In The Name of Allah

Necessity Of Creating And Developing Islamic High Technology Network

By
Dr. Mohammad Hussein Salimi
Associate Professor
Amirkabir University of Technology I.R.Iran
mhsalimi@aku.ac.ir
Amr Ali Seifoddin Asl PhD candidate
Amirkabir University of Technology I.R.Iran
S762595@aku .ac.ir
Expert Of technology corporation office
seifd@tco.ac.ir

Introduction:

The river of development has reached river-delta in which it will have been more than a way to develop the reach to human developed society.

Technology has had such a profound effect on human lives that progress of civilization is frequently identified by the dominant technology of the age. Civilizations were built around the use of innovative technology, and some vanished when they lagged in technology.

Today's technological transformations are pushing forward the frontiers of medicine, communications, agriculture, energy and sources of dynamic growth. Moreover, such advances have a global reach: a breakthrough in one country can be used around the world

The technology revolution begins at home—yet no country will reap the benefits of the network age by waiting for them to fall out of the sky. Today's technological transformations hinge on each country's ability to unleash the creativity of its people, enabling them to understand and master technology, to innovate and to adapt technology to their own needs and opportunities.

Beyond the agricultural, industrial, and information revolutions of the past, a multidisciplinary technology revolution, therefore, appears to be taking place in which the synergy and mutual benefit among technologies are enabling large advances and new applications and concepts (see Table 4). Many individual technology trends are pursuing general directions as shown. Beyond specific technologies, however, meta-trends are appearing that characterize properties of the technology trends and provide an abstract framework for describing the technology revolution. Furthermore, entry costs ("tickets") illustrate what individuals, businesses, countries, and regions will likely need to enter and continue to participate in the technology revolution.

Beyond individual technology trends and meta-trends, the prerequisites and resources required to participate in the technology revolution seem to be evolving.

Biotechnology will begin to revolutionize life itself by 2015 Disease, malnutrition, food production, pollution, life expectancy, quality of life, crime, and security will be significantly addressed, improved, or augmented. Some advances could be viewed as accelerations of human-engineered evolution of plants, animals, and in some ways even humans with accompanying changes in the ecosystem. Research is also under way to create new, free -living organisms.

Materials technology will produce products, components, and systems that are smaller, smarter, multi-functional, environmentally compatible, more survivable, and customizable. These products will not only contribute to the growing revolutions of information and biology but will have additional effects on manufacturing, logistics, and personal lifestyles.

The technology revolution is going far beyond merely generating products and services. First, these products and services are changing the way people interact and live. Cell phones are already bringing business and personal interactions into previously private venues. Increased miniaturization and sensorization of items such as appliances, clothing, property, and automobiles will likely change the way these devices interact with our lifestyles. The foods we eat are likely to be increasingly engineered. Health care could be integrated into our lives through better prognostics and daily monitoring for conditions. Second, business is becoming increasing global and interconnected.

Life in future will be revolutionized by the growing effect of multidisciplinary technology across all dimensions of life: social, economic, political, and personal. Biotechnology will enable us to identify, understand, manipulate, improve, and control living organisms (including ourselves). The revolution of information availability and utility will continue to profoundly affect the world in all these dimensions. Smart materials, agile manufacturing, and nanotechnology will change the way we produce devices while expanding their capabilities. These technologies may also be joined by “wild cards” in future if barriers to their development are resolved in time.

Multidisciplinary R&D teams enable some of the progress in technology trends. The old paradigm of hierarchical relations of technology is being replaced with one where a team searches for solutions in multiple disciplines.

The aim of this paper is discuss technology roles in new worlds shaping. Paper also talks about necessity of technology developing and sharing between Islamic countries.

Definitions:

There is some context that need for determine.

Technology: Technology can define as all knowledge, products, tools, methods, and systems employed in the creation of goods or in providing services . (khalil 2000)

Technology is application of knowledge and technical earnings for answer to a (or several) want. (lite 1981)

Webster define technology as: The practical application of knowledge especially in a particular area: engineering.

Technology can create before wants (technology push).

Technology embraces a lot more than just machine. There are several technological entities including hardware and software. Software divide to human skills, information and know how, and organizing.

Note: it is possible that in supporting activity some of technology entities don’t exist. For example there is not hardware entity in service activity (insurance, negotiating, and so on).

Technology can be classified in several ways. We classified it as flowing for discussion in this paper.

New technology: a new technology is any newly introduced or implemented technology that has an explicit impact on the way a company produces products or provides services.

The technology does not have to be new to the world, only to the company. It could have been developed years ago and used by others, but it is classified as new whenever introduces for first time in a new situation. New technology has a profound effect on improving productivity and maintaining a competitive business enterprise.

Emerging technology: an emerging technology is any technology that is not yet fully commercialized but will become so within about five years. It may be currently in limited use but is expected to evolve significantly.

Emerging technologies create new industries and may make existing one obsolete. They have the potential of triggering large changes in institutions and society itself.

High technology: the term high technology (high tech) refers to advanced or sophisticated technologies. High technologies are utilized by a wide variety of industries having certain characteristics.

A company is classified as high-tech if it fits the following description (Larsen and Rogers, 1988; Mohrman and von Gi nlow,1990):

- ➢It employs highly educated people. A large number of the employees are scientists and engineers.
- ➢Its technology is changing at a faster rate than that of other industries.
- ➢It competes with technological innovation.
- ➢It has high level of R&D expenditure.
- ➢It has the potential to use technology for rapid growth, and its survival is threatened by the emergence of competing technology

Some high-tech companies may be working with technologies that are “pushing the envelope”. These technologies may be referred to as “supper technologies”.

Low technology: the term high technology (high tech) refers to technologies that have permeated large segments of human society.

Low technology utilized by a wide variety of industries having the following characteristics:

- ➢They employ people with relatively low levels of education or skill.
- ➢They use manual or semiautomatic operation.
- ➢They have low levels of research expenditure.
- ➢The technology base used is stable with little change.
- ➢The products produced are mostly of the types that satisfy basic human needs such as food, shelter, clothing, and basic human service.

Medium technology: as used in this text, the term medium technology comprises a wide set of technology that fall between high and low technologies. It usually refers to mature technologies that are more amenable than to technology transfer.

Appropriate technology: the term appropriate technology is used to indicate a good match between the technology utilized and the resources required for its optimal use.

Techology new paradigms:

In the next decades we will witness drastic changes in the business environment.

New paradigms are created a paradigm is a framework of ideas that establishes the general context of analysis.

An overriding concern is the highly conditions that exist for manufacturing and service organization, conditions dictated by change in technology and by the global business environment. Table 1,2,3 listed several of the changing trends in science, technology and industry during recent years.

Table 4 listed changing trends in technology and comparing past, percent, and future technologies.

The priority of (High) technology acquisition:

Technology create wealth

Technology has always played a major role in creating the wealth of nations, influencing production and affects an increase in the standards of living and quality of life.

There are some factors that contribute to the wealth-creation system (figure 1) for example capital formation and investment make significant contributions to economic growth. Labor is another factor in economic growth. Social, political, and environmental considerations facilitate or hinder the wealth-creation process. Technology treats as the seed of the wealth-creation system. With proper nourishment and a good environment, a seed grows to become a healthy tree. Other factor contributing to wealth creation- including capital, labor, national resources, public policy, and so on- provide the fertile land, environment, and nourishment needed for growth.

Robert Solow is n be used in discussing the factors that lie behind economic growth. His empirical results show that technical progress accounted for more half the economic growth in the united stated between 1909 and 1949 His works indicates that technological development will be the motor for economic growth in the long run.

Boskin and Lau (1992) estimated the relative contributions of three sources of economic growth –capital, labor, and technical progress- for the United States, France, West Germany, Japan, and the United Kingdom. They showed that:

> Over the period under study, technical progress is by far the most important source of economic growth, accounting for half or more (three quarters for the European countries), and capital is the second most important source of economic growth (except for the U.S.)
>
> Capital and technical progress accounted for more than 95 percent of the economic growth of France, West Germany, Japan, and the United Kingdom. In the U.S. where labor grew more rapidly than in other countries during this period, they still account for 70 percent of economic growth (Boskin and Lau, 1992)

The U.S. National Science and Technology Council (NSTC), in its report " technology in the national interest"(1996), indicated that technical progress is the single most important determining factor in the nation's sustained economic growth. As much as half the nation's long-term economic growth over the past 50 year was credited to technology .

NSTC also emphasized that technology is the engine of economic growth. It reported that " performance of individual companies -the agent through which economic growth occurs- is strongly linked to their use of technology." The use of technology proved to enhance manufacturing in every performance category.

Long Wave Cycle

After the industrial revolution, economies of western countries went trough major economic expansion followed by a depression. In 1930 the soviet economist kondratieff observed that fluctuations occurred in Western economies periodicity phenomenon and suggested that basic new technology began the economic expansion in each long wave.

The Kondratieff cycle (or long wave) theory holds that capitalistic economies grow in a cyclic fashion with an average periodicity of about 53 years . This cycle is shown most clearly by the behavior of prices (or inflation) and interest rates, which rise and fall over time. The maximum in prices or inflation occurs at the Kondratieff peak (K-peak) and the minimum, at the Kondratieff trough (K-trough). The period of rising prices (inflation) leading up to the K-peak is called the up-wave. The converse is the down-wave(Figure 2)

Graham and Senge (1980) concurred with the view that inventions and innovations trigger economic long cycles.

Betz (1987) suggested that the process behind a long wave is an interaction between new technology, business opportunities the new technology create, and an eventual overbuilding of capital after the technology ages. He suggested the following sequence of events for the long wave process:

1.Discoveries in science create a phenomenal base for technological innovation.
2.Radical and basic technological innovation creates new products.
3.These products create new markets and new industries.
4.The new industries continue to innovate in products and processes, expanding markets.
5.As the technology matures, many competitors enter internationally, eventually creating excess production capacity.
6.Excess capacity decreases profitability and increases business failures and unemployment.
7.Subsequent economic turmoil in financial markets may lead to depressions.
8.New science and new technology may provide the basis for new economic expansion.

Betz eloquently argued that the long wave hypothesis merely describes past connections among pervasive basic innovation, long-term economic expansion, and excess capital formation in technology-mature industries: "It does not determine anything in the future." He made the following pertinent observation:

1.Cutting-edge technology is behind the long wave of economic activity.
2.High-technology products displace old technology when there is a justification for performance over cost.
3.Technology life cycle of industries affect long cycle in the national economy.
4.New technology comes from science, and science comes from new discoveries in nature.
5.A new technology, when created, will begin a new wave.

From industrial revolution until now, four long waves can be characterized (Table 5 & 6). With Start of each wave change technology paradigms and technology leaders modified. This time, fifth wave has stated. This age characterized by fast-paced technological change, the long wave is likely to be much shorter. (Figure 2) Many industries are increasingly getting involved in high technology. Scientific discovery and knowledge are an all-time high. Emerging technologies are promising new and uncharted for products and production. All indications support the view that technology will have greater impact on economic growth in the future.

New wave may modify technology leaders, currently Japan and Europe union compete with USA and new industrialized countries have some programs for become head in a few area (i.e. south Korea in nanotechnology and Finland in IT). (Figure 3)

Technology increase productivity

Productivity is the ratio of the output to input resources. On a national level, productivity is a very important factor in raising the standard of living. National productivity can de expressed as output in terms of gross domestic products (GDP) over input in terms of total hours worked:

$$\text{Productivity} = \frac{\text{Output (GDP)}}{\text{Input (total hours worked)}} = \text{\$/hour worked}$$

There is no doubt that improvement in productivity is vitally important to an economic system. It provides relief from inflationary pressures and permits real improvement in the standard of living. Technology is the driver for such improvement.

Productivity is highly dependent on technology. Dension (1985) estimated that two- third, and perhaps as much as 80percent, of U .S. productivity growth since the Great depression can be directly or indirectly attributed to technological innovation. Figure 4 compare U.S. manufacturing labor with Japan, Germany, United Kingdom, France, Italy, and Canada in period (1960 1988)

Accelerating Pace of Change

The general pace of technological advance and change seems to be accelerating. Economic growth, especially in the United States, is fuelling applied research and development investments, resulting in new product innovations and approaches. Computer technology continues to advance to the point where products become obsolete in two to three years. In some areas of biomedical engineering the pace is even faster; some medical devices are obsolete by the time a prototype is developed (Grundfest, 2000).

Today's technological transformations are more rapid (the power of a computer chip doubles every 18 - 24 months without cost increase) and more fundamental (genetic engineering breakthroughs) and are driving down costs (the cost of one megabit of storage fell from $ 5,257 in 1970 to $ 0.17 in 1999). These transformations multiply the possibilities of what people can do with technology. (Figure 4 & 5)

Change employment Patterns

After first industrial revolution, manufacturing share in employment and national income increased and became more than agriculture. After 1950 s service (spatially industrial service) has main share in employment and national income. In network age information play key role. Figure 6 illustrates assumption trend in different country employment. And figure 7 shows this trend in some selected country.

After 1990 s economic transformation human resource is the core competence between country and firms. During 1990 s trained and skilled labor in information field earned highest income and help economic prosper.

Network age provides new employment opportunities for developing and developed country, electronic commerce breaks barriers of distance and market information. . Revenues from India's information technology industry jumped from $150 million in 1990 to $4 billion in 1999

From March 1985 till March 1989 more than 73 percent of new created jobs in U .S.A., is in three top high yearly income jobs that statistics of employment ministry reported.

Surveying incomes in late 15 year shows that there is a transformation from industrial economy to information and communication economy.

Cost reduction

New technologies often improve on the ones they replace. Today new technologies reduce cost in communication, transportation, row material using, organization and so on.

Information and communications technology can provide rapid, low- cost access to information about almost all areas of human activity. From distance learning in Turkey to long-distance medical diagnosis in the Gambia, to information on market prices of grain in India, the Internet is breaking barriers of geography, making markets more efficient, creating opportunities for income generation and enabling increased local participation.

In The cost of transmitting a trillion bits of information from Boston to Los Angeles has fallen from $150,000 in 1970 to 12 cents today. Emailing a 40 page document from Chile to Kenya costs less than 10 cents, faxing it is about $10 and sending it by courier $50

At the present time smaller amount row material is needed. New artificial material and miniaturization, is two factors that reduce demand for industrial row material.

Exactly 3.5 kg glass fibers communicate equivalent on metric tons cupper, and more, we save 95% energy with producing fiber.

Even entire systems (such as satellites and automated laboratory processing equipment) with integrated micro scale components will be built at a fraction of the cost of current macro scale systems.

The industrial age was structured around vertically integrated organizations with high costs of communications, information and transportation. But the network age is structured along horizontal networks, with each organization focusing on competitive niches. These new networks cross continents, with hubs.

Increased Need for Educational Breadth and Depth

Emerging technology growth has most relationship with science growth. Because of science complexity, Technological complexity is expected to increase. This requires a higher level of human knowledge and skill to deal with complex technology, putting additional demands on human resource development.

The multidisciplinary nature of technology is also changing the skills required by the workforce as well as R&D technologists. Developers increasingly need to understand vocabulary and fundamental concepts from other fields to work effectively in multidisciplinary teams, demanding more time in breadth courses. This trend may increase over time to the point where multidisciplinary degrees may be necessary, especially for visionaries and researchers who tie concepts together.

Vocational and on-the- job training also cannot be neglected. When technology is changing, enterprises have to invest in training workers to stay competitive (Figure 8). Studies in Colombia, Indonesia, Malaysia and Mexico have shown that such training provides a considerable boost to firm productivity.

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Figures and Tables:

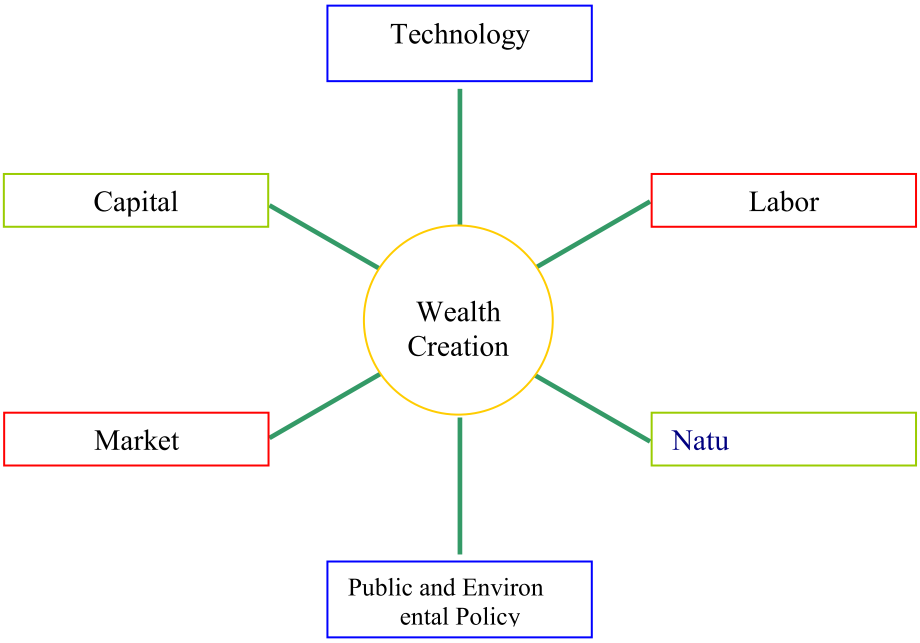


Figure 1 Factors Contributing To Wealth Creation

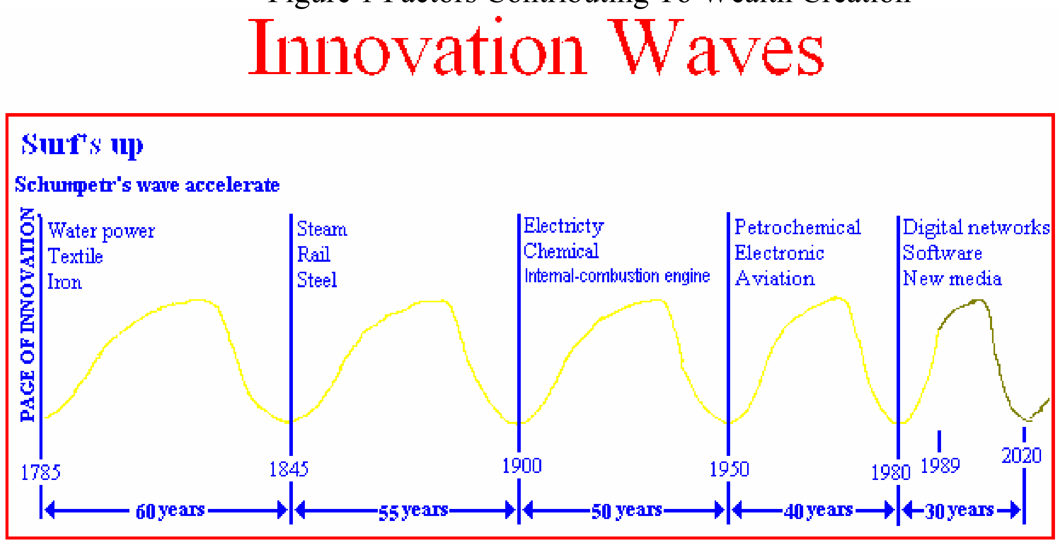


Figure 2 Innovation Wave

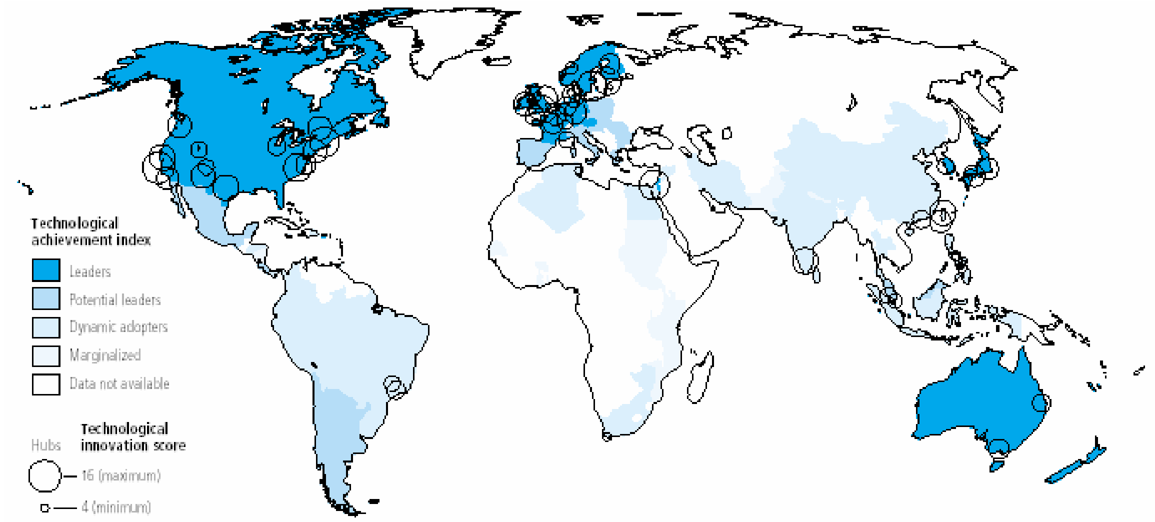


Figure 3 World technological achievement map

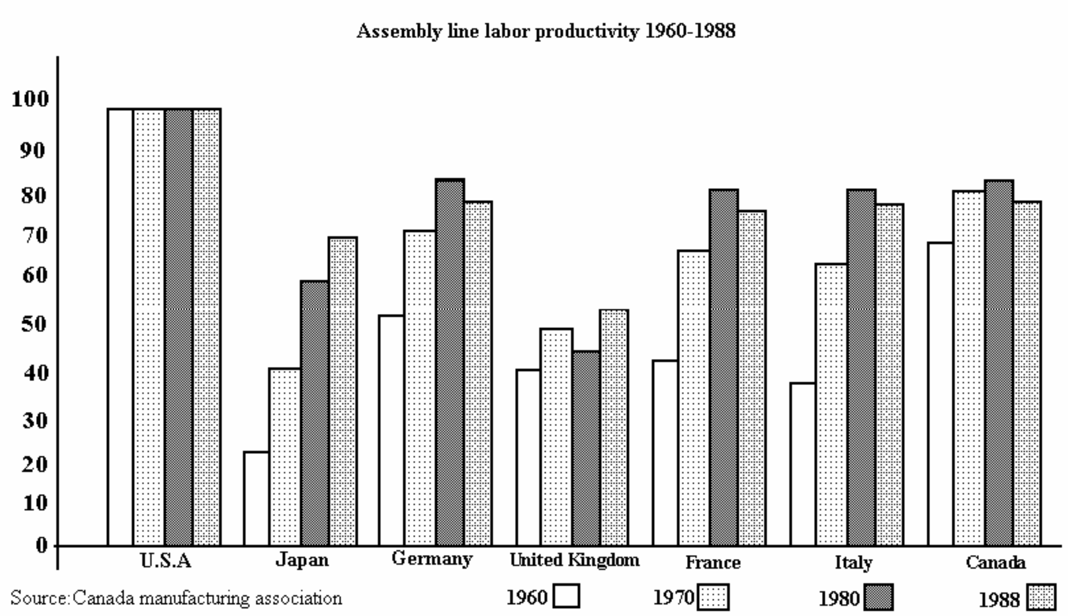


Figure 4 countries productivity percent measure up to U.S.

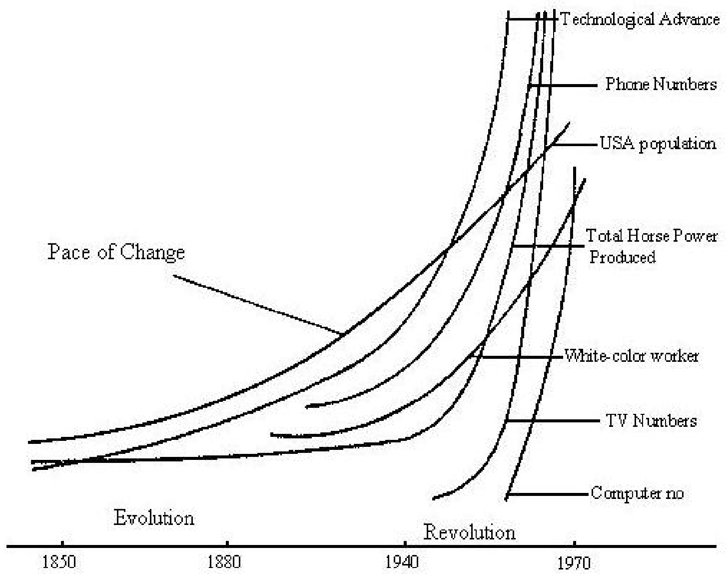


Figure 4 Pace of Change

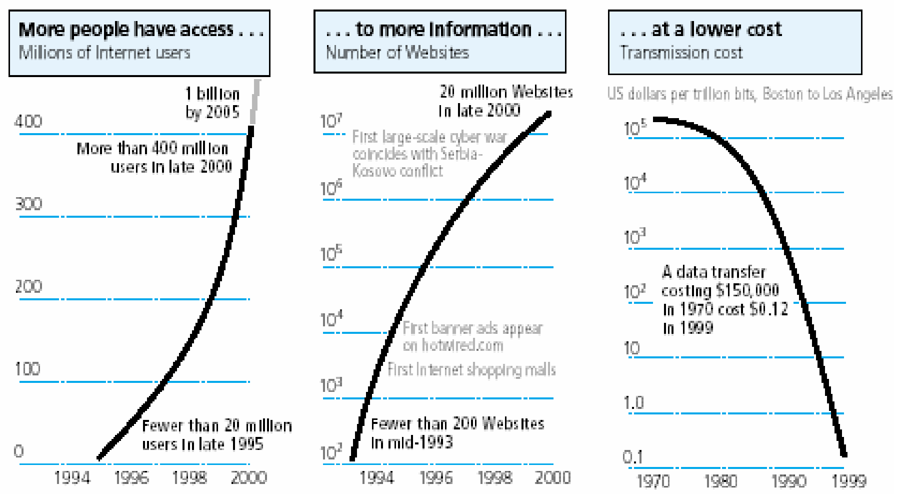


Figure 5 Pace of Change in information technology

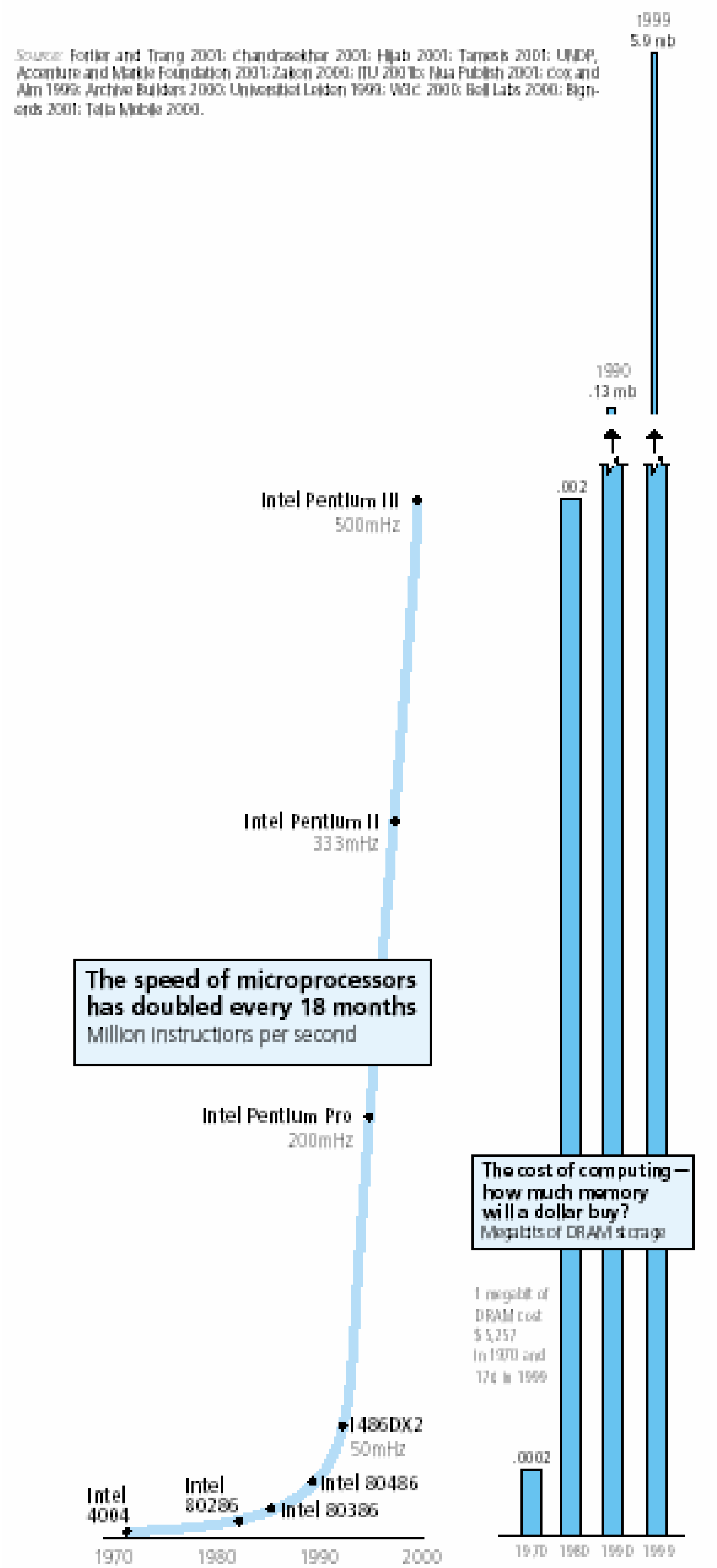


Figure 5 (continued) Pace of Change in information technology

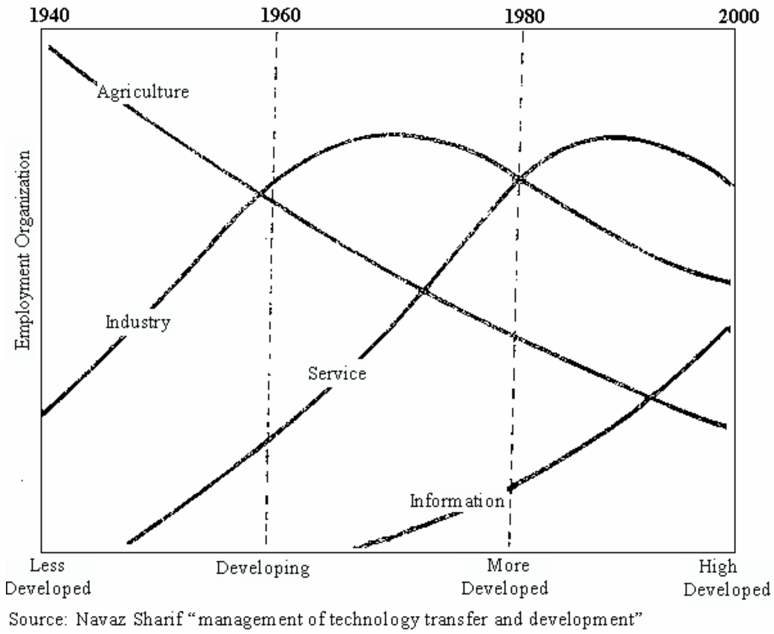


Figure 6 Relationship between type of employment and development rate

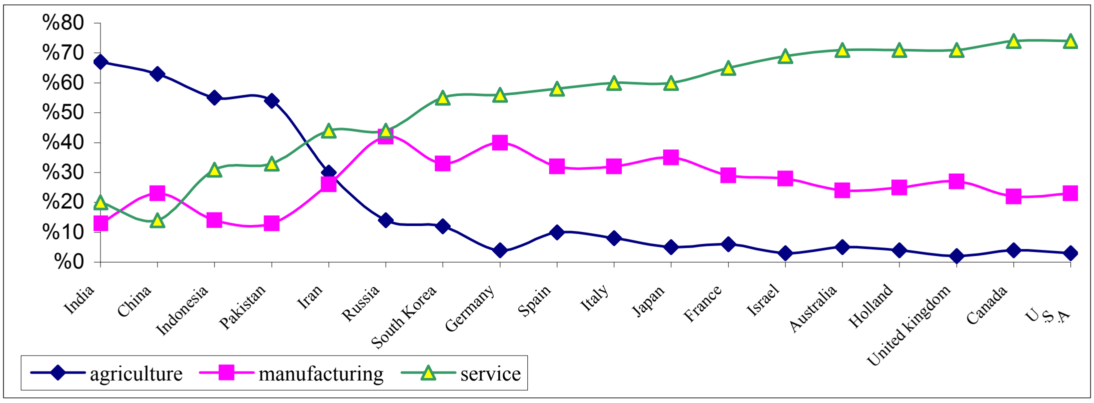
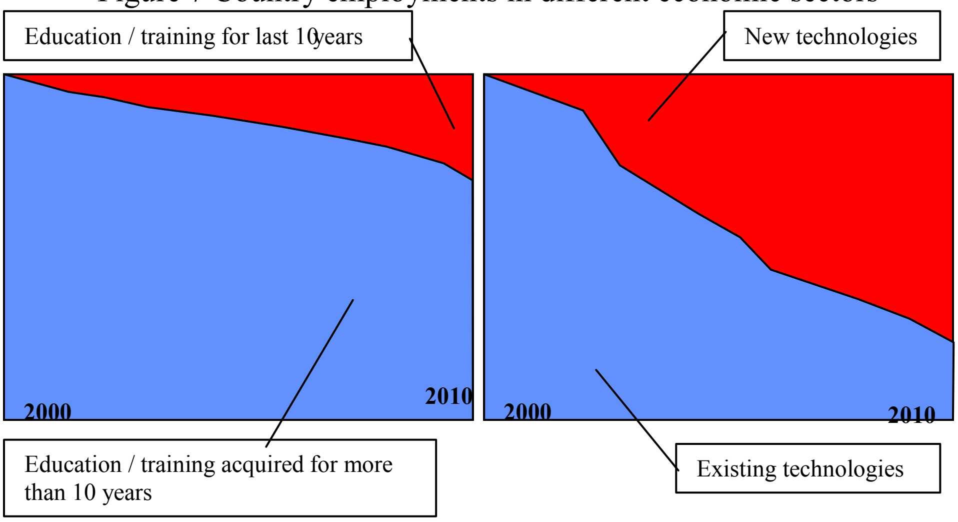


Figure 7 Country employments in different economic sectors



2010: 80% of technologies with less than 10years, While 80% of working force has acquired training with more than 10 years

Figure 7 technology trends and its effects on training.

Factor	Small science	Big science
Science boundary	Science boundaries are distinguished	Sciences boundaries are undistinguished
Science range	Every Science domain is limited and one person can learn and understand all science in a field.	Every Science domain is wide and only scientist groups can understand all science in a field.
Relation With Technology	No defined relationship Technology development is not directly effected from science.	There is conceptual relationship Technology development directly effected from science.

Table 1 comparing small science and big science

Factor	Experimental technology (Traditional)	Scientific technology (New)
Dependence	Dependence on expertise and proficiency	Dependence on high specialization on basic science and brain ware
Quantity of Row material	Needs for great mount of row material.	Needs less (Ether volume or weight) row material
Economic importance	Less value add	High value adds.
Developing trend foresight	Almost not able to foresight.	Foresight with high accuracy and reliability.
Development drive	Industrial demands	Science create Golden opportunities for various sectors of society
Berth type	Individual efforts without governmental awareness interfere.	Regular and planned research efforts in research institutes with national interfere.
Planning type	Individual or institutional planning for short time	National or sector planning for next 15-20 year.
Science age	Related to small science age	Related to big science age
Collaboration type	Every institute develops own needed technology.	Technology developing needs multidimensional collaboration between universities, industrial centers, research institutes, and even consumers.
End user roles.	Has an Inactive role.	Has active role

Table 2: compare scientific and experimental technologies.

Factor	Traditional	New
Life cycle	Long life cycles	Short life cycles
Innovation	Few innovations	Continuous innovations
Competition	Expected competition Competitors are the enemy Cooperation not allowed	Stronger competition Alliance with competitors accepted
Market	Expected market Local market	Uncertain market Global market
Quality	Quality is desirable	Quality is imperative (a hygiene factor, a survival factor)
Production	Mass production Produce in large lots No commitment to suppliers Large inventories Fixed manufacturing	Customized production Produce in small lots Suppliers are partners Reduce inventories (JIT) Flexible manufacturing
Organization	Large corporation vertically Integrated companies Bureaucratic organizations Financial methods control the organization	Smaller plants; companies rely on outsourcing Nimble organizations Financial methods to serve the organization's objective

Table 3: Changing trends in industry

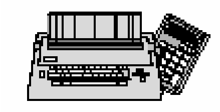
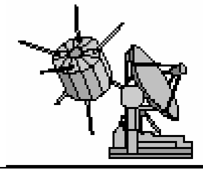
Past Technology	Present Technology	Future Technology
		
Trend Paths		
Metals and traditional ceramics	Composites and polymers	Smart materials
Engineering and biology separate	Biomaterials	Bio/genetic engineering
Selective breeding	Genetic insertion	Genetic engineering
Small-scale integration	Very-large-scale integration	Ultra/giga-scale integration
Micron plus lithography	Sub-micron lithography	Nano-assembly
Main frame	Personal computer	Micro-appliances
Stand-alone computers	Internet-connected machines	Appliance and assistant networks
Meta-Trends		
Single disciplinary	Dual/hierarchically disciplinary	Multi-disciplinary
Macro-systems	Micro-systems	Nano-systems
Local	Regional	Global
Physical	Information	Knowledge
"Tickets" to the Technology Revolution		
Trade schools	Highly specialized training	Multidisciplinary training
General college	Specialized degree	Multidisciplinary degree(s)
Locally resourced products	Locally resourced components	Products tailored to local resources
Capital ($)	Increased capital ($$)	Mixed

Table 4: The Technology Revolution: Trend Paths, Meta-Trends, and "Tickets"

Dates	Economy	Example Basic Innovation	Example Maturity Innovation
1760 1830	Industrial Revolution	Spinning Jenny (1764)	Cotton Gin (1793)
1830 1890	Railroad Era	B&O Railroad (1830)	Refrigerator Car (1872)
1890 1970	Manufacturing Era	Ford Motor (1903)	Automatic Transmission (1940)
1970	Information Age	Microprocessor (1972)	--

Table 5 Four economic cycles initiated by the four innovation waves

Economy	**Innovation**	**Growth Boom**	**Shakeout**	**Maturity Boom**
Agricultural / Commerce	--	--	--	-1809
Cotton / Textile	1762 1794	1794 1834	1834 1843	1843 1861
Railroad / Industrial	1831 1847	1847 1888	1888 1895	1895 1917
Mass Market	1882 1913	1913 1937	1937 1944	1944 1973
Information	1961 1981	1981 2007	?	?

Table 6. Dates for Dentian Economic Cycles in the United States