Luostarinen (1998) point out that in a case of long international experience, the knowledge transfer is flexible and some stages in the chain can be skipped.

**What is unique in Finland is the FIBO (Finland International Business Operations) 30 database. There are, however, a lot of open questions concerning the validity<sup>31</sup> and applicability of the stage-theory.**

## 2.3 MULTINATIONALS, MNCS

International markets have been promising after the war. The rise of open markets for goods as the result of GATT processes and later the globalization of markets for capital, and partly for services and labor, have been understood as a set of processes in economy, culture and society. Globalization as a concept has much in common with internationalization. It was Theodore Levitt (1983) who first discussed global markets and multinational corporations (MNCs). There has been a shift in comparative advantage of international trade away from traditional inputs of production, such as land, labor and capital, towards knowledge. The knowledge intensive or network intensive regions are the potential winners of the global agglomeration economies.

The large home market countries, such as the US, are most frequently the host countries of MNC headquarters. The growth of NMCs in number has been remarkable rapid. In 2012 there were about **100,000** multinationals (Table 4) in the world and **900,000 foreign affiliates** with total assets value about \$57,000 billion and sales about \$33,000 billion. **Multinationals as a firm group account for about 25% of the world GDP, and their total share of the interregional trade of all commodities may at the level of 80%** (World Investment Report 2013). Including the intra-industry in which German Mittelstand SMEs called Hidden Champions are “world-champions” means that the distribution of trade is well in balance in Germany. Germany is exceptional since the internationalization of SMEs has been slow in most of the WTO-member countries. This is the reason why it is important to study carefully the global mobility barriers of SMEs.



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YEAR	NUMBER OF MULTINATIONALS
1969	7,000
1990	24,000
2001	60,000
2012	100,000

**Table 4:** Number of multinationals in 1969–2012

Source: UNCTAD (2001) World Investment Report 2001: Promoting Linkages, New York and Geneva, United Nations. World Investment Report 2013: Global Value Chains [http://unctad.org/en/PublicationsLibrary/wir2013\\_en.pdf](http://unctad.org/en/PublicationsLibrary/wir2013_en.pdf)

Internationalizing the market mechanism because of transaction costs is not a unique idea. Based on his analysis of the industrial history of Western countries from the 1880s to the 1980s, Alfred Chandler (1990) proposed the **concept of economies of speed**. Chandler's concept of economies of speed has much in common with the transactions costs theory. In Chandler's thinking, the idea of speed of throughput has been important in explaining the rise of the large, vertically integrated firms. Chandler emphasizes the role of these firms as the innovators of new technologies. These firms, nowadays MNCs, exploit the potential of economies of scale and scope (Marshall, 1920) made possible by the new technologies of production. The economies of scale depends on the size of capacity and speed (or the intensity) with which the capacity is utilized. Chandler focuses on a managerial process, not the costs of acquiring inputs like the writers of the transactions costs theory.

**According to a modern interpretation of Chandler's (1977) thinking, the reason why a firm decides to internalize its operations can be the threat of transaction costs because of tacitness of intangibles assets. In that case, a firm's management is the Visible Hand, the powerful actor that internalizes the critical part of production.**

Internationalization and economies of speed are closely related to Schumpeterian-based production, which refers to fast-growing, innovative and know-how-based production. Interpreting Chandler's concept, the first movers are often firms that through interrelated sets of investments in production, distribution, and management can achieve the competitive advantages of scale, scope or both. The global first movers, in terms of Chandler's economies of scale and scope, are often MNCs, although this is basically the core area of entrepreneurship. The core managerial competence by MNCs is multi-plant operations. A counter power to MNCs' excellence in internalizing of global markets is the **venture capital approach** (see Lahti, Tom, 2000, 2004, 2008) that centers on the exponential growth of innovative firms. Tom Peters (1990) refers to **fragmented markets**, and proposes a flexible specialization as a strategy, by which he means smaller economic units or firms providing a wider variety of products for narrower markets. Tom Peters declared the time of uncertainty. It was not the first time. Both Joseph Schumpeter and John Kenneth Galbraith made the same declaration after the wartime.

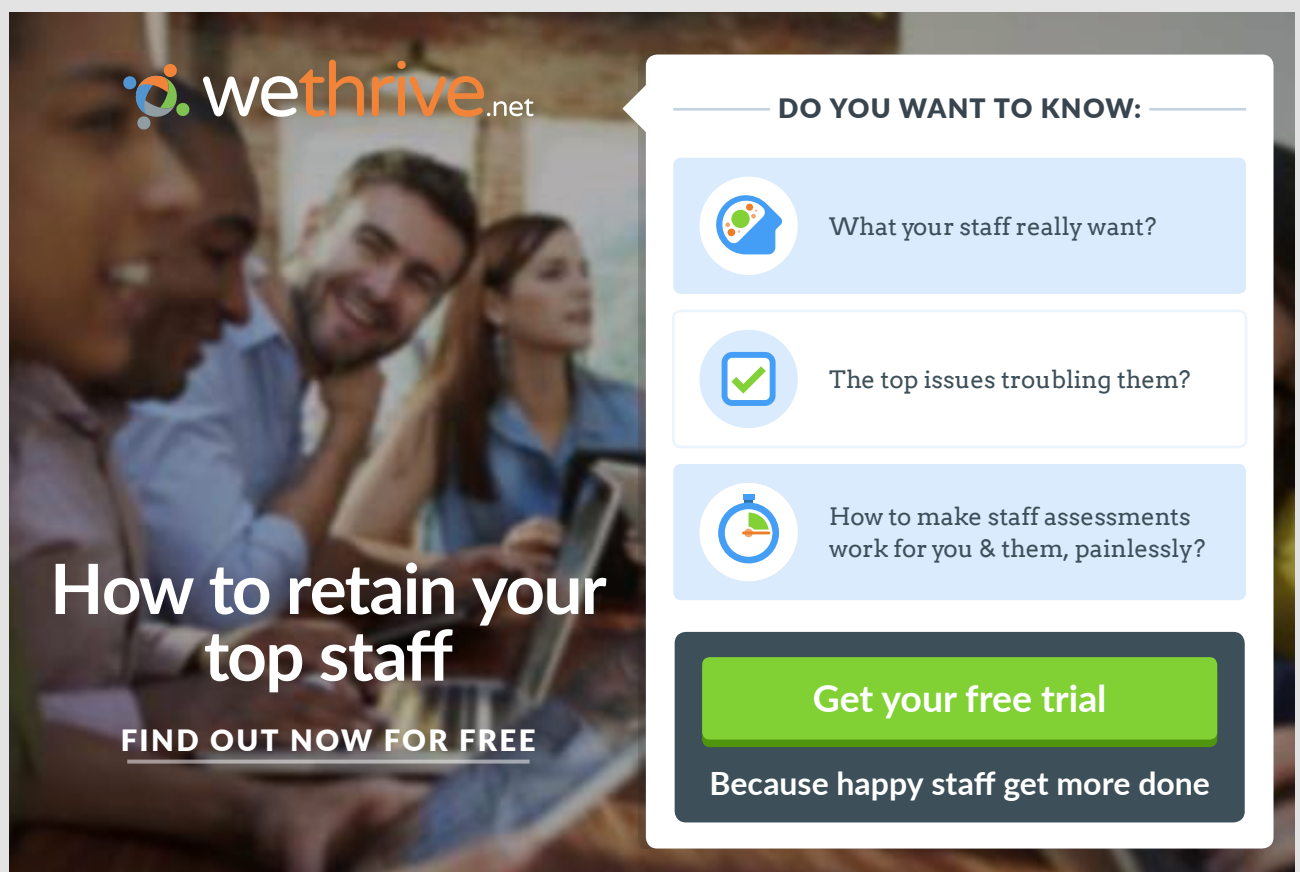
**The Nordic countries specialize in small missions and this narrowing of the global business scope forces firms to make the strategic choice: Internationalize (or globalize) or die (Luostarinen, 1979, 1994). Kenichi Ohmae (1996) predicted that the collapse of nation states is to be expected. Region states with sound socio-cultural structure are the winners of new regional agglomeration.**

Region states constitute fertile ground for innovations, encourage start-ups and may attract inward foreign direct investments (FDI). The geographical areas that seem to catalyze global growth are only marginal parts of the whole global base (Ohmae, 1995, 1996). Digitalization reduces IT costs which will alter the equilibrium of centrifugal and centripetal forces (Krugman, 1995), and the economic landscape. Economic activities are concentrated geographically. Most people in core countries, and a growing number in periphery countries, live in densely populated metropolitans. Ohmae refers to his home country, Japan where the Tokyo metropolitan dominates the global business. Dunning (1993, 1994, 1997) points out that clustering in a geographically limited area may lead to diseconomies of agglomeration since firm-specific advantages are not independent of market structures and institutional environments. National governments play a decisive role in affecting the economic activities located within their borders. They do so both by providing the appropriate incentives for domestic firms to upgrade the quality of their ownership-specific assets; and by ensuring that the location-bound general purpose inputs (including educational facilities and communications infrastructure), necessary for these assets to be fully and efficiently utilized, are available.



### *Market power of MNCs*

Stephen Hymer's dissertation (1976) explicitly recognized the existence of firm-specific assets. In other words, foreign direct investment (FDI) draws on the role of firms as creators and exploiters of intangible firm assets. It was popular in those days, particularly among the general public and the political science discipline, to "see MNCs as big and bad". Hymer was not an exception. He saw MNCs as taking advantage of barriers to entry to earn monopoly profits. Today, MNCs are embedded in practically in all contemporary capitalist societies as the most powerful actors of the Schumpeter's (1942) trustified capitalism. John Galbraith (1967), referring to the US, wrote that **large firms, today MNCs, are a continuation of the US's power system on an international level**. Advertising is the means by which large firms manage demand and create consumer needs where none previously existed. (Galbraith, 1967). Today, global markets are fully dominated by MNCs. Peter Buckley, Mark Casson (1976, 1985), and John Dunning (1993) have developed a more analytical theory that argued that MNCs exist to complement the supply of markets.



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Buckley & Casson (1976, 1985) called attention to advantages which accrue to a firm from **internationalization**, i.e. engaging in foreign production itself. Their theory drew on the **transactions cost theory** which provides the main rationale to explain why MNCs tends to concentrate on certain international operations (e.g. continuous R&D) within their own organizations, rather than to rely on the market mechanism. Global markets are not perfectly competitive. Transaction costs may include costs of seeking buyers and sellers, or costs involved in negotiating, co-coordinating, monitoring, and enforcing contracts. A source of transaction costs is the tacit nature of the firm specific knowledge relating to intangibles assets, such as patents. The essence of globalization for MNCs is **multi-plant operations** and **internal trading system** (e.g. ABB), including long term contracting or R&D to prevent the dissipation of know-how which is not patentable. Internalization allow multinationals to control quality by integrating backwards and internalizing the process to maintain required standards.

**When it is cheaper for MNCs to undertake transactions internally, rather than via markets, *internalization* is preferred or when markets do not function properly, MNCs internalize transactions and organize their own units to supplant markets.**

The catalyst of globalization by MNCs is market imperfections that arise as the result of exogenous variables (externalities) in the product, service and factor markets. These externalities take the form of government induced regulations and control actions. There is a risk of market failures in foreign operations e.g. in Asia, because of the lack of information or knowledge (natural externalities). **MNCs try to overcome negative externalities by internalizing their operations.** Referring to the New IO theory (Caves, 1982), the existence of MNCs engaged in continuous foreign direct investment (FDI) can be explained by some market imperfections resulting from mobility barriers such as proprietary technology, scale economies, control of distribution and marketing systems and product differentiation (Bain, 1956).

Through their FDI, MNCs restructure the markets and the rules of the game by **oligopolistic competition**<sup>32</sup> in terms of Chamberlin (1933, 1956). Even in a global oligopoly, firms are interdependent. They enter a market as a chain action of others<sup>33</sup>. MNCs go abroad to follow their competitors, customers or partners. The relevant indicator of the market efficiency is **contestability** (Baumol, 1982). One of the major problems in that sense is the “newborn” mercantilism that at least partly is reflected by the clustering boom (Porter, 1990). Contestability is especially difficult to maintain in industries where the production functions of domestic MNCs are based on country-specific matters or where there are essential governmental regulations or barriers of trade.

MNCs may use their overseas capacities to stop potential rivals from entering the most potential market segments. Entries by MNCs affect domestic firms adversely given the market power of their proprietary assets, such as superior technology, valuable brand, and other IPRs. A generally accepted view in the literature on MNCs is that they are active players in oligopoly in their target countries. William Baumol (1982) found that a perfectly competitive market is necessarily perfectly contestable, but not vice-versa. Perfect contestability does not exist by definition in countries where economic nationalism is the historical culture. The most striking example is the success of **Asian national “champions”** in globally competitive industries that is due to economic nationalism more than just effective firm strategies (D’Costa, 2012). Competition in Asian markets is working, not perfectly, but adequately to give consumers (and industrial users) new, genuine alternatives of products and services. Homogenization of tastes and working methods worldwide provides advantage for MNCs, e.g. Microsoft’s Windows.

The rush of Western MNCs to Asian countries such as China or India, with their large domestic market, has been a striking trend since the mid 1990s when the WTO treaty was signed by leading nations to speed up globalization. MNCs have provided for China well-functioning commodity technologies, making it possible for Chinese firms to entry the EU and the US markets as potential competitors to domestic firms. Zeng & Williamson (2003) have studied the strategies and performance of 50 Chinese companies. They are warning that MNCs executives who do not perceive China’s state-owned and privately-held companies as potential competitors have missed the rise of the new breed of Chinese MNCs that have already succeeded in capturing the dominance in e.g. textile and clothing exports<sup>34</sup>. The vitality of Chinese “Dragon” and Indian “Tiger” MNCs is a concern. The trend is that manufacturing capacity disappears from Western MNCs to eager producers in China and India (Andersen, 2005).

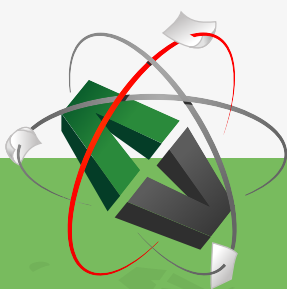
MNCs take advantage of the homogenous consumer segments<sup>35</sup> in the global markets. This increasing similarity or homogenization of tastes leads Theodore Levitt (1983) to conclude that there are global markets for some products and services. Serving the global market segments with standardized products or services offers valuable economies of scale and scope for MNCs. The aggregated preferences for certain product can be of the right type almost simultaneously in many continents like the huge prospects of Nokia’s mobile phones demonstrated in the 90s. The fact that MNCs can have a major impact on the restructuring of consumer segments globally has led to an assumption that oligopolistic rivalry provides MNCs a chance to empire-building at the global level. One of the major reasons behind such an assumption is that MNCs, through build-up overseas capacities can stop potential rivals from entering the most potential market segments. The worldwide economic growth rate is low in the US and the EU. MNCs have competitive pressures to win market shares from local competitors, which is an explanation to FDI in relatively mature markets. In the growth markets, MNCs attempt alternatively to reestablish market power through strategic alliances, joint ventures and collaboration over R&D.

MNCs are the major suppliers in technology markets. Their most common competitive model in global commodity markets is oligopoly. MNCs are claimed to misuse their monopoly powers in oligopoly game worldwide to create extremely high mobility barriers for new entrants. In the best case, MNCs are important partners for local entrepreneurs (e.g. in China) by providing them access to the world-class technologies and logistics. In the worst case, multinationals are bargaining against small and weak nations by their law suiting in terms of the international conventions and norms, e.g. the WTO agreement.

MNCs are the dominant suppliers of multi-cultural commodities. Globalization has had a fundamental effect on shifts in demand from local to global. Customer tastes around the world are becoming more similar. In some product markets, MNCs attempt to improve their market share to reach an oligopolistic equilibrium, a market leadership. MNCs make portfolio investments abroad to increase and obtain control of some critical resources (Cross, 2000).

**Rugman (1996) believes that MNCs are increasing world welfare and are not exploitative. Government regulations of their behaviour are likely to reduce overall welfare gains, since they prevents MNCs from doing what they can do best: Internalizing markets by their multi-plant operations.**

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### *The FDI contribution by MNCs*

The FDI contribution by MNCs to the host country's GNP growth has long been highly positive, because of knowledge and technology spill overs to domestic firms from MNCs (Kumar, 1990, 1994, 1998). **Spill overs take place only if the domestic firms have enough absorptive capacity.** Because MNCs have superior assets, domestic firms may lose their market share in the short run. In the long run, domestic firms may absorb spill overs of knowledge through vertical and horizontal linkages. The growth of FDI into Asian developing nations has been rapid during the past three decades. FDI is a vital source of external resources and a significant part of capital formation. FDI can be a green field investment, establishing a foreign affiliate starting new production facilities, or merger and acquisition operation that acquires control of existing units. The majority of FDI goes to the developed countries. China and India were the star performers in the aggregate GDP growth in the 1990s.

**Economic globalization means that economic actors in both private and public sectors need to develop their abilities to genuinely operate at the global level. The openness of markets for foreign MNCs is one of the key growth factors. Still, some of the development economists believe that FDI disciplines governments' macroeconomic policies.**

Ozawa (1996) emphasizes the **remarkable effect that FDI has on economic growth through the huge increase in trade.** Ozawa believes that the patterns and directions of inflows and outflows of foreign capital change in conjunction with the stages of structural transformations in the economy. Inwards FDI is typical for the factor-driven stage (Figure 6; Porter, 1990) when MNCs are seeking for cheap sources of raw materials and lower labour costs compared to their home nations. The existence of FDI by MNCs brings market dynamics to developing countries. In the best scenario MNCs may facilitate technology transfers by their Inwards FDI. There are certainly also the worst scenario in which the mistrust between MNCs and national or regional public authorities can lead to mutual failures or to even to **serious moral hazards**, e.g. some small Eurasia countries against Telia from Sweden. Dunning (1993) has established the **eclectic theory** with three advantages that are relevant to MNCs:

1. **Ownership advantages** primarily take the form of intangible assets, which are exclusive or specific to multinationals possessing them.
2. **Location advantages** are external to multinationals. There are extra costs for a firm investing in a foreign country related to the familiarity of local markets and institutions.
3. **Internationalization advantages** result from the exploitation of market imperfections and internalizing them into a firm's advantage.

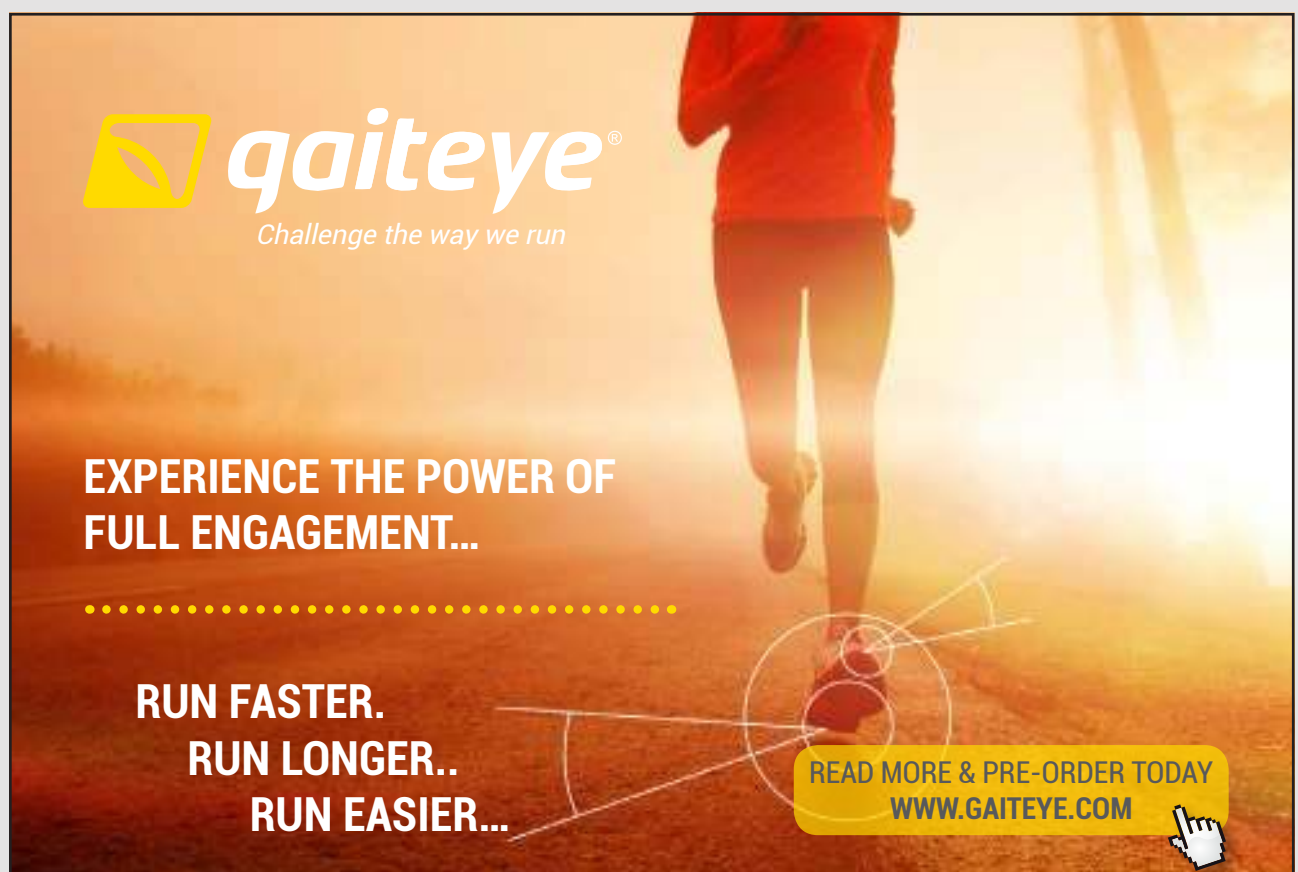
The propensity of a certain country to participate in international production is dependent on the extent to which its firms possess these advantages and the locational attraction of its endowments compared to those offered by other countries or regions. Dunning makes no predictions, about which countries, industries or firms are most likely to engage in foreign production. He says that **these three advantages will not be evenly distributed across countries, industries and firms**. Furthermore, Dunning expects that advantages interact with each other and that their significance and structure may change over time. In this context it is also useful to consider a country's international competitive position through the internationalization process of its firms. Dunning (1993) suggests that there really is a close connection between the ownership advantages of firms and some specific characteristics of countries.

**In the macro level, Alan Rugman has written extensively on MNCs and government policy, particularly trade and FDI policy. Alan Rugman (1996) believes that MNCs are inherently increasing world welfare and are not exploitative. Government regulations of their behavior are likely to reduce overall welfare gains, since they prevents MNCs from doing what they do best (internalizing markets).**

The openness of markets is one of the key questions for increasing welfare and industrial dynamism in the transition and developing countries. Terutaka Ozawa (1996) emphasizes the remarkable effect that FDI has on economic growth through increase in trade. He believes that the patterns and directions of inflows and outflows of foreign capital change in conjunction with the stages of structural transformations in the economy. Inward FDI is typical for the first, factor-driven stage when seeking for cheap sources of raw materials and lower labor costs compared to home countries. The existence of MNCs brings market dynamics to be considered. The assumption of immobile factors of production is also no more valid for empirical purposes (Sachwald, 1994). The growth of total capital invested into developing economies has been huge during the three decades of globalization. FDI is an important source of external resources and a significant part of capital formation, despite that their share in global distribution of FDI is declining<sup>36</sup>. The recent growth in MNCs and FDI in the world economy is explained by global factors.



The majority of FDI still goes to the well developed countries, where wages are high relative to those in developing countries. We are in the midst of a global reallocation of production activities. China and India were the star performers in aggregate GDP growth in the 1980s and 1990s. The rush of Western firms to access these countries, with their enormous domestic market, seems to continue. What is surprising is the speed by which the local firms, especially Chinese firms, have developed their technologies and positioned themselves as potential competitors to producers in the EU and the US. Chinese firms have succeeded to turn the state control to their advantage by beating MNCs in their home markets. Now these firms are launching their first export products to beat western MNCs globally<sup>37</sup>. The vitality of the Chinese “Dragon” and the Indian “Tiger economy” has risen some concerns. What is the global economy like, if virtually all production competencies will disappear from developed countries and be taken on by eager producers in China and India (Andersen, 2005).



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# 3 GEOPOLISTICS: ASIA WILL DOMINATE

## 3.1 COMPETITION AND GLOBALIZATION

Kenneth Arrow, the Nobel Prize-winner in 1972, claimed that a market leader in oligopoly markets is not ready to take the risk of radical or drastic innovations since the firm might jeopardize its dominant market position (Arrow, 1962; Arrow & Hahn, 1971). A market leader in oligopoly earns profits by replacing itself, **Arrow effect**, what small firms in monopolistic competition, by definition, cannot do. A market leader can (Denicolo, 2001): (1) Pre-empt potential rivals, (2) Slow down the diffusion of radical invention by new entrants, and (3) Maintain a permanent leadership

**In economics, the IO with its many extensions is the main scientific approach to add real-world complications to competitive models in the global context. A debate question is: What are the relevant competitive models to analyse global markets?**

The orthodox view by Chicago economists (Stigler, Friedman) dominates the neoclassical field of IO analyses when Chamberlin was the forefather of the SCP model. Since the 1950s, Chicago economists started to decline the comparative merits of monopolistic competition by Chamberlin (1933). In terms of mathematical economics, monopolistic competition is a departure from the ideal of perfect competition and from Pareto optimality. Stigler (1946) urged economists to use neoclassical price-theory models based on explicit, maximizing behaviour by firms rather than the emerging SCP method. Stigler (1946) strongly supports the view by neoclassical economists that the two market structures (perfect competition and monopoly) possess simplicity and the theoretical framework that cannot be found in oligopoly and monopolistic competition models. Chamberlin's (1965) counterargument was visionary. The argument that 'monopolistic competition is welfare enhancing since a society gets as much product diversity as it is willing to pay for' is the foundation of welfare benefits of globalization under the WTO regime.

The SCP based on the ideas of Chamberlin (1933) and Robinson (1933). The SCP model dates back to the works of Mason and Bain. Mason's (1957) main finding was: The higher (lower) the market power the higher (lower) the profitability. Bain (1951, 1956) found that three factors are important as entry barriers: economies of scale, product differentiation advantages, and cost advantages. Bain developed the SCP model of structure, conduct and performance (Mueller & Rauning, 1999). Scherer & Ross (1990) summarized the key factors of the SCP model (De Jong & Shepherd, 2007). The SCP is separate from the (mathematical) neoclassical theories since the SCP model based on a flow-chart-model, logical reasoning and empirical studies. The theory of international trade by Paul Krugman built on Chamberlin's model. In global markets, offerings of firms are mainly heterogeneous and differentiated.

**George Stigler, the Nobel-prize winner and his followers fully dominate the neoclassical IO theory that excludes imperfect competition theories and the SCP model from the frames of neoclassical economics.**

### *Diversity matters in international trade*

According to Ricardo's (1817) famous notion, a country gets advantage from specializing in what it is best at producing and trading with other nations. Bertil Ohlin (1933), the Nobel-prize winner predicted trade patterns based on relative factor advantages. Infrastructure, education, culture, etc. of countries differ. Staffan Linder (1961) noticed that demand plays a more important role than comparative advantage in trade, and, thereby, complemented the factor-driven explanations by Ricardo and Ohlin. In global markets, economies of scale (e.g. technological know-how or skilled labour force) are significant and countries will gain from specialization in intra-industry trade in which countries trade similar, but differentiated, products with each other, e.g. cars.

The monopolistic competition theory of international trade by Dixit & Stiglitz (1977) combines analyses of economies of scale and product differentiation. The resulting interaction between demands for product variety and economies of scale leads to intra-industry trade (Helpman & Krugman, 1985). To Krugman increasing returns is the main cause of international trade. In Krugman's (1979, 1980, 1981) New Trade Theory, monopolistic competition does not predict in which country firms locate, but comparative advantages in producing the differentiated good will likely cause a country to export more of that good than it imports. Instead of spreading out evenly around the world, production tends to concentrate in a few countries or regions in terms of Krugman's (1991, 1995, 1998) New Economic Geography.

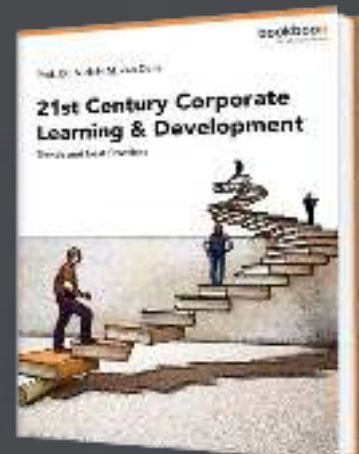
**Krugman's theory of international trade and geography integrated nicely important IO topics in global contexts, and reinvented Chamberlin's theme of monopolistic competition. The global society of nations is much different from the US-Europe society that dominated international trade until the 1980s. The global society is willing to pay for product diversity. About 60% of global markets follow the logic of monopolistic competition.**

International trade is running smoothly. The total GDP of nations has grown from \$22,000 billion in 1990 to \$74,000 billion in 2013. The growth of exports of goods and services has been higher from \$4,000 billion in 1990 to \$23,000 billion in 2013 (World Investment Report 2014). Germany has been the winner of international trade (Simon, 2014). Germany had about **€200 billion** export surplus with 20 biggest trade partners in international trade in 2012. Germany is the most diversified economy in the world in which even small firms can participate in global competition. In the US the majority of firms are domestic-market-oriented. **The diversity matters.** Hans-Werner Sinn (2012) expressed his worry that Germany beats other big EU-counties which may jeopardize the integrity of the EU. That is what happened. Britain is now going out of the EU.

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Globalization as a concept favours MNCs. The large home markets, e.g. the US or the EU are frequently the hosts of MNCs' headquarters. Germany owns excellent MNCs, e.g. Siemens and Bosch and 100,000 (Mittelstand) SMEs that have experiences on FDI-operations (Venohr & Meyer, 2009). Germany's domestic markets are efficient, **contestable** (Baumol, 1982). The economies of scale and product differentiation prosper in the economic landscape. German Hidden Champions (HCs) are doing a good global business (Simon, 2009). They specialize in niches and provide to Asian markets best possible products and services. HCs complement MNCs by taking the market risk of customer specific differentiation and radical innovations. Being mainly family businesses HCs keep control of business secrets e.g. by organizing their own networks of sales subsidiaries.

HCs have innovated unique business models. **The business thinker behind this success models is Hermann Simon (2009)**. HCs win their gigantic competitors, MNCs, by diversity. The competition model is the monopolistic competition model by Erich Gutenberg (1951). Focusing on product differentiation and customer orientation, HCs maintain high growth and profitability. HCs have a realistic view of the global markets: It is better to compete of customers' preferences and to avoid "big" competitive strategies. In Germany even state-owned firms (e.g. Deutsche Bahn AG or Deutsche Post DHL) contribute strongly to Germany's national economy by performing excellently in the global markets. In most of the WTO countries, **natural monopolies** behave like real monopolies that is the major barriers in the growth of local entrepreneurship (Lahti, 1989, 1991; Lahti & Pirnes, 1988).

The collapse of big US financial institutions in 2008 was a **Pyrrhic victory**<sup>38</sup>. From the 1960s to the 1980s the Chicago School propagated the idea that firm giants are efficient inside highly concentrated industries. The Chicago School succeeded in its political campaign. In the US financial market, the share of financial assets held by the 10 largest financial institutions increased in three decades **from 10% to 50%**. In the end of 2007, big financial institutions that had once been Wall Street's success stories had underwritten derivatives with a gross notional value of \$216,000 billion (Ferguson, 2009). The collapse of Lehman Brothers in 2008 almost brought down the financial system. Milton Friedman, the key writer of the Monetarism, was a controversial scientist<sup>39</sup>. As a scientist Friedman supported the perfect market contestability of markets but as the advisor of the US president Reagan his view was simply 'money talks'.

**The Great Depression was caused by loose monetary policy and by the speculative boom in the 1920s (Friedman and Schwartz, 1971). In the late 2000s, the leading US banks were "too big to failure". It took huge taxpayer-financed bail-outs to shore up the US financial industry**<sup>40</sup>.

The main reason for many well-known market failures is the biased view of market structure. In price competition, global market structures are **exogenous**. Firms cannot manipulate global market structures without risking their long run success. In strategic, non-price competitions with innovations (Schumpeter) and product differentiation (Chamberlin, Krugman, Gutenberg and Simon), global market structures can be assumed to be endogenous. The traditional view of mobility barriers might be too limited. The Nokia ICT cluster in Finland collapsed in the 2000s when the global market logic of mobile phone moved from oligopoly to monopolistic competition (temporary innovation/differentiation advantages). In the US financial market, the Wall Street's gigantic financial conglomerates were not "permanent success stories – "diamonds" as Porter (1990) claimed. The key scientific question is: To what extent the globalized markets are exogenous or endogenous? Shepherd (1990) listed factors of entry barriers that are sub-element of mobility barriers:

1. Most of factors that are commonly mentioned in the SCP literature are **exogenous (economic/intrinsic)**: e.g.: capital requirements, economies of scale, product differentiation, diversification, vertical integration, R&D intensity, and absolute cost advantages.
2. There is a list of **endogenous (voluntary and strategic)** factors: e.g. selling expenses, patents, and control over strategic resources.

The **Coase Theorem** (Coase, 1960, 1987, 1988) of intellectual property rights (IPRs) is a theme in the world. Globalization is a multifaceted concept. The WTO treaty signed in the year 1994 deals with the rules of trade of nations at a global level and makes all the member nation states equal. **Non-discrimination** is the main principle on which the rules of the multilateral trading system are founded. The WTO opens up markets although politics may seem to disturb the radical technology innovativeness across the globe affecting positively to globalization as a process. The WTO treaty provides **liberalism** as the doctrine of market exchange. The complexity and uncertainty in international political systems makes it difficult for the WTO to agree about fully liberal rules of the game. Big nations protect their own interests. The negotiators of the GATT rounds apply the incomplete contracts approach to open up global market step-by-step. In parallel to this power-block-politics global youth unemployment is set to continue growing over the near future<sup>41</sup>.

As Lucas (1988) argued **human capital externalities constitute the major growth factor. Catalysts of global communication externalities are found in urban systems (e.g. Silicon Valley or German metropolises) with the advanced innovation systems (Chandler, Hagström & Sölvell, 1998).**



Rugman (1996) supports strongly the liberal view to competitive policies worldwide in terms of the WTO rules. He believes that government regulations can prevent MNCs from doing what they do best, namely internalizing markets. Taken German as an example, it is possible to conclude that a good balance is needed between national MNCs and the entrepreneurial sector. In German small and mid-sized firms are profitable and even actively globalizing. Many other EU countries have stagnated since their small and mid-sized firms have not succeeded to globalize. An example of the sad country cases is Italy (the second biggest exporter after the US after the World War II). In Finland small and mid-sized firms are also stuck in the domestic markets and **about 30 large firms represent 90% of Finland's export**. The success story of globalization is German Hidden Champions that in the early 90s succeeded to make their first bold jumps in the internationalization process.

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### 3.2 TECHNOLOGY MARKETS: THE EU STAGNATES EXCEPT GERMANY!

**Technology markets consist of licensed technology and its close substitutes** (Gilbert, 2011). In the technology markets Intellectual Property Rights (IPRs) are marketed separately from the products in which they are used, e.g. through a cross-licensing (Shapiro, 2001). In industrialized countries there is a vast pool of know-how waiting to be untapped. Demand for know-how and technology is large in e.g. China and India (Gould & Gruben, 1996; Thompson & Rushing, 1999). The institutional innovations are: the Paris Convention for the protection of industrial property in 1883; and the Berne Convention for the protection of literary and artistic works in 1886. The World Intellectual Property Organization (WIPO) was created in 1967<sup>42</sup>. The Patent Cooperation Treaty (PTC) signed in 1970, provides the unified procedure for filing patent applications to protect inventions in contracting states<sup>43</sup>. **The Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement** that came into effect in 1995 shifts the emphasis on procedural uniformity, as promoted by the WIPO, to minimum standards of substantive protection.

**The effective protection of the TRIPS favor MNCs that are involved in collaboration with the universities and research labs in order to get access to the up-to-date scientific knowledge.**

The IO economists call standards “impure public goods”. The production and creation of standards share a similar element with law making, in that they have significant social meaning perform and several important functions. The **ISO** (International Organization for Standardization)<sup>44</sup> founded 1947 promotes proprietary, industrial and commercial standards worldwide. Standards give world-class specifications for products, services and systems, to ensure quality, safety and efficiency. They facilitate international trade. The ISO has published more than **19,500 International Standards**. De facto standards are those that emerge in markets by firms, e.g. Microsoft Windows. Apple’s de facto standards in smartphones was a reason why Nokia’s mobile-phone business crossed. Today, the US IT MNCs, such as Google, Facebook, Amazon, Microsoft and Apple rule the internet by their powerful de facto standards<sup>45</sup>.

**‘Money talks in technology markets’. MNCs, like Apple and Google, as the winners of de facto standards race ‘take all’. This is a reason why globalization is criticized by scientists (e.g. Higgins & Tamm, 2008).**

In 2014, the global R&D spending (GERD PPP) was **\$1,618 billion**. The leading countries were: (1) The US \$465 billion, (2) China \$258 billion, (3) Japan \$163 billion, (4) Germany \$92 billion and (5) Korea \$61 billion<sup>46</sup>. The US has a good balance in the R&D since the business sector pays 2/3 of the overall spending on R&D conducted in the US. The 50 leading US universities account for the lion's share of the Nobel prizes. In 1901–1999, US universities received 164 Nobel Prizes: 57 prizes for physics, 41 for chemistry, 34 for medicine, 25 for economics, and 7 for peace (Sherby, 2002). The US funding in high education are 2.3% of its GDP when the EU spends 1.1% (Thurgood et al., 2006).

***The Bill of Rights*<sup>47</sup> is the collective name for the multiple amendments to the United States Constitution which provide an excellent foundation to protection of property rights in global contexts.**

In the 1980, the US federal government adopted policies to promote the commercialization of research conducted with federal funding (Haour, 2004). The argument for that was that typically, post-invention development costs far exceed pre-invention R&D costs, and inventors cannot make risk-investments without protection from competition (Schumpeter, 1942). **The Bayh-Dole Act, DBA (1980)** allowed the US universities to become actors in patent markets (Eisenberg and Nelson, 2002). The DBA provides universities the first-right to commercialize patents. **The Stevenson-Wydler Technology Innovation Act (1980)** enabled e.g. the National Institutes of Health (NIH) to enter into license agreements with firms to promote the development of technologies developed by universities and research labs. The **First-Inventor-To-File** (the Leahy-Smith America Invents Act 2013<sup>48</sup>) is the right to the grant of a patent for a given invention that lies with the first person to file a patent application for protection of that invention, regardless of the date of actual invention.

There is a difference between the strict **First-To-File** of the European Patent Office EPO and the FITF system of the United States Patent and Trademark Office USPTO. The USPTO FITF system affords early disclosers some “grace” period before they need to file a patent, whereas the EPO does not recognize any grace period, so early disclosure under the FITF provisions is an absolute barrier to a later EPO patent<sup>49</sup>. **The US innovation system as the combination of the USPTO FITF system, the DBA and the Stevenson-Wydler is well tailored to the global technology market.** The institutional development in the EU is lagging behind. A common EU patent law may be a ‘mission impossible’. The copyright law is difficult to apply since it is too complex. Business secret in terms of the TRIPS has only partly been including in the EU legislation. These facts are the reason why the EU has not succeeded in science and technology competition although the **Lisbon Strategy** aimed to make the EU ‘the most competitive and dynamic knowledge-based economy in the world’ by 2010. The positive direction of R&D in Asia is driven by multiple synergistic factors with the US in global contexts.

Now, the US system functions excellently (31.8% global R&D spending). *Asia (Japan, China and Korea) is the main challenger* (39.1% global R&D spending). Europe is in stagnation (22.4% global R&D spending)<sup>50</sup>. The exception in the EU is *Germany* where the US system was combined with the German tradition after the World War II.

Germany's national economic system functions well in 16 regions (Laender). Vehicles, machines, electronics and chemicals account for more than **50%** of Germany's exports. The core of Germany's globalization is service industries in which trademarks and industrial design are important to complement the IPR portfolios. Germany is the third in service exports after the US and the UK. German B2B export companies are providing **integrated B2B services** to global customers. **Germany is much better service exporter than to the WTO statistics demonstrate, perhaps, the number one.** Germany's service business revolution in is related to IPRs revolution (Table 5).

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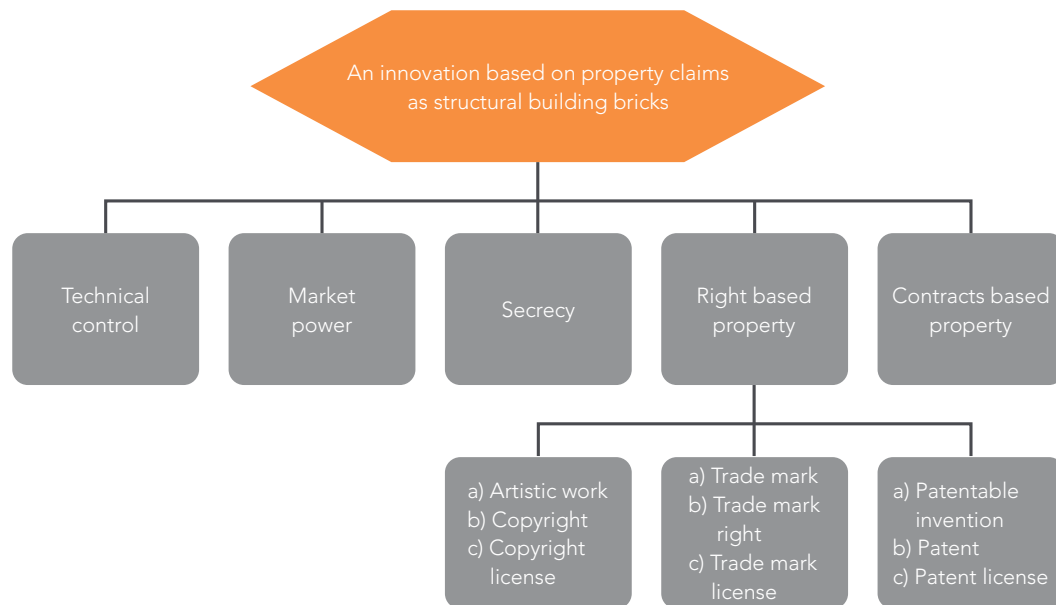


Year	PCT System	Rank	Madrid System	Rank	Hague System	Rank
1998	9,403	2	5,663	1		
1999	10,514	2	5,920	1		
2000	12,580	2	6,321	1	1,315	1
2001	14,035	2	5,808	1	1,231	1
2002	14,323	2	5,126	1	1,225	1
2003	14,658	3	5,559	1	599	1
2004	15,218	3	5,395	1	355	2
2005	15,991	3	5,804	1	334	2
2006	16,737	3	5,663	1	256	2
2007	17,821	3	6,101	1	380	1
2008	18,855	3	6,214	1	406	2
2009	16,797	3	4,793	1	408	2
2010	17,568	3	5,006	1	531	2
2011	18,851	3	5,000	2	584	2
2012	18,758	3	4,408	3	663	1

**Table 5:** Three international systems: Germany's global positionSource: [http://www.wipo.int/ipstats/en/statistics/country\\_profile/countries/de.html](http://www.wipo.int/ipstats/en/statistics/country_profile/countries/de.html)

Germany has a good location in the mid of Europe that is favorable for many kinds of businesses. Germany has probably the best infrastructure worldwide. Bayer is the core area of Germany's technology excellence and Bayer's capital Munich (München) is hosting the EPO's headquarter that is **the main PCT office** in the EU. The WIPO has its headquarter nearby Bayer in Geneva Switzerland where there is the main office for the **Madrid system** for the international registration of marks and for the **Hague System** of industrial design. In 1998–2012 Germany was the leader in the international registration of design and sometimes the number two or three. Ulf Petrusson (2004, p. 136) visualizes a holistic model of IPRs (Figure 8).





**Figure 8:** Extended Intellectual Property Rights model

Source: Petrusson, 2004, p. 136.

**Germany's near 400,000 internationally acting firms are masters the main international systems of IPRs protection and, thereby, they are in the strong position in global technology competition.**

As Walsh et al (2003, 2007) remarks, the patent system is not functioning perfectly. Patent protection does not guarantee that the inventor can prevent competitors from either legally or illegally by infringing patent (Levin et al., 1993; Cohen et al., 1996) Patent litigations are costly and a major mobility barrier in technology markets. MNCs negotiate of large patent portfolios. Schumpeter's (1942) creative accumulation function well since MNCs, e.g. IBM and GE have long histories of innovation success (Malerba & Orsenigo, 1995; Dismukes et al., 2005). To succeed in a rapid diffusion into global markets, MNCs internalize technologies by their own patent rights, cross-licensed patent rights and other IPRs. The mobility barrier in technology competition may prevent another innovation mechanism, namely creative destruction (Schumpeter, 1934, 1939). The problem is the worst in small and open countries in the EU.

**In Finland two extensive empirical studies imply that large firms have a smoothly running patent system when most of the private inventors and entrepreneurs are in marginal position in technology markets (Lahti, et al., 2006; Lahti & Kivi-Koskinen, 2014).**



A trade secret is an alternative tool for IRPs protection. Patents permit novel concepts or discoveries to become property when reduced to practice. From the seeker's point of view, a disadvantage is a leak of protected information by the enabling disclosure. **A disclosure system stimulates competitors to invent around existing patents by providing parallel technical developments or meet similar market needs** (Anton & Yao, 1994, 2004). The enabling disclosure is a bargain between the patent-owner and the public: (1) the disclosure obligations of the patent system better facilitates the diffusion of new technologies (Jones, 2008), and (2) the balance between current and future innovation through the patent process (Dam, 1994). There are cultural differences. Cohen, et al, (2000) noticed in their survey that Japanese respondents rated patents as the most effective and trade secrets as the least effective appropriability mechanism. In the survey in Finland for members of Academic Engineers and Architects, **business secrets were a vital IPR strategy element** (Lahti, et al., 2006).

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Some innovations are retained as a trade secret that is valuable commercial information protected by virtue of its being known only to the firms using it. The benefits of a trade secret include an unlimited term as long as a secret remains “secret” and, applicable to a wide variety of complementary technologies. The disadvantages include complete loss of protection if the secret is disclosed, including defenses against infringement (Lahti et al 2006). A novel product idea can be determined through **reverse engineering**. It involves taking something a mechanical device, electronic component, software program, or biological, chemical, or organic matter apart and analyzing its workings in detail without using or simply duplicating the original. Asian countries may not have the political will or an interest to create efficient norms to reverse engineering that is commonly used means to misuse the protected patent information. Patent infringements by Asian multinationals cannot always be proven.

***It is useful to relate industry dynamics (technological opportunities and appropriability rules) and the market structures (e.g. concentration rate and entry barriers) at the industry levels globally. When a global industry market environment is rich with technology opportunities and when the appropriability is low, the industry’s concentration rate tends to be low and vice versa.***

**Technical control** mechanisms are crucial because e.g. a cyber-war over the internet may threaten a firm’s business secrets. One major part of them is technical standards that protect the general intellectual property. In the light of BCG and PIMS, the **market power** is among the most relevant structural control mechanisms. Firms with a strong market position like multinationals can dominate branches and sectors of the economy, and by doing so, alter their structure. **Rights based properties** in various forms are probably the most important because they represent the legal isolation mechanism for protecting the firms’ assets. Rights based properties designed to protect the inventor from exploitation of their knowledge embodied in, e.g. industrial, product and process innovations, that mainly take the form of patents. Ideas embodied in symbolic material and creative expression are protected mainly by copyrights and trademarks. Although information technology has increased the scope for trademarks and copyrights, the patent system is still relevant. In knowledge-intensive industries, like biotechnology or ICT industries, the list of mobility barriers should be extended to include the **contract based property**. The most important property for growth firms seems to be the **business secret** which is a combination of right and contract based properties.

### 3.3 THE WTO RULES FIT PERFECTLY WITH CHINA

#### *China's hidden nationalism!*

Since the 1980s, China has been the fastest-growing nation with an average annual GDP growth rate about **10%**. Exporting has been the primary catalyst of rapid economic growth. A factor of the success model is the **One Country, Two Systems policy** in Hong Kong and Macao that are both full members in international organizations, such as the WTO (Wang, 1998). Because of their success in international trade, a big number of persons are ultra-rich<sup>51</sup>. China permits FDI inflows for foreign investors with two conditions: (1) export creation and (2) joint ventures with Chinese firms. China has opened **special economic zones (SEZs)** along the coast and, 14 coastal cities/3 coastal regions (Jao, 1987). China has provided favored tax treatment for foreign investors and laws on contracts, patents, and other matters of foreign businesses. A growth factor is infrastructure. Hong Kong and Macau are centers of trade and finance, and 98% of banking assets in China are state owned (Chui & Lewis, 2006).

China's average GDP per capita income (PPP, 2013) is **\$11,907** that is low in comparison to Hong Kong (\$53,216) and in Macao (\$142,599)<sup>52</sup>. China's policy is designed to remove the obstacles to growth in wealth regions. Shanghai by itself accounts for 8–10% of China's gross value of industrial output and the east coast accounts for about **60%** of China's imports and exports. Hong Kong is the second largest stock market in Asia and China (mainland) the third largest. China's working-age population is over 1 billion<sup>53</sup> of which about 50% is working in agriculture, forestry, and fishing. About **200 million rural laborers** and their families are relocated to urban areas to find work. **About 100 million surplus rural workers** are adrift between the villages and cities, many subsisting through part-time jobs. China has succeeded to combine the Asian nationalism and the global market rules by the WTO.


The **MFA** (Multifibre Arrangement under the GATT (Hyvärinen, 2001) is a good example of China's power. China became a MFA member in the 1980. In 1995, China's clothing exports was \$24 billion (world \$158 billion) and textile exports \$13 billion (world \$152 billion)<sup>54</sup>. In 1995, the **WTO ATC** (Agreement on Textiles and Clothing) took effect, and China pushed Africa out of the global markets of textile and clothing<sup>55</sup>. During the MFA, trade was open for small actors, since nations were responsible to allocate quotas. The ATC moved decision-making to retailers who prefer to have low prices. China was the winner of textile and clothing trade under the transition from the MFA to the ATC. In Africa **250,000 jobs** were lost in textile and clothing industries<sup>56</sup>. Africans buy cheap textile and clothing from China and second-hand clothes from the EU. To qualify for preferential access the EU requires African countries to source fabric locally or from the EU since Africa's own textile industry is collapsed as a result of the global price war.

In 2008 China exported **\$185.1 billion** worth of textiles and clothing<sup>57</sup>. The EU has lost its position in textiles during the ATC, from **\$78 billion** in 2005 to **\$50 billion** in 2008<sup>58</sup> and in clothes from **\$103 billion** in 2005 to **\$45 billion** in 2009<sup>59</sup>. The EU has still about 2 million employees in the industries. Italy has about ¼ of the sector's total in the EU. Italy lost its position in the commodity production, but succeeded to win market shares as the main supplier in clothing and textile technologies. Under the ATC, African countries failed to develop production along local value chains, by using cotton, wool and other raw materials in production<sup>60</sup>. Africa has a long historical tradition in the cotton sector. Today, the local, cotton-based textile industry is at a standstill. In raw cotton markets, the major trade barrier of trade is the **US New Farm Bill** that provides massive subsidies to the US cotton producers. As the result, prices of raw cotton in the world market have sunk drastically<sup>61</sup>, e.g. **70%** in 2001–2002<sup>62</sup>.

*The dumping of raw cotton in the US is the real Leontief paradox<sup>63</sup>, and should be settled by the WTO to prevent the non-discrimination of poor African producers in the global cotton markets. As table 6 indicates, some of the Sahel African countries are major exporters of cotton but Africa's cotton industry integrates have collapsed.*

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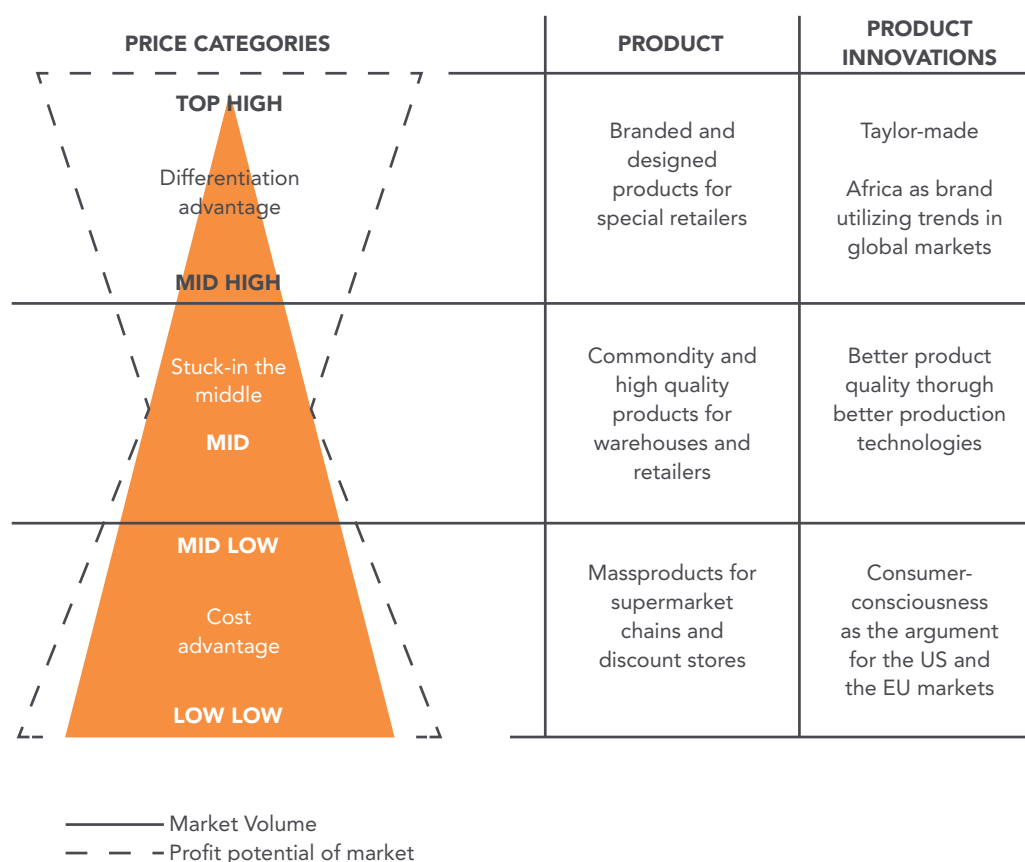
2014 RANKING	COUNTRY	EXPORTS BALES	PRODUCTION BALES
1	United States	10,000,000	16,397,000
2	India	5,000,000	31,000,000
3	Brazil	3,400,000	7,000,000
4	Australia	3,000,000	2,200,000
5	Uzbekistan	2,300,000	4,000,000
6	Burkina Faso	1,125,000	1,300,000
7	Greece	1,100,000	1,450,000
8	Mali	850,000	1,000,000
9	Malaysia	800,000	900,000
10	Côte D’Ivoire	650,000	800,000
11	Turkmenistan	625,000	1,450,000
12	Benin	550,000	600,000
13	Cameroon	450,000	500,000
14	Pakistan	450,000	9,800,000
15	Tajikistan	350,000	400,000
	<b>World</b>	<b>40,800,000</b>	<b>120,300,000</b>

**Table 6:** Cotton exports and related production in 2014<sup>64</sup>

Source. <http://www.indexmundi.com/agriculture/?commodity=cotton&graph=exports><http://www.cottoninc.com/corporate/Market-Data/MonthlyEconomicLetter/pdfs/English-pdf-charts-and-tables/World-Cotton-Production-Bales.pdf> <http://www.indexmundi.com/agriculture/?commodity=cotton>

The trade imbalance (over \$300 billion in 2010, US Census Bureau) is big. The US exports agricultural commodities to China, particularly soybeans, cotton, and wheat, roughly \$17.5 billion in 2010. Cotton exports to China grew in 2000 to over \$2 billion in 2010<sup>65</sup> that is the most striking Leontief paradox. In terms of Ricardo, the Sahel Africa's (only) comparative advantage is in its production system from cotton farming to cotton clothes. In 2001, the US **AGOA** (African Growth and Opportunity Act) allowed 37 African nations preferential treatment for special conditions to export a wide range of products to the US markets<sup>66</sup>. Africa accounts for **1% of EU clothing imports** through the **Cotonou treaty**. Africa's exports to the EU's marginal<sup>67</sup> because of China's price-competition. In the clothing exports that could be the best opportunity for Africa, the two big foreign suppliers of clothing to the EU are China and Turkey that together account for about  $\frac{1}{3}$  of total imports from outside the EU.

*Africa need its own differentiating brands and product contents. In global clothing business, luxury (TOP HIGH) products are the only option to African producers. Organic cotton is the best opportunity to Africa to differentiate worldwide<sup>68</sup>. Prahalad (2006) advised firms to focus “Bottom of the Pyramid” (BOP) markets. Africa should rebuild its “Pyramid” (TOP) segments (Figure 9). No other continent except America can replicate China's powerful Asian nationalism and the BOP markets.*



**Figure 9:** Differentiation as the strategic marketing selection



The EU and the U.S standards are possible to reach. The modern machine technology makes it easier to maintain the EU/US product quality. It is possible to claim that **about 70% of the consumer value in luxury clothes is based on the design communication of brand-owners, wholesalers and retailers.** Africa needs its own original design and brand-content that can be communicated globally. Africa's image is the green continent. Green is also Africa's color in the Olympic ring. Africa has good opportunities to strengthen its image as the producer of environmentally friendly products, including sustainable production materials, and brands. Many various niche shops and big retail chains like Marks & Spencer in the UK and Wal-Mart in the US have eco-friendly brands. Consumer awareness is rising in the US, in the most chemical-loving country where 80% of the cotton crop comes from GM seeds.

**For the Sahel Africa, the organic cotton cultivation is the way to reduce soil depletion. Referring to Ricardo and Krugman, organic cotton could be the article where the Sahel Africa has comparative advantage.**



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An increasing number of people world-wide and even in the US are waking up to environmental concerns. This will in time make a huge impact on the kind of textile fibers used for the clothing industry. Unsustainable fashion markets can be replaced by sustainable, environmental fashion markets. Organic cotton is a good example of that. **What Africa needs is its own grand brand, Africa, that denote environmental and quality in communication of design.** In all continents, consumers are used to see TV-documents of uncontrollable use of chemicals e.g. in India's textile and clothing industry<sup>69</sup>. The natural dyes are known till the early 19<sup>th</sup> century and could be a vital part of Africa's image to extract from roots, stems, leaves, flowers and fruits of various plants.<sup>70</sup> Referring to the consumer's awareness of the sustainability of our globe, the intrinsic value of Africa as a brand could be based on certified environmental and social quality of Africa's textile and clothing production and on subsidy-free farming.

### *China is the global winner*

Well-known brands have market potential and they can easily be transferred over borderlines and be modified to consumer preferences. Global markets are highly consumer-driven. Global brand has all ingredients of success. Branding is not only communication. Quality systems are also needed to guarantee that the products fulfill the new, often hidden non-tariff barriers in the target markets. International registration of IPR, e.g. the case Monsanto<sup>71</sup> challenge nations trying to monopolize the best ingredients of nature or culture. TOP HIGH segments account about 10% of market volume but well-known brands in TOP HIGH segments are the key component of a nation's competitive advantage.

China's global ethnically-based business networks and the Confucian culture are oriented toward success in global markets. **Asia and America are striving for leadership in global markets.** China's foreign exchange reserves are over \$2,000 billion<sup>72</sup> focused on investment in infrastructure development, such as the rail network, roads and ports. The world's largest economy is still the US but China will catch up the US very soon. The US is the main target market for China's exports (Table 7). In 2013, China's exports was **\$2.210 billion** (over 12% of world total) and surplus of trade **\$226 billion** that is the second best after Germany with **\$262 billion** surplus. China's and Germany's export power is the main reason why the US has the huge **\$668 billion** deficit.

2013 RANKING	COUNTRY	GDP BASED ON VALUATION \$BILLION PPP	EXPORTS OF COMMODITIES \$BILLION	TRADE BALANCE \$BILLION
1	United States	16,768	1,575	-688
2	China	16,149	2,210	+226
3	India	6,776	313	-152
4	Japan	4,667	697	-117
5	Germany	3,512	1,493	+262
6	Russia	3,491	515	+181
7	Brazil	3,012	244	+3
8	France	2,534	578	-100
9	Indonesia	2,389	178	178
10	United Kingdom	2,320	813	-170
	World	74,699	17,974	

**Table 7:** Top economies in 2013.

Sources: IMF World Economic Outlook, The World Factbook of the CIA, OECD

In 2013 the biggest product group (Mineral fuels, oils, distillation products, etc.) topped the list of top traded exports commodities with **\$3,209 billion** (Table 8). The growth rate of this group was over 80% in 2009–2013 that can be explained by the price component. The crude oil price was cut by about 50% in 2014<sup>73</sup>. Hard hit oil-exporting countries are Russia, Nigeria, Iran and Venezuela when Saudi Arabia can tolerate lower oil prices quite easily since its own oil costs are around \$5–6 per barrel. The US has become the world's largest oil producer. The US does not export crude oil, but imports less, creating a lot of spare supply. Big oil companies will cut down their high-cost projects involving drilling in deep water or in the Arctic<sup>74</sup>.

The “shale revolution” stimulates production of oil and natural gas in the US. **The revolution is the advances in oil and natural gas production technology, a combination of horizontal drilling and hydraulic fracturing.** These technological advances have enabled increased production of the abundant oil and natural gas resources in the US. Greater availability of domestic energy resources benefits the US. Until recently, the US oil and natural gas industry mostly followed the ups and downs of world oil prices, but with a long-term decline that reflected the decreasing availability of US oil and natural gas resources. The industries most sensitive to oil prices are coal mining, oil and gas extraction, oil field machinery, petroleum refining, and petrochemicals. They have accounted for 1.6 million new jobs, 1.8% of the total US non-agricultural employment<sup>75</sup>.

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<b>RANKING</b>	<b>COMMODITY</b>	<b>VALUE 2009 \$BILLION</b>	<b>VALUE 2013 \$BILLION</b>
<b>1</b>	<b>Mineral fuels, oils, distillation products, etc.</b>	<b>1,762</b>	<b>3,209</b>
<b>2</b>	<b>Electrical, electronic equipment</b>	<b>1,602</b>	<b>2,068</b>
<b>3</b>	<b>Machinery, nuclear reactors, boilers, etc.</b>	<b>1,508</b>	<b>2,003</b>
<b>4</b>	<b>Vehicles other than railway, tramway</b>	<b>846</b>	<b>1,339</b>
<b>5</b>	<b>Pearls, precious stones, metals, coins, etc.</b>	<b>324</b>	<b>613</b>
<b>6</b>	<b>Plastics and articles thereof</b>	<b>388</b>	<b>579</b>
<b>7</b>	<b>Optical, photo, technical, medical, etc. apparatus</b>	<b>395</b>	<b>543</b>
<b>8</b>	<b>Pharmaceutical products</b>	<b>419</b>	<b>485</b>
<b>9</b>	<b>Organic chemicals</b>	<b>306</b>	<b>445</b>
<b>10</b>	<b>Iron and steel</b>	<b>274</b>	<b>392</b>
	<b>All products</b>	<b>12,310</b>	<b>17,974</b>

**Table 8:** Top traded commodities (exports)

Sources: ITC calculations based on UN COMTRADE statistics

The EU concentrates on global sustainability to take the responsibilities of human beings to safeguard the common environment by the “clean” technology products. The US solved its economic growth dilemma by investing in the “most polluting” energy production and by following the Chinese strategy by crossing the global price-system in petroleum products. Now both the US and China win by “BOP” production and products. The EU community is in a serious crisis and may collapse fully.

In 2013, China’s top 10 export sectors accounted for 67.8% of the overall value of its global shipments (Table 9). The biggest product group of China’s exports was ‘Electrical, electronic equipment’ with **\$561 billion** (25.4% of China’s exports). China’s market share of the world is **near 30%**. Looking at other big product group, China is in a strong position also in the ‘Machinery, nuclear reactors, boilers, etc.’ group with **\$383 billion** (17.3% of China’s exports). China’s market share of the world is **near 20%**. China has succeeded to diversify its exports and still kept its leading position in textile, clothing and footwear product groups that are marginal in international trade in comparison to the biggest B2B-industries.

**About 80% of China's exports are manufactured goods. China's exports is over \$1,500 billion (30% of GDP)<sup>76</sup>. According to the WTO, China is estimated to take 50% market share of global manufacturing until 2050.**

RANKING	COMMODITY	VALUE 2013 \$BILLION	% OF TOTAL EXORTS
1	Electronic equipment	561	25.4
2	Machinery, nuclear reactors, boilers, etc.	383	17.3
3	Knit or crochet clothing and accessories	96	4.4
4	Furniture, lighting, signs and prefabricated buildings	86	3.9
5	Optical, technical and medical apparatus	74	3.4
6	Non-knit and non-crochet clothing and accessories	68	3.1
7	Plastics	96	4.4
8	Vehicles excluding trains and streetcars	58	2.7
9	Iron or steel articles	57	2.6
10	Footwear	50	2.3

**Table 9:** China's top 10 export sectors (Billion US dollar)

Sources: IMF World Economic Outlook, The World Factbook of the CIA, OECD

China pushes forward the modernization of agriculture by using policies such as finance, taxation and credits to enable household farmers can produce, process, sales, storage, transport, etc. their production<sup>77</sup>. China is the world's largest producer of **rice** and among the major sources of wheat, corn (maize), tobacco, soybeans, peanuts (groundnuts), cotton, potatoes, sorghum, peanuts, tea, millet, barley, oilseed, pork, and fish. China is the world's leading producer of pigs, chickens, and eggs. China has a long tradition of ocean and freshwater fishing. China ranks first worldwide in farm output. As a result of topographic and climatic factors, **10–15% of the total land area is suitable for cultivation**. About 50% of the population lives in the rural areas. At the predicted rate of land shrinkage, the amount of land will be just enough to meet that target. The **livestock revolution**, a growth in world livestock production and consumption, lead to rising use of cereal-based animal feeds and greater stress on fragile extensive pastoral areas and more pressure on land in areas with high population densities and close to urban centers (Henning, 2004).



**Livestock production is the world's largest user of land by grazing or as the source of fodder and feed grains. Livestock production accounts for 40% of the gross value of agricultural production globally. The demand for animal products in China and other growth countries is expected to *double by 2030* (Henning, 2004). China will face a severe water shortage in the north while the south still has abundant water resources<sup>78</sup>.**

Since the 1970s, **hundreds of million have been lifted out of poverty in China**. The major problem in China is to find its way to a **sustainable ecology**<sup>79</sup> when  $\frac{2}{3}$  of cities, almost all of China's rivers and 90% of urban water deposits are seriously polluted. **Water scarcity** in the northern China is a serious threat to sustained economic growth and has forced the government to plan a large-scale diversion of water from the Yangtze River to big cities, including Beijing and Tianjin<sup>80</sup>. In China's populated region rainfall is insufficient, and farmers use irrigation to supplement rainfall. The rise in animal production will account for a substantial growth in pork and poultry production. Egg consumption in China is already more than double the average for developing countries.

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China's future limit of growth is its access to sustainable energy (Ilan & McIntyre, 2008). There are petroleum reserves in the northwest and in the offshore<sup>81</sup>. China activates multinationals to downstream investments in its oil plants in China. China made a near \$400 billion deal with Russia. OAO Gazprom will supply of 30 billion m<sup>3</sup> of gas annually from West Siberia to China over 30 years. China would supplant Germany as Russia's biggest gas market<sup>82</sup>. China is the largest producer and consumer of coal in the world (Creedy, et al, 2006). China has potential for hydroelectric power production in the southwest China. The Three Gorges Dam across the Yangtze River was completed in 2006<sup>83</sup>.

**China's electricity consumption will grow by 4% a year through 2030, which require \$2,000 billion in the electricity infrastructure investment to meet the demand<sup>84</sup>. China's total energy consumption is projected to be double in 2020–2030 by the IEA. China is the second-largest primary energy consumer (after the US) and the third-largest producer (after the US and Russia). The IEA estimates that 80% of Chinese oil consumption will be met by imports in 2030, which increase China's vulnerability to external supply disruptions<sup>85</sup>. Sustainability is challenging since coal is almost 80% of China's primary energy consumption.**

China needs natural resources for its huge industrialization programs. China is the world's leading producer of chemical fertilizers, cement, and steel<sup>86</sup>. China's mineral resources include large reserves of coal and iron ore and nearly all other industrial minerals. The bottleneck is financing of investment in the industrial infrastructure and production in mineral rich regions in China<sup>87</sup>. China imports iron ore from Australia and the US and prefer to develop its steel production. China is the most lead-hungry country that has ambitious plan to expand e.g. its automotive industries. In spite of growth the world's nickel production does not meet demand<sup>88</sup>. The most common metals in use are iron, aluminum, copper and zinc. The **Hubbert's Peak** in copper and other base metals will be approached in the near future (Deffeyes, 2006). China's demand has been a stimulus for investments in stainless steel and aluminum industries in the South Africa, exporting about 80% of its metal and mineral production, primarily to China.<sup>89</sup> The huge Chinese hungry of minerals have been the fact why China strengthens its **strategic partnerships** with the South Africa (Nepeti, et. al., 2006). Through joint ventures and technology transfers, China opens prospects for its resource-seeking investment in the South Africa (Alden & Martyn, 2006). Most of African countries have deficits in their trade with China. China's outward FDI targeted to Africa is a trigger for Africa in its globalization.

In 2012 China was the world leader in the production of various kinds of automotive (Table 10). Today, in the US there are about 1,000 vehicles per 1,000 US people and in Europe about 600 vehicles. Chinese may have for instance 400 vehicles per 1,000 people in 2020 that would be at least 50 million new auto sales annually. China has strong domestic producers, like SAIC Motor, Dongfeng Motor Corp., and FAW but China's top car companies, are losing market share. While domestic producers still dominate, the cars they make are unpopular. As far Chinese consumers can afford foreign cars buy them. Volkswagen AG and General Motors Co., which entered the Chinese market decades ago, are the largest foreign automakers. Foreign car companies can form joint manufacturing ventures with up to three Chinese domestic automakers, which allows them to lower their operating costs by producing their cars inside the country.

**China's transportation-sector CO<sub>2</sub> emissions doubled from 2000 to 2010 and are projected to increase by 50% by 2020. China's 2020 target is to reduce economy-wide carbon intensity by 17% in 2015 from the 2010 level; the growth in emissions must be approximately cut in half<sup>90</sup>.**

COUNTRY	CARS	COMMERCIAL VEHICLES	TOTAL
China	15.523	3.748	19.271
US	4.105	6.223	10.328
Japan	8.554	1.388	9.842
Germany	5.388	0.260	5.649
Korea	4.167	0.390	4.557
India	3.285	0.859	4.145
Mexico	1.810	1.191	3.001
Canada	1.040	1.423	2.463
Russia	1.968	0.262	2.231
Spain	1.539	0.439	1.979
France	1.682	0.284	1.967
UK	1.464	0.112	1.576
World	63.069	21.071	84.141


**Table 10:** Production Statistics of automotive in 2012 (million)

Source: <http://www.oica.net/category/production-statistics/2012-statistics/>

## 4 GLOBALIZATION: FUTURE CHALLENGE

### 4.1 DIGITAL REVOLUTION AND GLOBALIZATION

Alfred Chandler (1990) compared the history of corporate capitalism in the US, Britain, and Germany. The large vertically integrated corporations emerged in the US to replace what had been a fragmented structure of production and distribution. Britain's corporations and their institutes were seriously lagging behind the US managerial revolution. As Chandler has claimed, the large-scale production technology of the 19<sup>th</sup> century **required vertical integration and conscious managerial attention**. The transformation from functional to product organizations was the means to enhance control and coordination (Chandler, 1962). For most of the 20<sup>th</sup> century, vertically integrated managerial hierarchies persisted because it was the appropriate solution for multinationals, MNCs to maintain the minimum efficient scale of operations (Chandler, 1997, p. 64).



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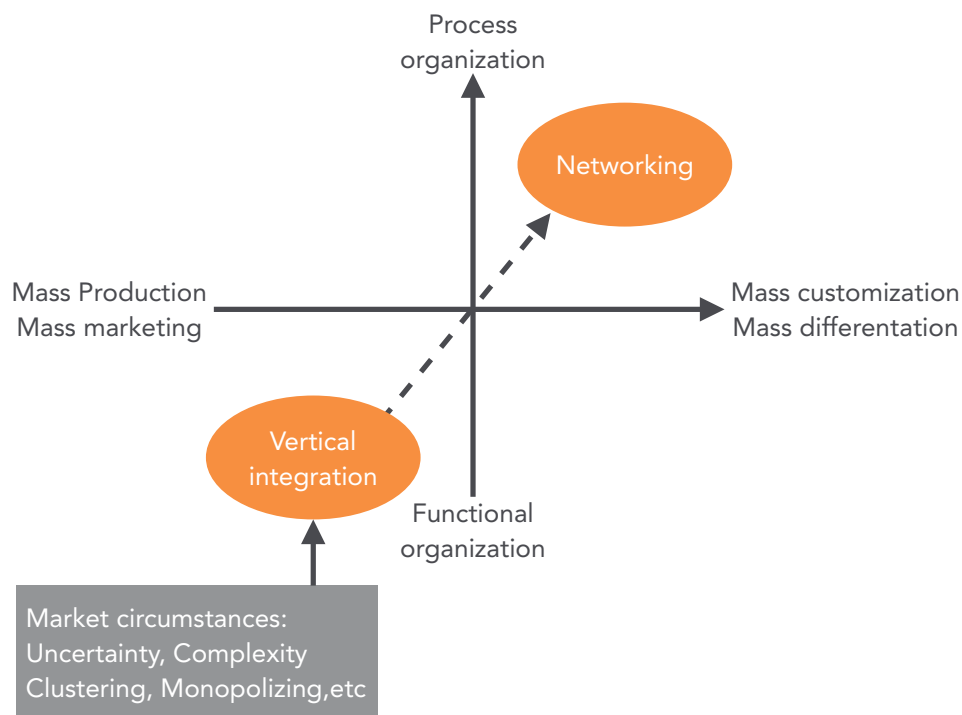
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Globalization and the digital economy have challenged the doctrine of vertical integration. The transformation from the vertically integrated production system to networking needs to enhance flexibility without losing control. The economic disaster of middle-management has led to the restructuring of the industrialized societies, especially in the US (Rifkin, 1995). The process model experimented in Japanese industrial firms, notably in Toyota, has been superior in productivity (like process and product quality). It is possible to speak about an drastic organizational revolution. The transition towards networking can be described in Figure 10.



**Figure 10:** The transition towards network organization

We are in the midst of transition from the industrial society to the information society. Circumstances in global markets can be highlighted by uncertainty, complexity etc that are the major reasons to the **de-integration** of the vertically integrated production. In the industries where knowledge is replacing labor and capital as the key value driver an extreme de-integration and outsourcing of the production into projects is the most prominent. This is because the increased flexibility by a project organization, as the response to market (demand) uncertainty, provides more economies of scope than a functional organization. An example is a **modern film studio** that is highly dependent on a scarce resource provided by third party namely well-known actors. In the past, a film studio was able to appropriate much of the value from its creative talents by utilizing long-term contracts. A project organization constructing on a film-by-film basis allows knowledge to accrue to individuals who are able to sell their services to the highest bidder (Robins, 1993).

**Peter Drucker, the well-known management advisor of many decades in the 20<sup>th</sup> century, has claimed that replacing managerial hierarchies with networking has been the greatest organization and industry structure shifts of the 20<sup>th</sup> century (Drucker, 1998). The *era of digital globalization* has replaced the era of trade based-globalization (Gereffi, 2001).**

Digitalization is revolutionary because it has increased the importance of space and scope to glue together productive processes. The technological forces of the digital era promote a firms' ability to use the applications of **modularized production chains** in the global contexts. The modularity of manufacturing creates norms for the coordination and co-alignment of processes (Tapscott & Ticoll, 2003). In the deconstructive model of manufacturing, the information-rich part, such as industrial services, is often integrated to the headquarters of MNCs when the commodity parts are relocated globally (Sammut-Bonnici & McGee, 2002). Common de jure or de facto standards are the prerequisites for modularization and for the fast ramp-ups and pilot productions of commodities. Modularization and standardization of industrial commodities makes relocation of production easier because the core competence is no more the mastery of production activities. Dell Computers is an well-known example of the use of new technologies to order and get components from suppliers at short notice. The suppliers of intermediate goods use new technologies to make it easier to detect faults and, therefore, move production closer and cut delivery times (Learner & Storper, 2001).

The **Volkswagen Group** (Wolfsburg) is one of the world's leading automobile manufacturers and the largest carmaker in Europe. Its sales revenue in 2013 totaled €197 billion and profit after tax to €9.1 billion. The Group has 12 brands. Each brand has its own character and operates as an independent entity on the market. The product spectrum ranges from motorcycles to low-consumption small cars and luxury vehicles. In the commercial vehicle sector, the products include ranges from pick-ups, buses and heavy trucks. The Group operates 107 production plants of which 19 are in Europe and 8 in other continents. The Group has 572,800 employees worldwide and produces some 39,350 vehicles, and work in vehicle-related services or other fields of business. Its vehicles are sold in 153 countries. The Group's goal is to offer attractive, safe and environmentally sound vehicles which can compete in an increasingly tough market and set world standards in their respective class.<sup>91</sup>

**Networking has thought to be the advantage of SMEs/entrepreneurs but MNCs like Volkswagen master their own network of production, sales and service networks globally through their de facto standards of production plants and through well-known brands. Volkswagen continuous builds competences e.g. protection, allocation and use of IPRs. The economies of scale and scope (Chandler, 1990) are huge for the company.**



SMEs do need to organize mutual collaboration to avoid the obstacles of small scale. **Subcontracting Excellence Club S.E.C ry**<sup>92</sup> is a network consisting of SMEs which have their special field of expertise in metal based industry, mechanical engineering, technical planning and industrial design. SEC is the basis on which the cooperation is built and where the versatile skills of the members speed up the development of new ideas. The problem of growth firms in international operations is how to compensate the small scale in competition against MNCs. Instead of scale, growth firms have to rely on scope (see Chandler, 1990). The difficulty of economizing the extended scope of resources through networking depends on the integration of assets (social, knowledge/technology and money) into a model that is applicable to growth firms (Lahti (2002, 2004, 2008)).





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Many EU countries have stagnated since their SMEs have not succeeded to globalize. A sad country cases is Italy (the second biggest exporter after the US after the World War II). Many glorious company stories are now merely historical incidences. In the US, Germany or China, there are ambitious mid-sized growth companies (e.g. Hidden Champions in Germany) and science-based start-ups (e.g. bio-medical start-ups in California) meaning (1) the **economies of smallness**; and (2) the **economies of bigness**. Finland has the “Bigness Complex” (Adams and Brock, 1986) since Finland is dependent on about 30 export firms that account for 80% of Finland’s exports. Finland has a growing population of internet-based start-ups utilizing Finland’s high internet penetration (Table 11) that is 97.1% – perhaps the highest in the world.

Country	Internet users 2014 Million	Penetration (% Population)	Facebook -2012 Million
Russia	87.4	61.4	7.9
Germany	71.7	88.6	25.3
United Kingdom	57.2	89.8	32.9
France	55.2	83.3	25.6
Turkey	46.2	56.7	32.1
Italy	36.0	58.5	23.2
Spain	35.7	74.8	17.5
Poland	25.6	66.9	9.8
Ukraine	18.5	41.8	2.3
Netherlands	16.1	95.7	7.5
Sweden	9.2	94.8	4.9
Belgium	9.4	90.4	4.9
Hungary	7.3	74.5	4.6
Switzerland	7.1	89.1	3.0
Austria	7.1	86.8	2.9
Greece	6.4	59.9	3.8
Finland	5.1	97.1	2.8

**Table 11:** Internet Usage in Europe

Source: <http://www.internetworldstats.com/stats.htm>

### *Economies of knowledge*

Economies have long been knowledge-based. Sumerians in the Mesopotamian river basin began the use of clay tablets 5,000 years ago. As Kenneth Arrow (1962) pointed out, **information as an economic commodity has attributes of an experience good**. Individuals intending to obtain information cannot know in advance the costs and benefits of certain types of information before they have acquired it. Arrow called that the **information paradox**. The geographic proximity matters in transmitting tacit knowledge. The Internet revolution has dropped the cost of transmitting information across the global geographic space, although the **marginal cost of transmitting tacit knowledge rises with distance**. While it is possible to translate a piece of information into bits, knowledge represents capabilities of individuals associated with understanding, as well as the abilities to organize, interpret and assess information, while information is knowledge reduced to messages that can be transmitted to decision agents (Dasgupta & David, 1994). The value of information depends on the recipient's prior knowledge. Conversely, **the more we know about the subject, the better able we are to evaluate and use new data about it** (Burton-Jones, 1999).

**It is possible to transform codifiable knowledge into bit strings. Tacit knowledge, embodied in practices or people cannot be transformed. The Internet produces forces for both de-agglomeration and agglomeration (Storper & Walker, 1989) allowing remote coordination of innovative activities. Because the Internet cannot 'feel' or 'touch', it maintains needs for deep personal contacts (Castells, 1989, 1996).**

According to Miles (1997), digitalization and the Internet facilitate worldwide relationships with clients. The costs of searching global partners are marginal compared to the time before digitalization. The Internet is the most user-friendly technology that have empowered the young generation, and been the main catalyst of the fundamental shift from seller-driven to buyer-driven markets. Some firms (e.g. Sisco and Dell in the US) have created on-line direct, make-to-order distribution model, and, thereby, they have succeeded to cut costs by **20–45%** through digital technology. Certain business areas are global by their nature. As activities are codified and digitized, they can be moved costless through space. This is true for knowledge intensive business services, such as accounting, advertising and, consulting in which global, the electronic delivery to customers is a substitute to the in-person delivery. Some other providers of knowledge intensive business services, such as German Hidden Champions, have made an opposite strategic choice. They have invested to keep face-to-face contacts with their key customer relations and succeeded excellently.

The internet's biggest success stories are: Amazon (about 50% of America's book market, over 50% in e-books); Alibaba (about 80% of e-commerce in China); Facebook (1.3 billion active members); and Google (68% of online searches in America, more than 90% in Europe)<sup>93</sup>. These companies are born-global. The main reason is the high penetration rate of internet, over 3 billion people and near 50% of the world's population (Table 12).



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World Regions	Internet users 2014 total	Penetration (% Population)	Growth 2000–2014
Africa	297,885,898	26.5	7.9
Asia	1,386,188,112	34.7	25.3
Europe	582,441,059	70.5	32.9
Middle East	111,809,510	48.3	25.6
North America	310,322,257	87.7	32.1
Latin America	320,312,562	52.3	23.2
Oc./Australia	26,789,942	72.9	17.5
WORLD TOTAL	3,035,749,340	42.3	2.3

**Table 12:** Internet Usage GloballySource: <http://www.internetworldstats.com/stats.htm>

Knowledge is replacing labor and capital as the key value driver. Markets are expanding from regional to global. Intelligent networks and virtual spaces are superseding the need for material investments and bits are becoming more powerful than atoms (Romer, 1989, 1990). It is possible to transform the codifiable knowledge into bit strings, while tacit knowledge, embodied in practices, people or networks of relationships, cannot.

## 4.2 DIGITAL SOCIETAL AND PRODUCTION FUNCTION

### *Internet revolution*

In the beginning of the 1990s, when the Internet emerged, it was suggested that the Internet would free the economy from the constraints of geography. The Internet is the protocol that makes possible to communicate over nations' borderlines. The Internet will reinforce the importance of face-to-face contact, and make possible greater linkages between localized concentrations of firms and research labs at very long distances. Since products of new economy such as software, databases, electronic libraries and the new media lack physical distances, the global, digital revolution could bring about the **death of distance** (Cairncross, 1997). The impact is not only to be felt in digitalized industries, but also in those traditional industries that would benefit from improved access to markets (Storper and Walker, 1989).



**In the US, the success of the government-created Internet over the proprietary standards of firms is in many ways a classic illustration of the agglomeration economies.**

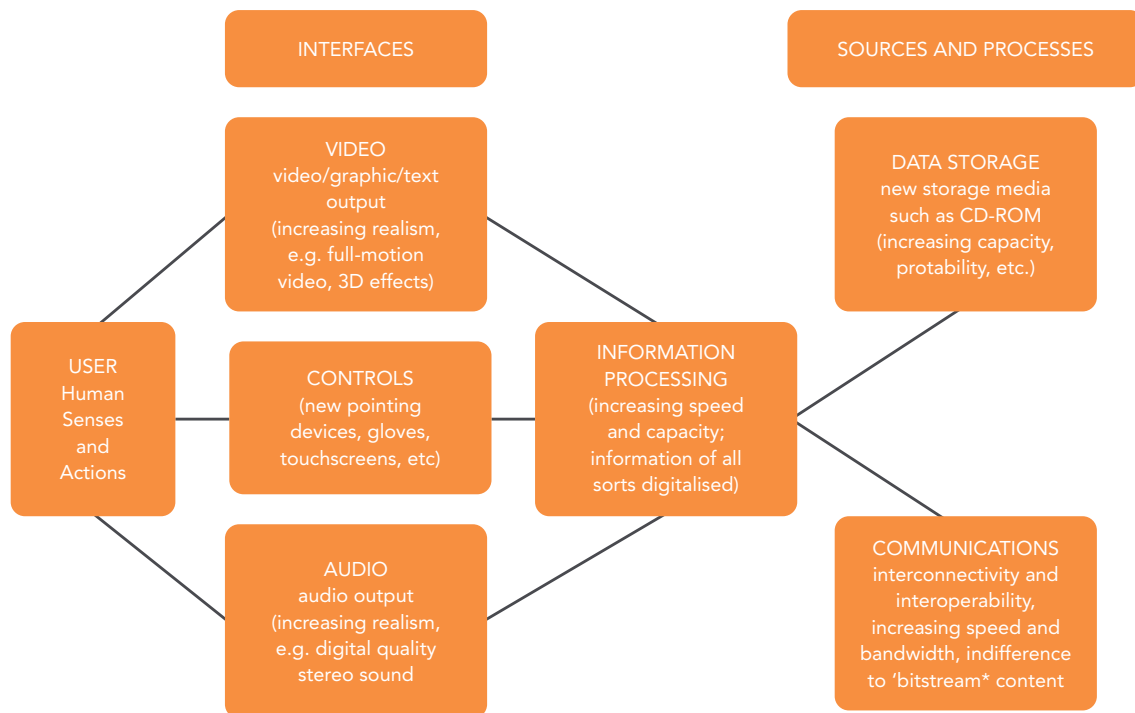
The Internet's existence would counteract proprietary networking strategies, notably by Microsoft, and, thereby, open the possibility for a wide range of firms to compete based on innovations around the Internet. Previous infrastructure innovations have had a double effect, permitting dispersion of routine activities but increasing the complexity of productive activity. The **Internet produces forces for de-agglomeration and agglomeration** (Storper and Walker, 1989). It allows remote the coordination of innovative activities and, even the distance monitoring of production plants or logistics. Because the Internet cannot 'feel' or 'touch', it maintains needs for deep personal contacts (Castells, 1989, 1996). This has led to the rise of net economy that integrates the Internet with media and other industries. Besides information there is the knowledge dimension. The idea is that the possibility to digitalize a huge amount of information can increase knowledge profitability, production, use and diffusion.

The new economy represents a minor part of the GDP in industrialized countries. The potential impact of the adoption of digital technology is wide-ranging. Digitalization of products allows infinite replicability of the product and disrespect of geographical distance in its delivery (music, e-book, insurances). Ian Miles (1997) demonstrates new interactive consumer media products under the label Interactive Television. The future of television is opened up beyond the vistas of countless new channels such as video on demand, surfing to Internet, and teleshopping. Miles emphasizes the term **interactivity** that has been applied to new consumer products like CD-ROMs and Websites. A recent issue, 'interactive TV' covers all of the 'multimedia' products.

The powerful information processing capacity of new IT products allows them to respond to more user input, and to deliver more requested output, more rapidly. The highly interactive products are perceived to be intimate ones, with users shaping what happens next. Some new media applications allow for anonymous contact in **cyberspace** (like bulletin boards, chat lines on CB radio or multi-user games through internet). One of the global megatrends is the **convergence** of computers, communications and broadcasting systems that means that there may be significant cross-over between media. An example of new media product is cyber music, graphical arts or film being run on the Web. Some products seem to succeed, other to fail.

Miles (1997) has examined the evolution of dominant design in the mid 2000s plotted below (Figure 11).





**Figure 11:** Stepping Stones into Virtuality



According to Ian Miles, the interactive products are felt to be not merely more powerful and functional than many of types of communication devices. Digitalization and the Internet offer immediate advertisement everywhere and facilitate worldwide relationships with clients, and traditional firms in peripheral regions may have immediate access to world markets. This is a big opportunity to hundreds of million entrepreneurs worldwide to run global business without massive investments in international marketing and logistics. Finally, last but not least, the increased capacity in data management at the firm level might allow an internal reorganization of the firm, towards a different spatial structure. The new technologies, internet, e-mails, mobile phones in particular, reduce significantly the search and matching costs of finding a partner (Gillespie, Richardson, and Cornford, 2001).

**In terms of the new digital centrifugal and centripetal forces, the costs of searching and matching global partners are marginal compared to the time before digitalization.**

Besides the convergence, the growing importance of high-quality content as a competitive factor will be strengthened in the media industry. The upgraded, customized information via the Internet will become a competitive trump card. The traditional media will win out over the Internet, since there are not such heavy investments in the production of content. If the reliability of information on the Internet is not at a journalistic level, its contents will increasingly resemble marketing communication, not journalistic information. The trend of the Internet and user-friendly technology, that have empowered the young generation, can catalyst a fundamental shift **from seller-driven to buyer-driven markets** (see Linder, 1961), even in public administration, e.g. the health care sector. Some firms have created on-line direct, make-to-order distribution model, and through that eliminated middlemen in the distribution or marketing channels<sup>94</sup>. The buyer-driven approach is the most efficient in the highly developed cities and clustered regions like the Silicon Valley in California.

**These kinds of agglomeration effects of the new Economic Geography have inspired policy-makers around the world to try to imitate the success of the Silicon Valley by offering tax breaks, infrastructures and regulatory relief to high-tech firms in specific locations.**

The consequences of agglomeration effects are not at all straightforward. Two counterbalancing effects can be identified. On the one hand, assuming the global convergence of computers, communications and broadcasting systems, the relevance of Marshall's (1920) and Krugman's (1995) demand and costs linkages is reduced and being close to suppliers and customers become less important. On the other hand, the need to be close to key customers is crucial because of the tacit knowledge transfer. These immobile factors can be fully utilized by regional clustering of actors. Certain business areas are global in their basic nature. As activities are codified and digitized, they can be moved costless through space. Transport costs of many economic (intangible) goods will be reduced to zero. This is true for knowledge intensive business services, such as accounting, advertising and, management consulting in which the global, electronic delivery to customers is a substitute to the in-person delivery.

**The Internet's agglomeration effects seem to be stronger than the Internet deagglomeration. University centers' purely intellectual activities are even more clustered than material activities. This suggests that present or future improvements in communication technologies, such as the Internet, may not eliminate the role of proximity.**

A major challenge is **integration of digital technology and creativity**. Creativity would include such uses as developing software for retrieving data from electronic libraries and an issue arising from this is the compatibility of hardware and software in different systems. The major obstacle in the adaptation of the new economy is not technological, but more cultural. Culture, as the collective memory, includes images, symbols and values that are brought forward from past events. We are in the midst of transition from industrial society to information society. Because of this transition, prevailing business assumption will be challenged. Knowledge is replacing labor and capital as the key value driver. Markets are expanding from regional to global. Intelligent networks and virtual spaces are superseding the need for continuous material investments and bits are becoming more powerful than atoms.

**The challenge of creativity is immense. User-centric interactive services are smart. Applications of New Economy engage people's brains and hands. What is the new, global culture is an open question.**

***Knowledge: What about big data!***

Advances in international communication systems lead to growing similarities in the fashion and music or game preferences of youths around the world, and to the prevalence of global brands, such as Coca Cola, Windows, Levi Jeans, Sony Walkman or Angry Birds. One of the distinctive characteristics of global economy is the role of the Information and Communication Technology (ICT) sectors, which consist of ICT products and media and content products, contribute significantly to the economic growth through the spillover effects. The “new” products, such as software, databases, and broadcasting represent the **weightless economy** where products are not-excludible, infinitely replicable and transportable costless through space.

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**Knowledge is the clue of global, digital economy.** Information represents the mere datum. Knowledge represents the meaning of that datum, and the force that creates new meanings and structures, new ideas and strategies to use it in a valuable way. It is possible to transform only the codifiable knowledge into bit strings, while tacit knowledge, embodied in practices, people or networks of relationships, cannot. The impact is not only to be felt in digital industries, but also in traditional industries that benefit from access to world markets<sup>95</sup>. The Internet revolution counteracts proprietary networking of IT giants, e.g. Google. Tangible assets are weak at resisting duplications by competitors. Intangible assets<sup>96</sup> have unlimited capacity and firms can exploit their value by using them in-house, renting them (e.g., a license) or selling them (e.g. a brand). They are relatively resistant to duplications by competitors.

Regional agglomeration includes investments made over a long period of time in any country (Dunning, 1981, 1988). The Internet economy has produced high densities of dot.com firms in San Francisco, New York, Los Angeles and Seattle, and is following precisely the same geographical pattern as financial service industries and others. For immaterial intellectual production, there is great value in being at the center of business, where the division of labor can be pursued intensively through seminars, conferences, and spontaneous face-to-face contacts. This kind of **creative industry boom** can well be identified in Sweden and in Stockholm (Kista). The capital regions in four Nordic nations are among the most potential regions of immaterial intellectual production in the EU when most of the industrial and agricultural regions are stagnated<sup>97</sup>.

**The exchange of experiences requires trust, understanding and long-term relationships, either directly or through the third party enforcement (Williamson, 1985, 1990, 1991). The Internet is open for anyone. In terms of Schumpeter (1942), creative accumulation relying on market power and economies of scale dominates over creative destruction.**

The **Human Genome Project** is an international scientific research project with the goal to determine the sequence of chemical base pairs which make up the human DNA. The project of identifying and mapping all of the genes of the human genome from both a physical and functional standpoint) has generated about 800 billion dollars economic impact and 310.000 jobs<sup>98</sup>. The genomics revolution is enabled by high-speed sequencers and supercomputers that are able to statistically analyze the big data and to sequence entire ecosystems<sup>99</sup>. However, the big data way of doing science will revolutionize biology. We have only seen a beginning of big data applications in genomics<sup>100</sup>. Charles Darwin (1809–1882), a biologist, could not anticipated the genomics revolution when wrote the **theory of natural selection**: All species of life have evolved over time from common ancestors through the process natural selection.

Darwin's scientific discovery is the foundation of modern biology, as it provides a unifying logical explanation for the diversity of life. Calling for a fundamental rethinking of theories of economics, Michael Rothschild (1990) argues that the market economy is best understood as a living, evolving ecosystem. The major ingredients of Malik's **Syntegration® procedure** is bionics<sup>101</sup> related strongly to ecosystems. The method may be **80 times more efficient than small teams, and up to 100 times faster than traditional decision-making processes** (Malik, 2013).

This means that a radical renewal of strategic making processes is possible and probable in the future as what has been going on as to operational decision-making processes. This was the brilliant vision of Peter Drucker (1985, 1998) in his writings. This is the main point of this book. Monopolistic competition (Chamberlin, 1965; Gutenberg, 1951; Krugman, 1995; Simon, 2009) provided diversity of new product innovations (differentiation) which is to best recipe for any market economy to main a living, evolving ecosystem.

The key element of Fredmund Malik's approach is the **societal function** parallel with the production function which enables society and its diverse organizations to function properly and humanely. His tools include the unique Syntegration® procedures, a social technology for adapting organizations in real time to even fastest-changing environments. Malik (2013) claims that his method ensures management compatibility and coherence throughout an organization and also shared understanding, language, and knowledge which are the pre-condition for speed of action and the effective self-regulation and self-organization of complex systems. The new availability of huge amounts of data, along with the new tools to crunch these numbers, offers a whole new way of understanding the world.

The crucial problem that Malik has tackled is to know more about the underlying empirical micro-processes. One of them is **technology substitution** that is much the same as the natural selection by Darwin. In terms of the TRIPS by the WTO technologies used in products and processes are (90%) protected by business secrets, and hidden from scientists. Malik (2009) advises managers to improve skills in decision-making. Malik analyses complexity by applying management cybernetics in an interdisciplinary combination of methods. Malik's argues that applying cybernetics, enables an organization to function more effectively and efficiently. Firms need to invest in big data to derive insight from information streaming in the value chain from suppliers and customer, which is the key strategic problem in Malik's (2013) conception. Malik's models are an example of how big data are complemented by big judgment (see Shah, Horne, Capellá, 2012). As Malik (2013) has emphasized, it would be necessary to have a thorough understanding of the systems dynamic.



**Malik (2013) predicted the “The Great Transformation” what we experience today: a long phase of mostly unexpected societal turbulence including financial collapse and debt crises that has the roots in the growing complexity of today’s global systems and the inadequacy of conventional management methods to effectively deal with it.**

With Big data the traditional approaches to economics<sup>102</sup> (hypothesize, model, test) may become obsolete in particular when big data is contextualized in their social, economic, and political contexts<sup>103</sup>. Big data has been called a “fad” by scientists and its use was even made fun of as an absurd practice in a satirical example on “pig data” (Reips & Matzat, 2014). Scientists are concerned of the use of big data and neglecting “principles” such as choosing a representative sample by being too eager to handle data. Integration across heterogeneous data-bases of “big data” presents formidable logistical and analytical challenges as working with big data is subjective, and what it quantifies is not necessarily an objective truth (Boyd & Crawford, 2012). Big data obsession of the media or consultants can lead to “a big mistake” (Harford, 2014).



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Big data is rapidly becoming a recognized market term for the growth in the volume of data. Understanding the use of pattern-based analyzing methods is not common among scientists (Mauro, Greco & Grimaldi, 2012). Google has conquered the advertising world with nothing more than big data and applied mathematics. Google's founding philosophy is that we don't know why this page is better than that one. No semantic or causal analysis is required. Google translate languages without actually "knowing" them. It is possible to claim: "All models are wrong, and increasingly you can succeed without them"<sup>104</sup>. What can science learn from Google is the use of **multivariate methods** that probe for the latent structure of the data, such as factor or cluster analysis, have proven useful. In health and biology, conventional scientific approaches are based on experimentation. For these approaches, the limiting factor is the relevant data that can confirm or refute the initial hypothesis<sup>105</sup>.

Big data analytics challenge the scientific method. In the minds of scientists model is tested to confirm or falsify it. This is the way how science has worked since Aristotle whose writings on science are largely qualitative. Beginning in the 16th century, scientists applied mathematics to the physical sciences<sup>106</sup>. The principles of scientific work expounded by **Sir Isaac Newton** (1643–1727), an English mathematician and the most influential men in human history. In his works, Newton described universal gravitation and three laws of motion, laying the groundwork for classical mechanics and for modern engineering<sup>107</sup>, which dominated scientists' view of the physical universe for the next three centuries. The classical physics has its origin in the Newton's mechanical model of the Universe.

**Albert Einstein** (1879–1955), a German physicist, is best known for his theory of relativity (equation  $E = mc^2$ )<sup>108</sup>. Einstein's contributions to physics are the theory of relativity, which reconciled mechanics with electromagnetism, and the general theory of relativity, which provided a new theory of gravitation. Because of Einstein, Newton's models in physics are no more valid at the atomic level. Research in physics is oriented to **statistically based quantum mechanics**<sup>109</sup> dealing with aspects of physics at the subatomic level. The CERN is a European research organization (Geneva) that provides largest particle physics laboratory in the world and other infrastructure needed for high-energy physics research which appears to show unpredictable behavior as billions of particles bombard against each other.

**The revolution in physics is the task of top scientists who are the link in the chain of observational processes of how the properties of atomic objects can be understood in terms of the objects' interaction with the observer**<sup>110</sup>.

### ***Cloud computing (CCT) technology***

The CCT applied across various kinds of manufacturing systems since it allows for a more personalized, diversified and mass-produced product portfolios and flexible reaction to customer needs. The new emerged technologies, mainly the IOT (Internet of things) address the key problems faced by manufacturing-SMEs in their transfer towards the service-oriented, collaborative, knowledge-intensive and eco-efficient business models in global markets (Huang, Li, Yin and Zhao, 2013). The brilliant idea of the resource and capability sharing based on the CCT for SMEs (e.g. Dokkari <https://www.dokkari.fi/>) resembles notions of networking. The key problem in implementing the CCT service platform for SMEs is not mainly technical. **It is a revolution in corporate cultures.**

The combination of CCT and strategic marketing make possible a presence in virtually any location around the world. Even SME-manufacturers can make the transfer to become more innovation centric by the increased use of digital technologies. In principle, creative destruction matters. The cloud computing (CCT) technology do help SMEs in product, process and service innovations but there are not so much evidence of how the CCT can be implemented in manufacturing industries. The CCT has impacted businesses and penetrated many areas from banks, automobile sector, education, logistics, wholesale, retail and health care.

***The adoption of CCT provides for a firm better visibility, cost reduction, resource management and greater flexibility (Weng & Lin, 2014).***

The CCT is a cloud-based architecture which is regulated by “invisible hand” by supply and demand resources at market equilibrium (Buyya, Yeo, Venugopa, Broberg, and Brandic); its flexibility in terms of services usage; and pay as per usage of resources. Some characteristics of the CCT are similar to network computing, grid computing, utility computing, pervasive computing and service computing (Fernando, Loke & Rahayu, 2013). The CCT lowers the cost of entry for SMEs that can benefit from the computing power for a relatively short amount of time. Reduction in capital investment in hardware and software infrastructure could therefore provide companies with the opportunity to acquire IT capacities that were not possible in past (Grossman & Gu, 2008). The CCT lower the IT barriers to innovations. Since computing resources are managed through software as a service (SaaS), they can be deployed fast which brings the ease of use (Greer, 2009) and lower transaction costs in global transfer of even tacit knowledge.

The CCT diffusion is a vital research topic because it enables firms to execute data transactions along value chains, e.g. manufacturing, finance, distribution, sales, customer service and collaboration with trading partners. The CCT may lead to higher profits (Grossman & Gu, 2008). The CCT reduces cost of IT services and increases processing throughput, reliability, availability, and flexibility and decreases process time (Hayes, 2008). The CCT provides many strategic and operational advantages to its adopters although its adoption rates among manufacturing SMEs – the user group of the CCT that could potentially take substantial strategic and operational advantages of the early adaption – seems not to grow as expected (Goscinski & Brock, 2010).

Business environment is characterized by the pressure of competition. The most successful firms today are those who link their customers and suppliers together into tightly integrated networks. Even manufacturing-SMEs realize that the CCT provides both a global reach and a local responsiveness and that the traditional vertically integrated business models need to be re-evaluated, with increased cooperation between partners and sharing greater information with customer and suppliers in order to avoid interruptions in logistics flows and create **differential advantages** (Alderson, 1957, 1965).

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ICT technologies such as RFIDs (Radio Frequency Identification) and robotics are the enablers of traceability which means to consumers safety, awareness of product sources, etc. and to SMEs a better protection of immaterial property rights (IPRs). Counterfeit (goods falsified) are even **10%** of international trade, presenting a high risk to firms. The ubiquity of RFID devices poses tremendous privacy and security implications for consumers and firms. Robotics impact on capacity to maintain a globally competitive manufacturing. Digital innovations will revitalize industrial production that is the key driver for innovation, economic growth and job creation in the EU since about 32 million people employed in manufacturing and each job generates extra service jobs. **80%** of innovations are in manufacturing industries and **75%** of the EU's exports are manufactured products<sup>111</sup>. Robotics offers solutions to societal challenges from ageing to health, smart transport, security, energy and environment. Advanced robotics is one of the key drivers of digital revolution globally<sup>112</sup>.

The CCT allows the creation of virtual value chains that are not dependent on location<sup>113</sup>, and facilitate the demand-based or factor-based location. Gartner predicted strong growth (2011–2017) across all public cloud services market segments, with a CAGR<sup>114</sup> of 17.4%. The end-user spending on public cloud services is growing to **\$250 billion** by 2017, including cloud advertising<sup>115</sup>. The “Industry 4.0” – digital revolution – contributes to Germany's GDP **€78 billion** by the year 2025. Big data and analytics market reached the volume of **\$125 billion** worldwide in 2015<sup>116</sup> and information volume worldwide is growing annually at a minimum rate of **60%**<sup>117</sup>. Big data is a storage issue, but also a massive analysis issue<sup>118</sup>.

Robert Lucas (1988) has argued that human capital externalities constitute a major growth factor. Alfred Marshall (1920) proposed this factor as one of the main reasons to justify the existence of cities. Two sub-factors that seem to catalyze communication externalities are the city size and education system. Human capital have some **external effects** through a variety of other channels. Marshall found that the supply of specialized intermediate goods improves the productivity of final producers. Marshall refers to a more extensive division of labor within a more educated workforce, etc. The famous example is Silicon Valley, the region most associated with the rise of the Internet<sup>119</sup>. The close relationships between universities, federal research labs and industry leaders have shaped the collaborative and entrepreneurial network of firms in the region. Researches on innovation process shows that both location and proximity are critical. Firms need networks of experts and institutions around them to test and get feedback on the new products and services, get ideas for new products from customers, related industries and research institutions. For this to happen, a lot of formal and informal communication has to take place.

**Having a long history as a state-owned research laboratory, the core units of Nordic ITC firms are able to combine the university type of organization culture with the competitive behavior. In the areas of creative destruction like mCommerce, this kind of entrepreneurial culture is powerful.**

The Nordic ITC firms have their own model of temporary monopoly profits in the Schumpeterian sense. Like Hamel and Prahalad (1994) suggest, **Nordic ITC companies have shifted their focus from market share to opportunity share.** A trustified window of opportunities may be easy to see in the case of mCommerce. The huge speculation with the global, internet-based markets with a billion users means that the process of discovery in a market setting is totally chaotic. Because entrepreneurial opportunities depend on asymmetries of information and speculations in the stock markets, there are many winners and losers among the market participants. **The opportunity share of the Nordic ITC firms consists of the unique ability to integrate the Internet with mobility.** An example is the meteoric rise of **Linux operating system.** The Linux community of volunteers is an example of how ad hoc participants can foster the rapid development technology and therefore, make a 'creative destruction' possible.

**The Schumpeterian challenges are: Can Nordic entrepreneurs following Linus Torvads' example challenge the big giants of communication industries? Is there something in the Nordic cultural heritage, education system or mentality that makes it possible to act globally in the age of 21 – and win big industry giants?**



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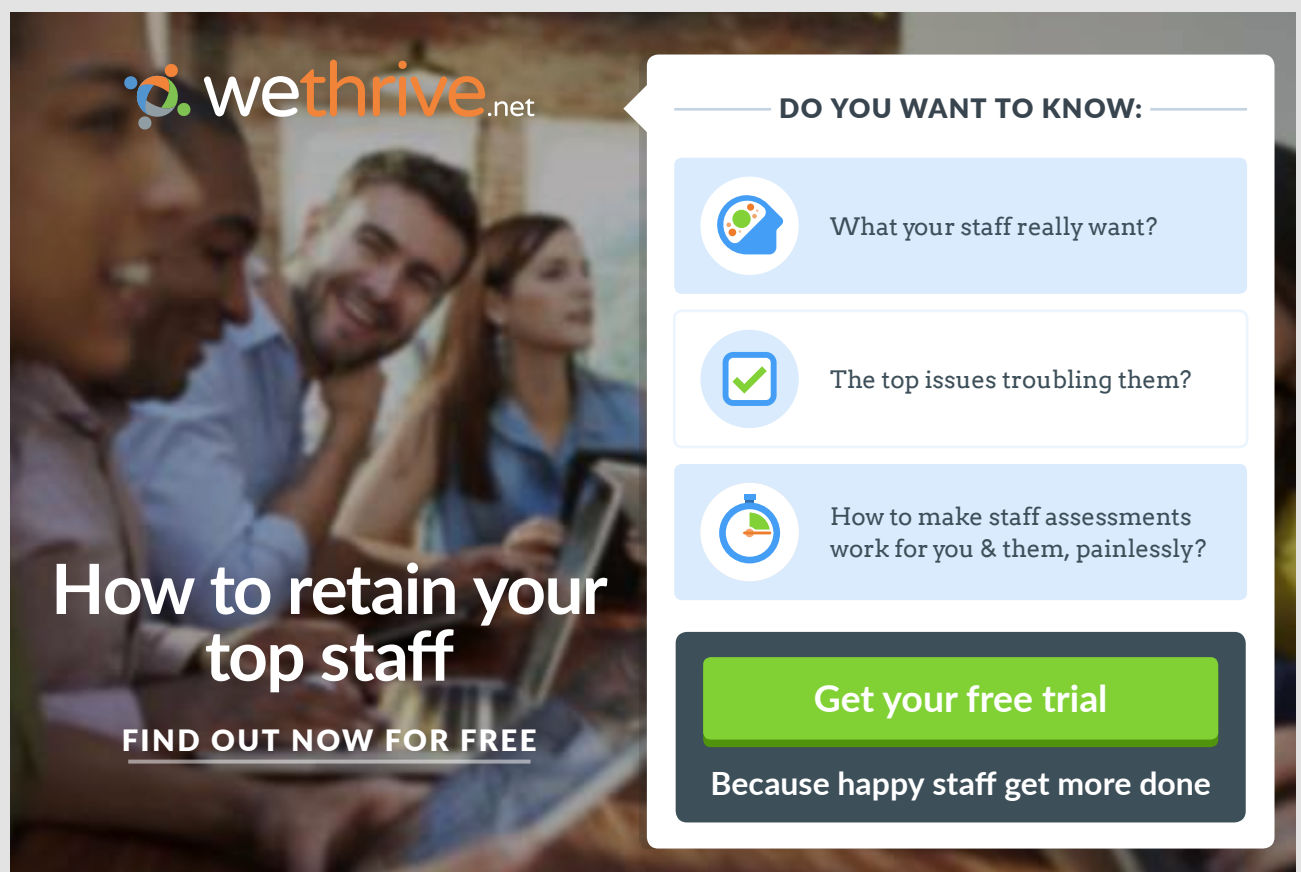
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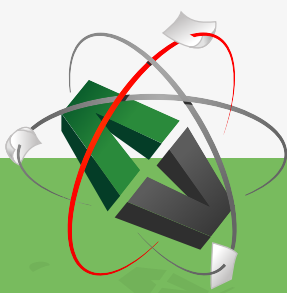
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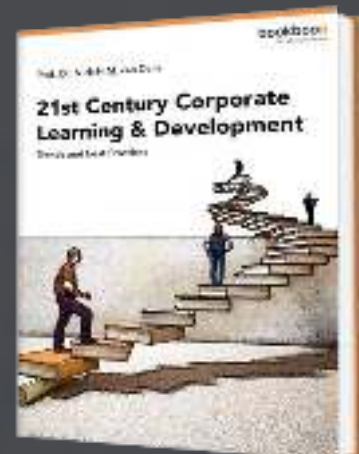
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## ENDNOTES

1. Today, there are 18 top quality, entrepreneur driven companies in SEC, located mainly in the southern part of Finland. The cumulative turnover of the members is about EUR 200 million, and they employ some 2.000 individuals. SEC was established in 1993. <http://www.secry.fi/english.htm>
2. Moore's original statement can be found in his publication "Cramming more components onto integrated circuits", Electronic Magazine, 19.4.1965.
3. Tuomi, Ilkka "The Lives and Death of Moore's Law".  
[http://www.firstmonday.org/issues/issue7\\_11/tuomi/](http://www.firstmonday.org/issues/issue7_11/tuomi/)
4. The Stability and Growth Pact reinforces the Maastricht convergence criteria and the restrictions on fiscal policy rules, even with penalties on countries that fail to correct situations of excessive deficits and debt.
5. Statement of the international group of experts nominated by the EU Commission and working under the leadership of Esko Aho, the President of the Finnish National Fund for Research and Development (SITRA).
6. The global shock in the Finnish bank industry in the early 90s provides innovative firms opportunities to make temporary monopoly profit(s), if they are able to foresee the new entrepreneurial environment (creative destruction). Otherwise, small innovative firms have the risk of going bankrupt. In the early 90s, about 1/5 of SMEs were going bankrupt because of the global shock and relatively more innovative firms.

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7. One of key issues in the development of venture capital markets is harmonization of taxation. See Lahti, Tom (2004).
8. [www.nobelprize.org/nobel\\_prizes/...](http://www.nobelprize.org/nobel_prizes/...)
9. <http://www.ericsson.com/news/1741771>
10. Balassa 1976) also makes a difference between certain types of integration, namely: 1. Trade integration, which means removing barriers, 2. Factor integration, which refers to liberalization of factor movements, 3. Policy integration consisting of harmonization of economic policies, and Total integration, i.e. complete unification of the policies of participating countries.
11. <http://www.britannica.com/EBchecked/topic/343324/Friedrich-List>
12. Heckscher was a Swedish economist. He is best known for his book “Mercantilist.” Although his major interest was to study economic history, he developed the essentials of the factor endowment theory of international trade in a short article in Swedish in 1919. It was translated into English thirty years later. <http://www2.econ.iastate.edu/classes/econ355/choi/ho.htm>
13. There are four major components of the HO model: Factor Price Equalization Theorem, Stolper-Samuelson Theorem, Rybczynski Theorem, Heckscher-Ohlin Trade Theorem  
<http://www2.econ.iastate.edu/classes/econ355/choi/ho.htm>
14. Foster and Stehrer (2013) used the World Input-Output Database (WIOD). They first provide an overview of these trends over the period 1995–2011 for 40 advanced and emerging countries with a specific focus on the EU as a whole and the individual EU member states. They show results from an econometric analysis to explain growth performance, focusing on the impacts of the increasing internationalization of production.
15. Wassily Leontief received a Nobel prize in 1973 for his contribution to the input-output analysis. Three of his students, Paul Samuelson, Robert Solow and Vernon Smith are also recipients. <http://www2.econ.iastate.edu/classes/econ355/choi/leo.htm>
16. <http://www.princeton.edu/pr/pwb/volume98/issue07/nobel/>
17. Krugman praises his PhD thesis advisor, Rudi Dornbusch to whom he presented ideas, e.g. a monopolistically competitive trade model. Rüdiger “Rudi” Dornbusch (1942–2002) was a German economist who worked for most of his career in the US. Krugman wrote: “...Rudi had the knack of inspiring students to pick up his enthusiasm and technique... Rudi largely invented the modern role of academic economist as active policy participant. <http://www.pkarchive.org/theory/Rudi.html>
18. “Bold strokes: a strong economic stylist wins the Nobel”, The Economist, October 16, 2008.
19. Paul Krugman, Nobel – Forbes [www.forbes.com/2008/.../13/krugman-nobel-economic](http://www.forbes.com/2008/.../13/krugman-nobel-economic)
20. Centripetal forces that affect geographical concentration are (1) Market-size effect, (2) Thick labour markets, and (3) Pure external economies. Centrifugal forces are: (1) Immobile factors, 2) Land rents, and (3) Pure external diseconomies. Krugman, 1995.
21. These two disciplines tend to overlap, particularly in international marketing and international economics, and used the same concepts or theories. The product cycle concept was initially developed by economists as part of the international framework, and later adapted by marketers.
22. Vernon stresses the degree of standardization as evidence of maturation of the product. A mature product typically may become standardized across international markets.
23. Adam Smith emphasized the importance of a natural order of things in the developmental sequence of an economy building in book Wealth of nations in 1776 (Coleman, 1980).

24. As mentioned earlier, the four distinct stages are: 1. factor-driven, 2. investment-driven, 3. innovation-driven, and 4. wealth-driven.
25. For instance: entrepreneurship, innovations, knowledge, skills, technology, and culture.
26. Especially paper & pulp industry and metal & engineering industry
27. This process goes through exports first, then the establishment of a marketing subsidiary and concludes with the creation of overseas production facilities. (Arora, and Fosfuri, 2000).
28. The importance of experiential knowledge increases with the sophistication of the product handled and with the complexities of the target market, allowing firms to perceive and formulate opportunities (Johanson and Vahlne, 1977).
29. My own notice based on long experience since the beginning of the 70s.
30. It has the information of 390 Finnish industrial companies accounting for 46% of total Finnish industrial exports. Luostarinen founded the FIBO) program in 1974. Since then, data has been collected systematically. To maintain the comparability of the surveys executed 1976, 1983, 1990, 1997). The latest mail survey in 1997 is based on the information for the 1996 fiscal year.
31. The questions: 1. How to define the boundaries of the different stages? 2. Why the process of internationalization is one-directional, outward oriented, but not the practice in average? 3. What is the applicability of the model to different types of product or service? 4. What is the role of multinationals that have both high levels of resources and international experiences and are likely to skip lower commitment stages of the process? (Bridgewater, 2000).
32. Oligopolistic rivalry refers to rivalry in a market which is shared by a small number of usually large producers or sellers. Each producer is, thereby, obliged in its market behavior to take fully into account the actions and behavior of its current and potential large rivals in the market.
33. The strategic group theory mentioned earlier is a realistic framework to analyze this kind of mutual learning by doing of interdependent firms.
34. China's average growth of 10% per year during 1980–2001 (World Bank (2003) World Development Indicators, Washington, DC: World Bank).
35. Advances in international communication leads to growing similarities in the fashion and music preferences of youths around the world, and to the prevalence of global products such as Coca Cola, Levi Jeans or Sony Walkman.
36. FDI's can be a green field investment, establishing a foreign affiliate starting new production facilities, or merger and acquisition operation that aims at acquiring control of existing entities.
37. Ming Zeng and Peter Williamson have studied the strategies and performance of 50 Chinese companies, warn against such complacency, saying: "Multinational executives who do not perceive China's state-owned and privately-held companies as potential competitors have missed the rise of the new breed of Chinese companies that have already succeeded in capturing some foreign markets." (Zeng and Williamson, 2003).
38. [http://en.wikipedia.org/wiki/Pyrrhic\\_victory](http://en.wikipedia.org/wiki/Pyrrhic_victory)
39. Krugman, Paul (May 1, 2012) Milton's Paradise Lost, New York Times.
40. The Economist (2013) The origins of the financial crisis: Crash course, 7 Sep 2013. <http://www.economist.com/news/schoolsbrief/21584534-effects-financial-crisis-are-still-being-felt-five-years-article>  
Harvard Business Review (September 2014, p. 20): "The financial sector's power has grown in the few decades, and the legislation has failed to keep it in check..."

41. UN warns global youth unemployment will continue to rise [www.ft.com/.../fa7f0a0a-b730-11e2-841e-00144feabdc0.html](http://www.ft.com/.../fa7f0a0a-b730-11e2-841e-00144feabdc0.html)
42. The WIPO Convention was signed at Stockholm in 1967 and as amended in 1979). According to the Article 3, the WIPO seeks to “promote the protection of intellectual property throughout the world.” [www.tmpsearchers.com/intellectual-property/](http://www.tmpsearchers.com/intellectual-property/)
43. In 2014, there were 148 contracting states to the PCT that constitute the International Patent Cooperation Union and, the total number of PCT applications was 539,300 (national phase entries). The growth rate of PCT applications was high in Asia in China (31.5%), Korea (21.3%), Japan (17.45%) and India (12.6%). [PDF]Patent Cooperation Treaty Yearly Review – WIPO [http://www.wipo.int/ipstats/en/statistics/country\\_profile/countries/de.html](http://www.wipo.int/ipstats/en/statistics/country_profile/countries/de.html)
44. Its headquartered is in Geneva, Switzerland and as of 2013 works in 165 countries. <http://www.iso.org/iso/home.html>
45. The Economist October 2014 Schumpeter – Pointers to the future, p. 64.
46. Source: Battelle, R&D Magazine, International Monetary Fund, World Bank, CIA World Factbook <http://www.rdmag.com/articles/2013/12/global-funding-r-d>
47. <http://billofrightsinstitute.org/resources/educator-resources/headlines/property-rights/>
48. [www.uspto.gov/news/pr/2013/13-10.jsp](http://www.uspto.gov/news/pr/2013/13-10.jsp)

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49. USPTO Issues First-Inventor-to-File Examination Guidelines and Final Rule, February 13, 2013, By Donald Zuhn, <http://www.patentdocs.org/2013/02/uspto-issues-first-inventor-to-file-examination-guidelines-and-final-rule.html>  
First-To-File Patent Law Is Imminent, But What Will It Mean? Posted Feb 16, 2013 by Leonid Kravets <http://techcrunch.com/2013/02/16/first-to-file-a-primer/>
50. Source: Battelle, R&D Magazine, International Monetary Fund, World Bank, CIA World Factbook <http://www.rdmag.com/articles/2013/12/global-funding-r-d>
51. In 2007 China hds **66 billionaires**, the second largest number after the US, which had 415 IBISWorld Newsletter March 2008, China – Let the Good Times Roll, IBISWorld
52. [http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?order=wbapi\\_data\\_value\\_2013+wbapi\\_data\\_value+wbapi\\_data\\_value-last&sort=desc](http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?order=wbapi_data_value_2013+wbapi_data_value+wbapi_data_value-last&sort=desc)
53. <http://www.economist.com/blogs/freeexchange/2012/01/chinas-labour-force>
54. [http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2000/01/06/000178830\\_98101903374851/Rendered/INDEX/multi\\_page.txt](http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2000/01/06/000178830_98101903374851/Rendered/INDEX/multi_page.txt)
55. [www.adb.org/Documents/books/ado/2006/part010403.asp](http://www.adb.org/Documents/books/ado/2006/part010403.asp)
56. Hyvärinen, ITC, Geneve.
57. General Administration of Customs en.ce.cn/Business/.../t20090221\_18279633.shtml
58. European Commission: Trade: Textiles and footwear ec.europa.eu/trade/.../textiles-and-footwear/
59. European Commission: Trade: Textiles and footwear ec.europa.eu/trade/.../textiles-and-footwear/
60. <http://www.pambazuka.org/en/category/development/29776>
61. In the US 10% of 25,000 big cotton farmers receive 73% of all cotton subsidies, \$5 billion <http://www.un.org/ecosocdev/geninfo/afrec/vol17no1/171agri4.htm>
62. The International Cotton Advisory Committee  
<http://www.zmag.org/content/showarticle.cfm?ItemID=13230>
63. Africa and China: A Strategic Partnership? Judith van de Looy, ASC Working Paper 67/2006, African Studies Centre, Leiden, The Netherlands
64. China is about as big producer as India but it not a major exporter of cotton.
65. <http://edis.ifas.ufl.edu/fe902>.
66. [www.economist.com/business/displaystory.cfm?story\\_id=9516043](http://www.economist.com/business/displaystory.cfm?story_id=9516043)
67. According to the EUROSTAT database (2005), key suppliers to the EU in 2004 are: Mali €42 million, Chad €27 million, Cameroon €26 million, Sudan €14 million and Zimbabwe €22 million, Ivory Coast €9 million and Mozambique € 9 million.
68. Organic cotton is fibre that does not come from genetically modified (GM) seed and has been grown without the use of man-made pesticides and fertilizers.  
[www.eaecon.org/5th%20Inter%20Papers/Final%20Paper%20-%20Ancy%20T..htm](http://www.eaecon.org/5th%20Inter%20Papers/Final%20Paper%20-%20Ancy%20T..htm)
69. <http://www.infochangeindia.org/features61.jsp>
70. <http://www.textileasia-businesspress.com/>
71. The Seeds Of Suicide: How Monsanto Destroys Farming ...  
[www.globalresearch.ca/the...of...monsanto.../5329947](http://www.globalresearch.ca/the...of...monsanto.../5329947)
72. China's economic stimulus plan targets its infrastructure  
[www.usatoday.com/.../2008-11-11-China\\_N.htm](http://www.usatoday.com/.../2008-11-11-China_N.htm)
73. <http://www.infomine.com/investment/metal-prices/crude-oil/1-year>

74. <http://www.economist.com/blogs/economist-explains/2014/12/economist-explains-4>
75. <http://www.cfr.org/united-states/shale-gas-tight-oil-boom-us-states-economic-gains-vulnerabilities/p31568>
76. Asia Pacific Trade, Asia Pacific Exports, Asia Pacific Imports  
[www.economywatch.com](http://www.economywatch.com)
77. [www.ifad.org/evaluation/public\\_html/eksyst/doc/thematic/organic/asia.pdf](http://www.ifad.org/evaluation/public_html/eksyst/doc/thematic/organic/asia.pdf)
78. Groundwater mining also occurs in countries of the Near East, South and East Asia, Central America and in the Caribbean, even if at the national level the water balance may still be positive. [www.fao.org/docrep/005/y4252e/y4252e05b.htm](http://www.fao.org/docrep/005/y4252e/y4252e05b.htm)
79. A 1998 WHO report on air quality in 272 cities worldwide concluded that 7 of the world's 10 most polluted cities were in China. Pollution costs the Chinese economy 7%–10% of GDP each year. [www.ncbuy.com/.../backgrounds.html?...backeconomy](http://www.ncbuy.com/.../backgrounds.html?...backeconomy)
80. A 2005 report by the World Bank states that more than 300 million people in rural China have no access to safe water and nearly 800 million have seen no improvement in sanitation and hygiene in recent years.
81. China's onshore oil resources are mostly located in the Northeast and in Xinjiang, Gansu, Qinghai, Sichuan, Shandong, and Henan provinces.
82. <http://www.bloomberg.com/news/2014-11-10/russia-china-add-to-400-billion-gas-deal-with-accord.html>
83. [www.worldlawdirect.com/.../China\\_country\\_analysis\\_brief.html](http://www.worldlawdirect.com/.../China_country_analysis_brief.html)
84. [www.ncbuy.com/.../backgrounds.html?code...](http://www.ncbuy.com/.../backgrounds.html?code...)
85. [http://www.gasandoil.com/ogel/samples/freearticles/article\\_15.htm](http://www.gasandoil.com/ogel/samples/freearticles/article_15.htm)
86. "In Chinese Factories, Lost Fingers and Low Pay". David Barboza. New York Times. January 5, 2008  
[en.wikipedia.org/.../Economy\\_of\\_the\\_People's\\_Republic\\_of\\_China](http://en.wikipedia.org/.../Economy_of_the_People's_Republic_of_China)
87. [www.chinamining.org/](http://www.chinamining.org/)
88. Russia has 40% of the global resources. Norilsk is the largest global producer of nickel and palladium.  
[www.miningworld-russia.com/pages/Russia.htm](http://www.miningworld-russia.com/pages/Russia.htm)
89. An Evaluation of the Developing Economic Relationships between China and South Africa in the Context of Negotiations on a Trade Agreement by Nepeti Nicanor, Simon Roberts and Marian Walker, Accelerated and Shared Growth in South Africa: Determinants, Constraints and Opportunities, 18–20 October 2006.  
[www.commerce.uct.ac.za/...Units/.../Chinadraft%20final%20101006.pdf](http://www.commerce.uct.ac.za/...Units/.../Chinadraft%20final%20101006.pdf)
90. <http://www.theicct.org/china>
91. [http://www.volkswagenag.com/content/vwcorp/content/en/the\\_group.html](http://www.volkswagenag.com/content/vwcorp/content/en/the_group.html)
92. SEC was established in 1993. <http://www.secry.fi/english.htm>
93. <http://www.economist.com/news/briefing/21635077-online-businesses-can-grow-very-large-very-fastit-what-makes-them-exciting-does-it-also-make>
94. Some ICT firms (Cisco and Dell) in the US have succeeded to cut costs by 20–45% and to reduce working capital and Investment by 20–60% through applications of digital technology.
95. Besides the new of digital economy there are terms like virtual economy, information economy, weightless economy, knowledge economy, network economy, e-economy and many others.



96. Intangible assets include intellectual property such as trademarks and patents as well as brand, networks and databases. The presence of intangible assets account for the significant differences that are observed between the balance sheet valuation and stock market valuation of publicly quoted firms such as in the pharmaceutical sector where patents are critical.
97. Research and innovation statistics at regional level  
[http://ec.europa.eu/eurostat/statistics-explained/index.php/Research\\_and\\_innovation\\_statistics\\_at\\_regional\\_level](http://ec.europa.eu/eurostat/statistics-explained/index.php/Research_and_innovation_statistics_at_regional_level)
98. Economic Impact of the Human Genome Project – Battelle” (PDF). Retrieved 1 August 2013. [http://www.battelle.org/docs/default-document-library/economic\\_impact\\_of\\_the\\_human\\_genome\\_project.pdf](http://www.battelle.org/docs/default-document-library/economic_impact_of_the_human_genome_project.pdf)
99. His 1859 book **On the Origin of Species** established evolution by common descent as the dominant scientific explanation of diversification in nature. He also examined human evolution and sexual selection in *The Descent of Man*, and *Selection in Relation to Sex*, followed by *The Expression of the Emotions in Man and Animals*. In recognition of Darwin's pre-eminence, he was one of only five 19th century UK non-royal personages to be honored by a state funeral. <http://listverse.com/2009/02/24/top-10-most-influential-scientists/>

# #2020Resolutions

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100. The National Science Foundation announced the Cluster Exploratory, a program that funds research designed to run on a large-scale distributed computing platform developed by Google and IBM in conjunction with six pilot universities. The cluster will consist of 1,600 processors, several terabytes of memory, and hundreds of terabytes of storage. Early CluE projects will include simulations of the brain and the nervous system and other biological research that lies somewhere between wetware and software. Learning to use a “computer” of this scale may be challenging. <http://www.wired.com/2008/06/pb-theory/>
101. Today’s organizations are highly complex hybrids of man and technology, the results of human thought and action. For the management of these organizations, the biological sciences provide more substantial guidance than the economic sciences. Consequently, the scientific basis for the Malik Management Systems® are the three complexity sciences systems theory, cybernetics and bionics. <http://www.malik-management.com/en/malik-approach/cybernetics-systemics-bionics>
102. Models by neoclassical economics can predict future development if the future is similar to the past. If the systems dynamics of the future change, the past can say little about the future.
103. <http://www.theguardian.com/news/datablog/2012/mar/09/big-data-theory>
104. Google’s research director Peter Norvig claims: “All models are wrong, and increasingly you can succeed without them.” Calude, Cr. (2015) The Human Face of Computing, Amazon.
105. <http://www.bigdataparis.com/documents/Pierre-Delort-INSERM.pdf#page=5>
106. <https://en.wikipedia.org/wiki/Aristotle>
107. <http://listverse.com/2009/02/24/top-10-most-influential-scientists/>
108. Einstein received the 1921 Nobel Prize in Physics “for his services to Theoretical Physics, and especially for his discovery of the law of the photoelectric effect. Einstein published over 300 scientific works and, and in 1999 Time magazine named him the “Person of the Century”. In wider culture the name “Einstein” has become synonymous with genius.  
<http://listverse.com/2009/02/24/top-10-most-influential-scientists/>
109. [https://en.wikipedia.org/wiki/Quantum\\_mechanics](https://en.wikipedia.org/wiki/Quantum_mechanics) <http://home.cern/>
110. Sundara Raman: “ I see the data scientist immersing himself/herself in the deluge of big data in interacting with the data and making observations about the properties of data to uncover probabilities of patterns that emerge – which like the atomic objects, results in uncovering a treasure trove of value not seen before.” <http://blogs.teradata.com/international/data-scientist-the-new-quantum-physicist-in-the-data-universe/>
111. <https://ec.europa.eu/digital-agenda/en/factories-future>
112. <http://ec.europa.eu/digital-agenda/en/robotics>
113. <http://ec.europa.eu/digital-agenda/en/smart-manufacturing>
114. Compound Annual Growth Rate (CAGR). <http://www.moneychimp.com/glossary/cagr.htm>
115. <https://www.gartner.com/doc/2642020/forecast-public-cloud-services-worldwide>
116. Big organizations already purchase external data and practically 100% will do so by 2019. <http://www.forbes.com/sites/gilpress/2014/12/11/6-predictions-for-the-125-billion-big-data-analytics-market-in-2015/>
117. <http://www.gartner.com/newsroom/id/1731916>
118. The volume of data captured by the Internet of Things (IoT) will exceed 1.6 zettabytes by 2020 <https://campustechnology.com/articles/2015/04/15/internet-of-things-data-to-top-1-6-zettabytes-by-2020.aspx>
119. The Internet itself was, of course, a project directed by federal government agencies in association with regionally-based university computer departments.