

# **How the West grew rich?**

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**(Book Summary)**

Till about 200 years back, abject poverty characterized the world. It is only since the 19<sup>th</sup> century, a significant proportion of people in the west have become affluent and better fed and healthier. Their book is about how a group of countries collectively referred to as the 'west' have become rich and prosperous. The authors explain the various factors which have made the western nations so wealthy over time.

The authors explain the objective of the book, "The story of the move from poverty to wealth offers enough mysteries, surprises, exposes, triumphs and tragedies to make it worth the retelling for its own sake. Moreover, a better understanding of how economic growth came about in the west should be helpful to those westerners who are concerned with public policy, the comparative significance of the west's many economic institutions, the future of the western economies themselves and most of all to those who feel some responsibility for passing along to the next generation an opportunity to better their own conditions at least as much as has the current generation."

### **A gradual process**

The process of development of the west has been gradual. Even over an entire decade in the early stages of development, the economic gains were generally perceived to be insignificant. Despite some radical innovations, the process of growing rich was gradual. "There was never a day nor even a generation, when a television anchor or a newspaper editor, however astute, could have led off with news of an economic or technological development which rescued the west from poverty." But as decade after decade of growth continued, it became clear that the proportion of affluent people was rising.

### **Explanations for the West's growing rich**

Many of the traditional explanations for the development of the western world are inadequate. China and the Islamic nations were at one point of time well ahead of western countries in science and technology. Yet, they were left behind. The availability of natural resources is also not a satisfactory explanation, when we take into account the development of countries like Switzerland and Japan. Some have argued that the affluence of the west is the result of the pursuit of personal riches by businessmen. Others have attribute it to lucky circumstances. A major expansion in trade during the 15<sup>th</sup> century, the first industrial revolution of the 18<sup>th</sup> century, the second industrial revolution of the 19<sup>th</sup> century and the current electronic revolution came in quick succession, giving a tremendous momentum to the growth process. The leftists have argued that the development of the west has come at a heavy price – tremendous income inequalities, exploitation of workers, colonialism and imperialism.

The authors argue that the western countries succeeded because it created conditions that encouraged innovations in trade, technology and organization. This enabled them to accumulate capital and labour and exploit natural resources. Moreover, they gave their enterprises the autonomy to make a number of decisions made by political and religious authorities in other nations. It became easy to set up enterprises. Trading took place without much restriction. Owners of enterprises also received some sort of reassurance that the business assets would not be arbitrarily seized by the political authorities. As the authors put it, "The economic enterprise had become a unit for making a wide range of economic decisions and its gains and losses from the decisions were expected to accrue to

the enterprise, or less abstractly, to its owners. Virtually, without thought or discussion, the west delegated to enterprises the making of a decision basic in the innovation process: which ideas should be tested and which should be allowed to die. For economic innovation requires not only an idea but an experimental test of the idea in laboratory, factory and market.”

### **The process of development**

The authors have outlined the process of development of the western nations.

- Emergence of an autonomous economic sphere and a merchant class: This involved a relaxation of political and religious controls.
- Innovations in trade leading to discovery of new resources: The early long distance trading voyages were enormously profitable and gave a strong boost to the growth process.
- Innovations in manufacturing processes: As a result, the cost of production came down.
- New product development: Development and manufacture of new products became extremely profitable once methods had been devised to produce them in large quantities.
- Encouraging innovation: In the 17th century, the west developed a mode of scientific procedure based on observation, reason and experiment. This enabled it to develop the basic knowledge upon which modern western science was built. Late in the 19th century, pure science and industrial technology became integrated.
- Dealing with uncertainty: Innovation is marked by uncertainty. It involves experimentation till the product is commercialized. Successful experiments have rich pay-offs while failed ones are costly. The west dealt with this problem by diffusing the authority to undertake an innovation among a large number of firms and individuals who could bring together the money and talent.
- Embracing change: The diffusion of the authority to innovate also ensured that people wanting to maintain the status quo could not suppress the innovation. A general belief that innovation was good, gained currency, though not in any planned or rational way.
- Innovation in organization: The west's success in technological innovation was facilitated by its success in organizational innovation. The West was successful in modifying the size and structure of its organizations to keep pace with the changing times. Competitive rivalry also encouraged firms to be different from others. The combination of adaptation and diversity greatly facilitated innovations in western countries.

The west emphasized the use of experiment in technology and organization to harness resources to the satisfaction of human wants. The key elements of the system were the wide diffusion of the authority and resources necessary to experiment; minimal political and religious restrictions on experiment and incentives which combined ample rewards for success with severe penalties for failing to experiment.

### **The Middle ages**

During the middle ages, Chinese and Islamic technology were probably more advanced than that in the west. But the west was on the verge of getting ahead. In the 1400s, the west began to replace medieval institutions with modern ones. The seeds were sown for the formation of nation states in France, Spain, Portugal and Ireland. Advances in shipbuilding helped reduce transportation costs. Trade and exploration activities gained momentum.

It is interesting to understand the differences between the medieval and modern times. The medieval

economy was overwhelmingly agricultural. Political and economic authority were combined in the same institutions – the manor in the country and the guild in the towns. Terms of exchange were determined not by negotiations between traders but by custom, usage and law.

Medieval society was preoccupied with providing food. Between the 15<sup>th</sup> and 18<sup>th</sup> centuries, roughly 80 to 90% of the world's population was engaged in raising food. Rural life revolved around manors which were production enterprises of considerable size and complexity. They grew crops, raised animals, milled their own grain, baked their bread, spun thread and wove cloth, made their own plows and did most of their own metal work. The three most important features of manors were the unity of political and economic spheres, widespread use of servile labour and a high degree of self sufficiency. Most participants in the manorial system had no say in deciding what occupation to follow, what trading activities to conduct and what crops to cultivate or what animals to rear. Within the manor, the fundamental exchange was the trade of labour for the use of land. Only a minor fraction of the production of the manorial system was consumed outside it. In the case of most transactions, the sellers were selling the product of their own work and the buyers were buying for their own use. The feudal economy did not encourage the development of credit. There was little trade surplus that could be used to pay off a loan. The church passed strictures on the taking of interest.

The towns were less self-sufficient than the manors and became centres of trade. Exchange with the outside world was far more important for the towns. In general, the town residents acquired most of their food, clothing and shelter through trade. Urban dwellers also possessed some kinds of special privileges and some powers of self government that were absent in the villages. The guilds had the political authority to make rules and to punish violations. The guilds were undemocratic as far as membership was concerned but guild leaders could not exploit guild members for their personal benefit as the manor leaders could. Medieval towns obtained a degree of political autonomy by the purchase of charters from their suzerains. Some towns attempted to get more powers for themselves in areas such as taxation. They also tried to gain control over the guilds. The towns however did not make any concerted efforts to end the rigid political control of trade characterized by the feudal system. A few towns like Venice, Geneva and Florence became major centres of trade. The extent of self government in these city states was unprecedented.

The medieval people were not equipped to identify and manage risks effectively. The biggest uncertainty was crop failure. Rules also changed from time to time. According to the authors, “The possibility of calculation, of assessing prospective magnitudes of cost and revenue and the probability of alternative outcomes in a novel enterprise, of profiting from judicious buying and selling rather than from diligent service to one's lord or from industriously plying one's trade was wholly alien to the customary order of feudal society... The amassing of wealth through skill and luck in the calculation of future consequences, through the discovery of new customers and new sources of goods and through the artful sharing and hedging of risks transcended medieval understanding and had no legitimate place in the medieval system... Ironically, in seeking security through a life wholly regulated by custom, usage and law, in preference to the insecurity of unregulated trade, medieval society appreciably reduced the security of its people.”

Meanwhile, technological advances were gaining momentum. From the 8<sup>th</sup> to 13<sup>th</sup> centuries, there was a gradual expansion in iron production in several parts of Europe. As early as the 8<sup>th</sup> century, foundries began casting bronze church bells. Later, they began to cast cannon in bronze and iron. Medieval chemistry produced soaps, paints, varnishes, dyes, sulphur and saltpeter. The Roman technology for making ceramics and glass was improved upon. So was the case in textiles. The introduction of the padded horse collar in the 12<sup>th</sup> century facilitated the substitution of horses for

oxen in plowing. Probably, the most formidable technological advancement of the middle ages was the invention of the clock in the late 13<sup>th</sup> century. The clockmakers' shops became research centres for mechanical arts, friction, precision metal work and study of the behaviour of materials under different temperatures and pressures. Two instruments, the telescope and the microscope contributed significantly to the technological revolution of the 17<sup>th</sup> century. Over a period of 1000 years from the fall of Rome in the 5<sup>th</sup> century to the 15<sup>th</sup> century (when the modern age began), technology progressed steadily but surely. Ways of cultivating the land, logging, mining, smelting, spinning, weaving, building, making plots, bricks and glass changed but so slowly that the change was very gradual.

Unlike China and the ancient empires, the Europe of the late medieval city states and the early monarchies did not have a central authority strong enough to check the determination of its merchants to gain access to profitable trading opportunities. This pluralistic aspect of western feudalism, according to the authors, played an important role in the development of the west. Western feudalism rejected the notion of an absolute state. Moreover, the chieftain's tenure of the land along with the obligation to perform military service, stayed in the family – even after the Chieftain's death. If the Chieftain had only a life interest in the holdings, his subordinates might have shifted their loyalties to his superiors as the Chieftain grew old. This would have strengthened loyalties to the sovereign as opposed to the feudal vessels. Since the tenure continued within the family, the trend became reinvesting income in long-term improvements.

Towards the end of the 15<sup>th</sup> century, the military capability of the feudal chivalry declined. Professional armies combining infantry, siege artillery and cavalry came into vogue. The new arrangements made the capabilities of part-time soldiers outdated. Professional armies became popular in Italy in the late 14<sup>th</sup> century. The 100 years war between France and England also accelerated this process. By the end of the 15<sup>th</sup> century, countries like France were using professional armies. Before the introduction of siege cannon, the lords' castles had supplied them with fortified bases from which they could defy their feudal superiors with impunity. The introduction of siege cannon ended the military usefulness of the castle. The decay of the barter economy of the manors and the rise of money based agriculture (as opposed to barter of labour for land) also contributed to the decline of feudalism.

### **The growth of trade**

Between the middle of the 15<sup>th</sup> century and the middle of the 18<sup>th</sup>, trade grew impressively. The three-masted trading vessel reduced transportation costs and facilitated travel over longer distances. The basis for trade also changed from one based on custom and usage to one based on negotiation between traders.

Rapid expansion of Europe's overseas trade and the work of explorers like Vasco da Gama generated new profit making opportunities and aided the development of markets. The merchant class successfully stepped into the vacuum created by the decline of feudalism and manorialism. The rise in population, growth in inter-urban trade, growth of cities and improvements in transportation all contributed to the development of markets. Between 1600 and 1800, the population of Europe doubled. Intra European trading volumes also increased sharply, thanks to differences in climate, natural resources and population densities within the continent. For example, the Baltic region provided timber, other forest products and later cereals. The Iberian peninsula exported wool, vegetable oils, dyestuffs, iron ore and some fruits.

As trading volumes and urbanization picked up, a merchant class emerged. As the authors explain,

“Cities live on the difference between what they have to pay for raw materials for their shops and factories and what they can obtain for the finished products plus what they can net from outsiders by selling such specialized services as banking, insurance, warehousing, commodity trading, medicine, law, government and religion. Agricultural life requires less trading than urban life because the farm is more self-sufficient than the city apartment: a movement from farm to city is inevitably a movement towards more trading.”

The full-rigged ship served as the main carrier of western maritime commerce until the latter part of the 19<sup>th</sup> century. Since the Roman times, merchant ships had been designed to sail nearly dead downwind. The full-rigged ship could tackle much more hostile wind conditions. Merchant vessels also increased in size during the 15<sup>th</sup> century. Large vessels were faster than smaller ones. They also reduced the cost per unit of cargo. There were also economies of scale in staffing. Larger vessels were more seaworthy, could store more rations and offered greater protection against pirates.

What happened in the 15<sup>th</sup> century was an interlinked growth of trade and maritime technology. Both were urban activities. Like its earlier growth within Europe overseas expansion reinforced merchant capitalism and nourished its further growth.

Much of early modern European history is a story of a continual tug-of-war between a nascent political class and the established political structure. The emergence of a reasonably autonomous business class occurred more readily in Western Europe, more specifically in the UK and the Netherlands. Governments did attempt to control trade in many ways but when it came to trade between two regions under different jurisdictions, opportunities were generated for voluntary trade on negotiated terms.

The landholding feudal magnates supported the expanding role of merchants because they gained materially by buying from and selling to merchants. The authors conjecture that the wealth of the feudal aristocracy must have increased rather than decreased even as feudalism declined. “It makes a more interesting account of the west’s transition from feudalism to capitalism to tell the story as a melodrama in which an ancient aristocracy was gobbled up alive by the upstart wolves of trade. Dramatic, though they are, such accounts do not accurately reflect the general experience of either landowners or merchants.” The merchant class got its power from the feudal nobility not by displacing the feudal nobility in agricultural activities but by expanding the trading activities in which it had been traditionally engaged. Moreover, governments were compelled to take care of their interests more seriously than they had in the past. Also, after 1500, the merchant class became successful in gaining autonomy from political and religious interference.

By 1750, the growth of trade had significantly improved economic welfare through greater specialization and exchange. Change from manorial agriculture to one based on individual peasant holdings materially improved the food supply. Mercantile capitalism emerged as a successor to feudalism. Improved agricultural methods created a pool of landless farm labourers, who were ready to take up alternative employment.

### **The evolution of institutions favourable to commerce**

While studying the economic development of the west, a lot of emphasis has been laid on technology. Yet, it is the organizational innovations which played a key role in generating growth.

The development of commercial law, commercial courts and commercial instruments was a response

to the expansion of commerce. Insurance instruments became available from the 16<sup>th</sup> century. Lloyd's the insurance company was formed in the late 17<sup>th</sup> century. The development of marine insurance markets in Italy, Amsterdam and London made possible risky voyages. The division of risk between the perils of the sea and the uncertainties of the markets was essential to the development of maritime commerce. Towards the end of the 18<sup>th</sup> century, the royal courts in London had accumulated enough experience in setting disputes related to insurance, bills of exchange, ships' charters, sales contracts, partnership agreements, patents, arbitrations, etc. The reputation for fairness developed by English courts. They played a very important role in the growth of English commerce.

The Magna Carta was an important development in establishing property rights. Magna Carta gave the English a considerable lead on their neighbours. The abandonment of arbitrary levies and their replacement by regular taxes at stipulated rates were a major step towards encouraging businessmen to develop their own ways of creating and accumulating wealth. The distinction between confiscation and taxation made the greatest difference in Holland and England. In both countries, the power to impose taxes resided in parliaments in which the merchant class was strongly represented.

Another important development was the double entry book keeping system. It gave an impetus to the development of financial accounting and the practice of evaluating the credit worthiness of the enterprise by analyzing its balance sheet and profit and loss statement.

The growth of commerce demanded high moral standards. The merchant class evolved a moral system suited to life in highly organized enterprises. This was the only way by which enterprises could go beyond the family and manage colonization, foreign trade and canal building and find the institutional loyalties necessary to discharge their economic functions. The moral outlook for mercantile capitalism was supplied in the sixteenth century by the Protestant Reformation. The merchant community needed independence from religious authorities. Religion was gradually transformed from a restraining influence upon capitalist development to a force that sanctioned mercantile capitalism by precisely the moral teachings required for the smooth running of the expanding commercial system. Protestantism supplied the merchant class with both a highly individualized moral responsibility outside the control of the clergy and with moral dogmas that emphasized exactly the thrift, industry, honesty and promise keeping needed for capitalist institutions.

An institutional innovation that was important in smoothing the politics of transition from feudalism to capitalism was partnership or alliance between governments and their merchant classes. Governments granted trading monopolies to merchants. In turn they became substantial personal participants in the profits of these business enterprises.

The development of capitalism in the west also owed a good deal to the fragmentation of Europe into a multitude of states and principalities. Had the merchants been dealing with a political monopoly, they might not have been able to purchase the required freedom of action at a reasonable price. On the other hand, individual centres of competing political power had a great deal to gain from introducing technological changes that promised commercial or industrial advantage, and hence greater government revenues. In fact they had much to lose from allowing others to introduce them first.

According to the authors, "It may be that a pre requisite to sustained economic growth is an economy trading across a geographical area divided among a number of rival states, each too small to dream of imperial wars and too fearful of the economic competition of other states to impose massive exactions on its own economic sphere." As in Europe, the United States also had a federal system in

the 19<sup>th</sup> and early 20<sup>th</sup> centuries. Intervention by the federal government was limited and states faced economic competition from each other. Modern Japan also grew out of a decentralized feudal society

### **The development of industry: 1750-1880**

By 1750, three hundred years of gradual expansion in markets had been accompanied by a corresponding expansion in agricultural and handicrafts production. Until 1880, the principal technological advancements of western industry were in the mechanical arts. In struggling with the problems of building accurate clocks and portable watches, clockmakers developed knowledge of precision machining, the effects of changes in temperature on different materials, friction, gear trains, levers, ratchets, springs, lubrication and mechanical durability. By 1750, when the industrial revolution demanded skill and ingenuity from mechanical designers, western clock makers had already developed considerable expertise in mechanical design. In the 17<sup>th</sup> century, scientific method became experimental. Hypotheses were tested by experiment.

The factory system could not be introduced in isolation. There had to be parallel changes in the production of raw materials and finished goods, in wholesale and retail trade, insurance and banking. The steam engine helped produce more coal by pumping water out of coal mines. This provided the fuel necessary to expand the production of finished goods. In the 19<sup>th</sup> century, there was also a revolution in communication. Innovations occurred where the economic system not only encouraged invention and discovery but was also quick to put them to commercial use.

The steam engine facilitated the movement of production from the cottage to the factory. It helped expand production of iron and steel and at a lower cost. It also provided the power for mining, transportation by rail and water and for the mills themselves. Demand for iron and steel also rose due to the growth of steam engines, rail roads and later ships. The Bessemer process introduced in 1856 made steel production far more efficient. The late 19<sup>th</sup> and early 20<sup>th</sup> century began to be known as the age of steel. Replacement of wood by iron and steel resulted in gains in longevity, feasible speed of operation, precision of construction and possibilities of mechanical complexity.

The growth of factories was led by the textile industry in both England and the U.S. Powered machinery were introduced for spinning yarn. Over the years, the power loom improved steadily, both in productivity and in its ability to weave cloth of better grades. The shift from handloom to power loom involved a change in both technology and organization of production from cottage to factory.

The factory system came to ceramics because there were advantages to united control of the step production process, further advantages to specialising workers at each step in the process and yet further advantages in a central source of power. But the invention of specialized machinery did not play an important part in bringing the factory system to the ceramics industry as in the textile and iron and steel industries.

The development of the factory system produced an enormous increase in the output. Until 1750, the expansion of trade was the result of falling transportation costs and mercantile initiative in building new markets. During the 19<sup>th</sup> century, growth in trade was stimulated mainly by the falling cost of factory output, which lowered prices.

Historical evidence suggests that the capital required for the early factories was modest. Moreover, the capital was not painfully accumulated. There was no reduction in real income or consumption of

workers or land owners. There was no concerted effort to increase savings. The increase in output generated by the factories was more than sufficient to pay capital costs over a short period of time.

An agricultural revolution reduced the proportion of the population required for providing food from the medieval 80-90% to less than 5%. The enforced displacement of agricultural workers to the cities provided labour for the factories. The major factors driving the agricultural revolution were mechanical energy, an increased use of fertilizers, improved seeds, improvements in methods of cultivation and animal husbandry, improved transportation and development of regional specialization in agriculture.

### **Impact of factories on labour**

The industrial revolution improved the living standards of labourers. According to the authors, the romantic view that workers in pre-industrial Europe lived well need not be taken seriously. If early factory work was oppressive, the alternatives to factory work were worse. Indeed, the early factories could attract workers because the wages were still above the poverty level. “The Industrial Revolution is not, as many have thought, a precedent for imposing sacrifices on the living generation in the hope that things will be better for later generations.... Its lesson is that economies progress rapidly when the fruits of progress are widely and contemporaneously enjoyed.”

To summarise, the revolutionary changes in western industry and transportation between 1750 and 1880 are traceable to one organizational development, two technological developments and two social changes. The first was the introduction of the factory. The first of the two technological developments was the enormous increase in the use of steam and water power in factory production and the application of steam power to land and water transportation. The second major technological change was the substitution of iron and steel for wood in fabricating machinery and other products. This substitution changed the size, longevity, precision and mechanical complexity of a wide range of products, from sewing machines to ships. The two social changes were the rapid rise in population and the steadily improving agricultural productivity.

### **Diversity of organization: The Corporation**

By the closing decades of the 19<sup>th</sup> century, the use of the corporate mode of organization in the west gone beyond monopoly enterprises backed by government powers. The concept of group-owned enterprises conducting their business through agents elected by owners had achieved general acceptance.

The publicly held corporation had two major advantages. It enabled investors to spread the risk of investment. It minimized agency risk by enabling stockholders to express their dissatisfaction with the management by selling their shares.

In the US, the history of forming corporations by registration under general incorporation laws paralleled England's in some respects. In both countries, it was the third step after first experimenting with corporations formed for religious, charitable and local governmental purposes and a period of extensive formation of franchised corporations. But limited liability seems to have been more emphasized in the US than in England. In the US, allowing the formation of corporations by registration without obtaining a charter by special act of the legislature, began with statutes limited to specific lines of business. Beginning in 1837 in Connecticut, some of the American states adopted broad general incorporation laws applicable to most lines of business activity. This enabled firms to

obtain corporate charters without procuring a special legislative enactment. Only in the second half of the 18<sup>th</sup> century, did it become possible to adapt the incorporated mode of enterprise organization to an increasingly wide variety of business situations. The years 1864-1870 were a peak period for incorporation in American industrial states. Corporate enterprises could raise venture capital from wealthy individuals and investment banks even if securities markets were still not as well developed. In 1891, New Jersey adopted a general incorporation statute. It proposed inter state operation, permitted corporations to own stock in other corporations and provided the same degree of freedom in forming corporations that England had provided earlier.

During the 19<sup>th</sup> century, the same economic forces that encouraged England and the US to adopt general incorporation laws produced the same result in France and Germany. The need for a form of group ownership, adapted to a multitude of different lines of business and to variations in the size and distribution of ownership, resulted in a system of incorporation by registration. European governments, like the American states, realized that, if their incorporation laws were unduly restrictive, businesses would migrate to neighbouring countries.

But the tendency to incorporate was not universal. Many enterprises, including some that were very large, continued to operate as proprietorships or partnerships. The organization of western enterprise continued to be diverse, proliferating and adhoc to the different circumstances of different enterprises. In the long run, innovations in corporate law supplied the legal framework for meeting the organizational needs of 19<sup>th</sup> century enterprise.

### **Technology, trusts and marketable stock**

After the American civil war, there were a number of striking advances in technology that helped to reduced production costs. There was progress in metallurgy. Steel was substituted for cast iron. Advance in machining made possible the interchangeability of parts. Mass production of agricultural machinery, sewing machines, typewriters, cash registers, bicycles and automobiles received a boost. In the US, the number of steam engines in use doubled between 1860 and 1880 and again between 1880 and 1900.

Before the introduction of electricity, the distribution of power to factory machines depended on drive shafts, gears and pulleys. The layout of the factory was governed by the need to locate the machines with the greatest power demand closest to the engine. The efficient flow of work remained a secondary consideration. About 1890, it became possible to provide each machine with an electric motor and to transmit power to the motor through an electric wire. Wires could be bent to any shape and run to almost any desired length, since transmission losses were relatively small. This introduced new flexibility into the design of the factories and the efficient flow of work between successive steps in the products regained priority. Substitution of mechanical power by electric power facilitated the construction of large plants. It also enabled smaller plants to become more efficient. The development of the IC engine sparked off a second industrial revolution. Progress in electromagnetism started a revolution in communications. As capacity increased and technology improved, the need for more capital was automatic. From 1880 onwards, there was a fall in the price of manufactured goods. Consequently, internally accumulated surpluses were not necessary to meet the rising capital requirements.

The range of functions performed by a single enterprise was also increasing. U.S. steel makers and oil refiners integrated backwards. Marketing became more sophisticated. During the days of artisans, selling was an incidental part of the artisan's work. In the modern industrial enterprise, the mass manufacturer of a line of products began to be combined with distribution within one enterprise. The

distribution departments of many national manufacturers grew larger than the leading mercantile enterprises in the 18<sup>th</sup> and 19<sup>th</sup> centuries.

Before 1890, publicly held industrial corporations were very rare. By 1914, many major industrial enterprises were incorporated and publicly held. Stock exchanges originated through the trading of government securities and the securities of chartered companies. Until the 1890s, shares of railroads and utilities were mainly traded. England was ahead of the US in developing markets for industrial stocks. This helped British companies to raise capital for capacity expansion and tapping new technological opportunities. American companies were in contrast, dependent for finance on personal contacts with wealthy individuals or banks.

Large scale trading in American stocks originated in trading in trust certificates issued by the trusts of the 1880s. Initially, they traded as unlisted shares. But after 1891, they were fully listed on the New York Stock Exchange. Beginning in the fall of 1897, a post depression merger movement virtually completed the shift of most American companies to publicly held corporations with listed shares.

The corporation with transferable shares converted the underlying long-term risk of a very large amount of capital into a short-term risk of small amounts of capital. Marketable securities also enabled investors to spread their risk.

Large enterprises are characterized by agency risk. Agents and employees may fail to act diligently. They may consciously or unconsciously act in their own interests than in the interests of the owners. Managers in charge of different functions lobby to get funds for their own functions. But there are advantages in setting up large enterprises managed by professionals. So, what is necessary is a mechanism to set up effective devices for controlling/minimizing agency risks. This is taken care of through marketable stock. If the investors do not like the way in which the company is being managed, they can sell off their shares and drive down the market value of the stock.

Economic development is possible only if there exist investors with no financial or bureaucratic interest in preserving an arrangement which is less economical than an available successor. So, there must be decision makers for whom sunk costs must have zero values. One of the most distinctive features of capitalist economies has been the practice of decentralizing authority over investments to substantial members of individuals who stand to make large personal gains if their decisions are right, who stand to lose heavily if their decisions are wrong and who lack the economic or political power to prevent at least some others from proving them wrong. According to the authors, the diffusion of authority to select capital expenditure programs is essentially about the diffusion of authority to select projects for innovation.

Large corporations had to cope with the difficulties of organizing work forces of unprecedented size. The confrontational aspects of the relationship encouraged the substitution of capital-intensive production for labour intensive production wherever possible.

### **The link between science and wealth**

At the beginning of the 19<sup>th</sup> century, most industrial technology, including the technology of the industrial revolution was the work of artisans or engineers with little or no scientific training. Among the various branches of science, chemistry was the first discipline to produce results useful for industry. The first industrial research laboratories in the US were established by chemists. The first

phase of the application of science to industrial processes and products consisted of testing, measuring, analyzing, and quantifying process and products in place. Such laboratories contributed information rather than invention or new scientific insights. Chemistry not only offered a better understanding of processes but in some cases, it also led to the development of new products. In many cases, the best way to improve a product was to improve the materials of which it was made. Physics had developed as a body of knowledge before chemistry. But its usefulness was more clear in astronomy than in everyday life. The full impact of science on industrial technology could be felt only after 1875. Bell laboratories, established in 1925, launched a program to improve the reliability and longevity of vacuum tubes. In the 1940s, William Shockley developed an electronic amplifier of semi conductive material instead of using vacuum tubes.

After 1880, industry became more closely linked with science. The intervals between scientific discovery and commercial application began to grow shorter. By the early years of the 20<sup>th</sup> century, industrial research had quite clearly turned toward the development of new products and processes. As long as industrial technology was focused on the visible world of the mechanical arts, advances in technology originated almost entirely with artisans who were imaginative and ingenious but in no sense learned scientists. About 1875, the frontier of western industrial technology began to move from the visible world of levers, gears, cams, shafts, pulleys and cranks to the invisible world of atoms, molecules, electron flows, electromagnetic waves, inductance, capacitance, magnetism, amperes, volts, bacteria, viruses and genes.

There was an immense gulf between societies in which science was in the hands of a few wise men, with individual agendas and western society's thousands of specialized scientists seeking to contribute to a coherent understanding of all natural phenomena. The experimental method was adopted by a number of researchers and their common method united them in a community of working scientists. The west scored over other societies, by getting a large number of scientists, specialized by different disciplines, to cooperate in creating an immense body of tested and organized knowledge whose reliability could be accepted by all scientists.

The west successfully organized its scientists with little hierarchy. This encouraged independent thinking. Hierarchical organization might have resulted if the funding of basic science could have come from only one source. The diversity of sources of funding enabled western society to undertake research activities on a large scale. Western science also rose at a time when political and religious authorities lacked the power to suppress new ideas with incompatible explanations of natural phenomena.

Western society encouraged a large number of companies to work on different ideas. Consequently, the system became biased towards acceptance of proposals. Innovation is more likely to occur in a society that is open to the formation of new enterprises than in a society that relies on existing companies for innovation. The openness of western societies to the formation of new organizations and to changes in the activities of existing organizations encouraged innovation by the threat of penalty for failure to innovate. The organization of the scientific side of western innovation took the form of a proliferation of research laboratories widely different in size, sponsorship, goals, personnel and facilities. According to the authors, "Innovators must be, by self-selection, more willing to take risks than the average individual, more given to dissent from the status quo, more willing to upset applicants. They are therefore more likely to flourish in a society that either fails to inculcate a complete respect for authority or that offers a number of competing authorities to its members. Individuality has found expression not simply in western innovation, but in the multiplicity of ways the west went about the work of innovation."

Growth is a form of change. Change implies innovation. The western system of innovation depended on the wide diffusion of power to undertake and use innovations, coupled with rewards for success and penalties for failure. The system of innovation penalized those who failed to cope with change. Scientific and technical knowledge could be converted into economic growth because western society enjoyed a social consensus that favoured the everyday use of the products of innovation.

### **Diversity of Enterprise**

Large publicly held corporations in mass-production industries are the most conspicuous type of economic organization in the west. But they arrived on the scene too late to qualify as a fundamental explanation of western economic growth. Undue emphasis on large corporations understates the role of smaller enterprises in the development of the west. Many innovations in the west have succeeded by trying out new ideas in new enterprises organized on an experimental scale, with little commitment to the status quo. Moreover, the western system employed enterprises of all types and sizes, depending on the nature of the economic mission for which the enterprise was organized. Not just the large corporations.

The formation of new enterprises plays an important part in growth by innovation. New enterprises can be established on a small, experimental scale at relatively low cost. Their efforts can be intensely focused on a single target. Many of the smaller enterprises fail but the few which succeed constitute an important source of innovation. The easy formation of new enterprises tends to act as a disciplinary device for older enterprises. New enterprises, specializing in new technologies have been instrumental in the introduction of electricity, the internal combustion engine, automobiles, aircraft, electronics, aluminium, petroleum, plastic materials and many other advances. Many Third World countries have made the mistake of seeking growth by imitating the largest mature western enterprises instead of facilitating growth by experiment, through start ups.

In the west, in the same industry, firms of different types and sizes tend to coexist. The same industry may have contract, brand-name and specialized manufacturers. Smaller firms engage in activities that are quite different from those of larger ones. The main thrust of the publicly-held industrial corporation, as an institution, is to use capital intensive, labour-saving methods of manufacturing. As a result, most of the labour force in countries like the US is employed outside the manufacturing sector. Most of the work of producing and distributing goods and services in western economies is done in smaller enterprises. Large industrial organizations organize a higher proportion of the economy's capital resources than of its labour resources. But labour is the more important resource, in terms of social significance. And industrial giants are not the institutions used to organize labour.

A fundamental characteristic of organization in western economies has been decentralization. The strength of the tendency to decentralization in western economies has not been adequately appreciated. There have been many prophecies that capitalism will end in the domination of western economies by a few capitalists. Such prophecies have turned out to be false.

### **Implications/Comparisons**

The relation of the political to the economic sphere may be analyzed by the methods of economics. From the viewpoint of economics, one would expect the division of output between the holders of political power and the economic sector to encounter some maximum point: the level of

expropriation beyond which further exactions would diminish political revenues.

Organizational innovations tend to benefit a small number of innovators a great deal, a large number of consumers, a great deal in total but very little individually. On the other hand, it may threaten a number of people committed to the status quo. As a result, there is often an adverse political response. Innovations will be retarded if there is political verbal decision making and enhanced if market methods of decision making are used.

Organizational innovations in the West have not stopped in the past few decades. During the period 1920-1960, it became the practice to separate strategic decision making and control from the operating parts of the enterprise. The operating functions were decentralized. This led to the conglomerate form of organization in the 1960s. During the 1970s, the corporate sector became a significant factor in the control and the structuring of economic organizations. In the case of smaller enterprises, innovations have included franchise systems and high-tech corporations. The high tech corporation is managed by scientists or engineers and funded by venture capital.

## **Conclusion**

How can the Third World catch up with the West? The starting conditions for growth are irretrievably different. The West was behind the Chinese and Islamic civilizations, at the time its growth took off. There is also nothing to suggest that the west deliberately created a merchant, entrepreneurial, capitalist class. It developed out of internal dynamics. But this gap was not as large. Another problem is that unlike in the west at the take-off stage, political and economic power are consolidated in Third World countries. But one silver lining is that growth through technology came relatively late in the history of western expansion. In the initial stages, trade was the primary source of growth. The success of Korea, Taiwan, Hong Kong and Singapore brings out the tremendous trading opportunities available to Third World countries.

The Third World can learn a great deal from both capitalist and socialist experiences. There is no simple prescription for costless, painless, economic growth. Some developing countries have experimented with planning. But planning looks at an economic system as a lifeless machine, without the internal capacity to change, adapt, grow, renew, reproduce itself and shape its own future. As the authors put it, "Plans can lead to steel, concrete and machinery supplied with property trained workers, but they do not ordinarily provide for creating extensive classes of people with the capacity to engage in independent economic activities not envisioned by the plan. But a growth system is like a living organism with impulses of its own. The result of planning for growth is to produce an economy, that is, it not a wholly lifeless statue of the real thing, at best a tame zoo-bred shadow of the natural animal." The experience of the Soviet Union should convince third world countries about the futility of planning. In socialist countries, there is only one form of ownership. Western economies on the other hand, have experimented with different forms of ownership. Investor ownership has become the most popular arrangement. The decision to reject principal organizational solutions that merged through experimentation in the west, has been one of the fundamental weaknesses of the Soviet economy. Russian managers had little discretion to respond to consumer judgment. How much to produce and what to charge became a matter of politics than economic judgment. This easily explains Russian's plight today

