

WIFO

ÖSTERREICHISCHES INSTITUT
FÜR WIRTSCHAFTSFORSCHUNG

 **WORKING PAPERS**

**EUROPE AND THE INDUSTRIAL
REVOLUTION**

FELIX BUTSCHEK

149/2001

EUROPE AND THE INDUSTRIAL REVOLUTION

FELIX BUTSCHEK

WIFO Working Papers, No. 149
May 2001

EUROPE AND THE INDUSTRIAL REVOLUTION

Felix Butschek

Even up to the beginning of the 20th century it could be still said that this continent ruled the whole world, directly or indirectly. The example of the British twin-turreted battleship "Nemesis", which in 1841, en route to Canton during the First opium War, destroyed nine war junks, five forts, two military posts and a coastal battery in a single day (Parker, 1996, p.154), provides just one illustration of conspicuous military superiority.

Such overwhelming superiority was the result of a process which had taken place only in Europe and North America, and nowhere else: the Industrial Revolution. Not only did this mean that in Europe per capita output was many times what the rest of the world produced, but in addition a yawning gap had opened up in technical expertise, the knowledge which had been the driving force behind the Industrial Revolution.

Over the course of the 20th century Europe's world domination has in fact come to an end, for various reasons. The Europeans were embroiled in two terrible conflicts which, although they were called World wars, mainly affected Europe; non-European countries or groups of countries achieved an impressive feat in bridging the gap industrially, as in the case of Japan and nowadays also other countries in Eastern Asia; and lastly, the European system of values changed, with imperialism being supplanted by democratic principles which are also applied to foreign policy.

The change has been far less as regards international income levels. These actually vary within Europe itself: the former Communist countries are still far below the EU average, and in socially unstable South America prolonged bouts of growth alternate with economic crises. But with the exception of the successful region of South-East Asia there persists, as before, an immense income difference between

Europe and the USA on the one hand and the remaining continents on the other.

These, then, are the bare facts. However, in a retrospective review the question which arises is that of the whys and wherefores: how did the Industrial Revolution come about, and why particularly in Europe? This continent represents a relatively young culture compared with others, such as the Chinese. The latter existed thousands of years before Europe entered the world scene and had exhibited impressive achievements not only in architecture and art but also, unquestionably, in technology and administration. The enigma gets even more complex than this, however.

Today, the Arab world counts as one of more economically stagnating regions. Yet in the early Middle Ages its culture had reached a glittering peak. It was through Arabic translations that many Ancient Greek philosophies underwent a revival in Europe. And it was from the same source that Europe adopted the Indo-Arabic system of numerals which really first made possible the rapid advance of European mathematics. As late as the 10th century, a Muslim scholar described the Europeans as backward in thought and language: the farther north they lived, the more ignorant, gross and brutish they were considered to be (Crosby, 1998, p,3). How can the total stagnation of this advanced culture be explained, how was it possible for the Industrial Revolution which took place in its immediate vicinity to pass by this region almost entirely?

In search of the causes

Economists have, of course, long debated how industrialization came about. Many of them, it has to be said, failed to take full account of the contemporary circumstances surrounding this transformation a fact which applies both to Adam Smith and to David Ricardo. Karl Marx, although he underestimated the possibilities of widely scattered income growth, came much closer to capturing the epochal nature of this process with all its social consequences.

While all economic historians attributed a central role in the Industrial Revolution to technical progress and innovation, they did not see these as its sole cause. They realized that the process must have been driven by a whole series of factors

extending beyond the directly economic sphere. Most of these were eventually summed up by Rostow in his book "The Stages of Economic Growth", which was widely acclaimed at the time.

He began by identifying five distinct stages in the industrialization process: the starting-point, i.e. traditional society; a period of establishing the preconditions for take-off; take-off itself; the drive to maturity; and finally maturity, i.e. mass consumer society. Rostow describes traditional society as pre-scientific society in which, although inventions do occur, they are limited in a manner such that labour productivity rises only slightly. In these agricultural societies the kinship group or family is dominant and behaviour is governed by "long-term fatalism". The transitional period of the late 17th and early 18th centuries marks the start of the breakthrough of scientific thought and discourse into the economy. Types of men come to the fore who are entrepreneurial and prepared to take risks, with a new set of values. The emerging nation-states show a keen interest in economic growth, in order to enlarge their financial resources. To make this possible, the state increases its investment both in the transport infrastructure and in the education system. Growing overseas trade brings market expansion, and commercial and financing organizations develop which foster entrepreneurial activity. In the take-off stage the obstacles to new development are finally surmounted and growth becomes the normal state of affairs. New, rapidly growing industries arrive, giving rise in their turn to other forms of production. Capital investment exceeds 10% of GDP. The new entrepreneurial class becomes widely established. Finally, this spurt leads into the period of maturity, in which all of these tendencies are consolidated (Rostow, 1960).

The Growth Accounting school sought to approach the problem empirically, by setting about quantifying growth-relevant factors (see, for example, Maddison, 1995).

Although theoretical approaches are also found in many authors who attempt to pinpoint the causes of the Industrial Revolution, as well as Rostow, the question as to how it was that all these necessary preconditions came about, and why it happened in Europe in particular, was a long time left unanswered. This shaky theoretical foundation is all the more surprising since economics is one of the social sciences that can refer back to a comprehensive theoretical basis. The debate itself on the causes of the Industrial Revolution demonstrated certainly, the inadequacy of the then prevailing theory,

Changes in economic theory

The basic assumptions of what is referred to as neoclassical economics operate in an abstract sphere totally removed from reality. According to this theory, people's behaviour in bilateral exchange is characterized by a series of surprising features predetermined by nature. Their concern is to maximize, in all circumstances, their own precisely calculated utility. When they enter into a business relationship this always takes place under conditions of perfect competition. The preferences of these individuals remain constant over time, and there is perfect information in the sense that the economic subjects concerned have complete information on the conditions (both current and future) of the exchange. And this takes place not only instantaneously but also completely without cost - the end result is market equilibrium. Perhaps the most remarkable thing about this model is that it applies to all times and contexts; or to put it the other way round, neoclassical economists presuppose all the behaviour-determining factors which in actuality have to be explained.

It is also not really surprising, therefore, that neoclassical growth theory fails to tell us anything either about economic growth or about how income differences arose between countries and regions. What it does is seek to explain these phenomena on the basis of the input of labour and capital which in reality account for only a fraction of the changes and a residuum called technical progress which is responsible for almost everything and about which nothing is known, with the result that some economic historians refer to it as a "measure of ignorance" (Abramovitz) .

It is true that this growth theory has undergone constant development and in its "new" guise attempts to incorporate technical progress into the model insofar as it is not merely the direct outcome of investment but also gives rise, outside the particular business concerned, to a spillover which can be utilized by economic subjects who have created the necessary human capital. But all this constitutes marginal factors, long known to economic historians, whose sole significance lies in the fact that they can be built into the neoclassical model.

More recently this situation of theoretical inadequacy in economics has undergone a

radical change. The so-called school of "new institutional economics" (NIE) levelled fundamental criticisms against the assumptions inherent in neoclassical economics. First, it pointed out that the notion of mutual perfect information is, quite apart from any other reason, inherently invalid because of the considerable difference in people's cognitive abilities in processing information in an exchange situation. There is therefore asymmetry in the degree to which economic subjects are informed. Consequently, whatever their attempts to behave rationally in the light of their objective, their ability to do so is correspondingly limited. Lastly, every business deal that is concluded gives rise to substantial costs associated with its proposal, execution and supervision (i.e. transaction costs) and takes time to complete, and the situation is very rarely one of perfect competition. For all these reasons, a state of equilibrium between supply and demand at a particular point in time is almost never the reality and competition has to be seen, rather, as an ongoing dynamic process which brings together the imperfect knowledge of market participants and corrects erroneous decisions. As the Austrian school of economics holds, rational behaviour does not exist at the level of the individual economic subject but only at that of the market system as a whole: "competition as a process of discovery".

However, the key difference between these two theoretical approaches lies in the fact that NIE does not assume that human behaviour is identical in space and time, but that it varies very considerably within these dimensions. And differing forms of behaviour leave their mark not only on the general functioning of different societies but also on their respective national economies.

But what is it that governs human behaviour? The answer, as the name of this theory would have it, is institutions. According to the classic definition given by Nobel laureate North, these are "...the humanly devised constraints that structure political, economic and social interactions. They consist of both informal constraints (sanctions, taboos, customs, traditions and codes of conduct) and formal rules (constitutions, laws, property rights)" (North, 1991, p,97), More recent research, however adds to this the fact that institutions not only restrict people's freedom to act and preferences but often actually determine them (Kubon-Gilke, 1997). And the totality of these institutions (referred to in the business management context by the expression "governance structure"), i.e. the institutional structure, characterizes a society.

The final point to be noted here is that this new theoretical development brings the

various branches of the social sciences together again. Psychologists, sociologists and economists are all involved in the debate on the determinants of behaviour. And it is sociologists who, for the institutional structure of a society, have reintroduced the concept of "culture" (Knight, 1997, p.694).

The cradle of European individualism

This new approach makes it possible not only to ascertain the origin of the institutional structure which ultimately constituted the precondition for the Industrial Revolution but also to clarify the reasons leading to the present-day disparities in income. Only a few decades ago researchers looking for the causes of industrialization were still concentrating mainly on the 18th and 19th centuries, This boundary was then pushed back by the debate on "proto-industrialization" i.e. industrialization before industrialization (Mendels, 1975). Nowadays, signs of relevant institutional change are traced back as far as antiquity.

The starting-point of European development lies in the size and form of states. The rugged Mediterranean landscape, which included numerous islands, permitted the emergence of only small political units of a mostly urban nature. These city states were under either oligarchic or democratic government, i.e. the citizenry was involved to a greater or lesser extent in the formation of political will. The societies concerned already incorporated the creation of well-defined property rights ensuring free disposition over land, capital and (in the form of slaves) labour. This enabled the development of a money economy with agricultural and craft-based production and already extensive trade (North, 1988, p.107). A very considerable degree of legal security kept down transaction costs and created the conditions for the fundamental elements of economic growth as formulated by Adam Smith: market expansion and the division of labour. It also created a certain degree of scope within which the individual was free to act politically, but above all economically, in addition the small-scale political structure allowed citizens who came into conflict with their respective ruling authorities to move on into other states,

Although the system of Greek city states fell into declines many later political forms in this region adopted the structures of the "polis", and this included Rome. Despite

frequent social clashes Rome never developed into any form of democracy. Nevertheless, many egalitarian elements are undeniably discernible: forms of wording such as “Senatus Populusque Romanus” or the description of the Emperor as “primus inter pares” indicate such an awareness. What can definitely be said is that the relationship between central administration and citizen (the “cives Romanus” with separate legal personality.) was different from that in non-European cultures: “I stood before all others in authority, but of actual power I possessed no more than my colleagues in each separate magistracy” (Augustus, *Res Gestae* 34 quoted in Dahlheim, 1999, p. 74) . This may have been a piece of fancifulness, but it documented how he saw himself. Subsequent centuries were to witness tendencies towards absolutism. But for a long time government showed a concern, after a region had been conquered by military means, to consider the interests of the inhabitants and to leave civic matters to self-administration - albeit by the upper strata (Dahlheim, 1999, p.65).

Rome grew into an empire which gradually created a functioning civil service, a regular army, local administration with police and fire brigade, etc. “Pax Romana” was the expression for a situation which guaranteed the state's citizens a high degree of personal and legal security. The development of the law proved absolutely fundamental to the Europe of the future. For Rome created not only likewise well-defined property rights but an extensive body of private law whose essential features have remained valid up to the present day. It must of course be remembered that despite these future-oriented elements, Roman society did not yet differ fundamentally from that of other contemporary advanced cultures,

This political and economic system broke down in the turbulences of the migration of peoples. Its productive capacity was overstrained by the relentlessly rising costs of defence, which were reflected in similarly increasing taxation. It also became less and less able to guarantee citizens' property rights (North, 19BS, p.126).

And so the urban culture of antiquity also declined in Europe. The cities of the Roman Empire had been production centres only to a limited extent: they functioned as consumer cities. An upper stratum which derived its income from the surrounding estates spent the latter in the centres of administration and cultural life - albeit not just on personal consumption but also on investment in the urban infrastructure. With the rising costs of defending the Empire, this lifestyle could no longer be maintained. The patricians withdrew to their estates, and urban demand dwindled.

The Germanic invasion of the Western Roman Empire not only led to disruptions in the cities but also left the rural areas stricken with the result that it became increasingly difficult to maintain the provisionment of the centres. But even when things had stabilized to some extent under the new rulers the demise of urban culture was not halted, since the Germanic upper stratum despised this lifestyle and settled in the rural regions. Nor were these consequences offset by the fact that the bishops had established their seats in the cities. In the 7th century European urban culture was dealt a further heavy blow by the advance of Islam, since the Saracens subsequently blocked off the entire Thyrrenian Sea and so brought trade on its coasts to a standstill (Pirenne, 1971, p.6).

The population was therefore forced to resort to agriculture for its subsistence. Not only did urban culture largely disappear, but also trade and the money system remained in a depressed state. In some cases the economy was reduced to the level of primitive barter. Only gradually did new institutions develop which once again brought about some degree of personal and legal security.

The Christian work culture

Even during the late period of the Roman Empire and in the early Middle Ages however, an institution was already beginning to take shape which was to have central importance for the subsequent development of Europe: society's evaluation of work. This process was very intimately linked with the Christian religion.

In classical Greece - In contrast to its early period - any kind of productive labour was despised. Its society was no different in this respect from all other advanced cultures of the time. Only the reasons differed somewhat: the activities deemed appropriate for the free citizen were confined to politics, science and war. All work necessitated by the compulsion to earn a livelihood must inevitably it was felt, stunt men's abilities to achieve higher things. The dignity and outlook of the free man went hand in hand with economic independence. Following the same line, Roman antiquity defined as acceptable only the "artes liberales" such as architecture, medicine and science. Early Christendom initially ascribes an ambivalent character to work: on the one hand it was part of the task of Creation - "And God said ... (replenish the earth)

and subdue it" while on the other hand God's punishment of Adam for his disobedience was that he would have to eat bread "by the sweat of his brow". But the Christian postulate of equality placed all forms of work on an equal footing. The following centuries saw a further development of the Christian view of work, with lasting consequences. Augustinus (St. Augustine of Hippo) stressed the nature of work as an element in the divine process of the Creation. " ... for the first time in the world history of labour, labour is given a positive meaning ..," (Frambach, 1999, p.51). Furthermore, in complete contrast to antiquity, idleness is regarded as something detrimental.

And Catholic theology, in fact, started from the assumption of the main factors prompting the emergence of the capitalist type of man. This is particularly true of the natural-law ethic of St Thomas Aquinas. The fundamental idea behind this ethic lay in the rationalization of life: "Sin in human activities is that which goes against the rules of reason" (St Thomas, cited in Sombart, 1923, p.307) . This rational approach also had reference to the economic sphere. To the schoolmen who embraced the doctrine of scholasticism, the true economic virtue is "liberalitas", i.e. rational management: it could also be called economic efficiency. This lies between wastefulness and miserliness (Sombart, 1923, p.309). What is reprehensible in any circumstances, however, is idleness. Any individual guilty of the latter is sinful in that he wastes the very valuable commodity that time represents. Here, therefore work is not merely rehabilitated but elevated to the status of a Christian duty.

It is, of course, no surprise that the Thomist ethic also imposes uprightness and honesty as requirements. However, this is not merely in general terms but in specific relation to business dealings; anyone who engages in trade "with misleading statements, falsehoods and ambiguities" is committing a mortal sin. In addition, Sombart also believes that it can be deduced from the writings of the scholastics that the authors actually favour the entrepreneurial and independent type of man in economic life (Sombart, 1923. p. 311).

Lastly, the Thomist ethic distances itself from the early Christian ideal of poverty. Whereas St Thomas accepted the income situation as given at any one time, his successors also recognized the dynamic aspect of the matter and hence regarded the accumulation of wealth as perfectly legitimate. The importance attached to economic activity by the Scholastic can be judged from an examination of the prohibition of interest: the latter applied only to pure usury, whereas if the creditor

shares in the entrepreneurial risk in any form the prohibition naturally did not apply! (Sombart, 1923, P.316).

Thus, all in all the Thomist natural-law ethic created a set of institutions highly suited to form the type of man who drove forward industrial development in Europe. Nor, therefore, is it any surprise that Sombart does not accept Max Weber's observations on Puritanism and the capitalist ethic, since capitalist behaviour had been shaped much earlier.

Certainly the Reformation radicalized this positive evaluation of work by investing it with the nature of a divine calling, expressed - in the case of German - by the use of the word *Beruf*. Man has a duty towards God to work. Calvinism goes still farther. Whereas Luther interprets the vocation to work as at a given place, which nobody should attempt to change, Calvinism makes the perception of work dynamic. The standpoint is predestination, or election, Although man cannot influence this, it can be recognized by hard work and its visible results (Frambach, 1999, p.60).

But the contribution made by Christianity to the capitalist development of Europe was by no means restricted to the social valuation of work. It differed from the religions of other advanced cultures not only in its content but also because it made no all-embracing demand. Christ himself made a clear distinction between the respective domains of the Emperor and of God. This dualism ran through the entire history of the Middle Ages and thereby created considerable scope for personal and intellectual development. Moreover, the Judaeo-Christian tradition was directed towards controlling nature: "... replenish the earth, and subdue it!". There was no place left here for paganism, which saw a deity in every tree (Landes, 1999. p,38).

Lastly, in the Middle Ages the Western Papal Church created a common institutional basis. This included not only the Church in the strict sense but also the monastic communities and the universities (Mitterauer 1999. p.52). In this context there emerged not only common rules but, above all, a common and permanent intellectual discourse which encompassed all countries of the Latin-speaking world and which was a constitutive element of scientific development and hence also of subsequent technical progress.

It is true that the influence of the Church (particularly the Catholic church) on industrial development was not a wholly positive one. The dogmatic obstacles it presented to scientific research are notorious, and the Enlightenment saw itself as the means of triumphing over such prejudices. The outbreak of religious fanaticism in

Spain and Portugal, with the Inquisition and the expulsion of Jews and Muslims, appears to have been a major cause of the total stagnation of these originally leading trading nations of Europe (Landes, 1999, p.134). All In all, however, Christianity must be recognized as having played a central role in the formation of an institutional structure, and hence the type of man, whereby the industrialization of Europe became possible,

The city and its burghers

The political system that was characteristic of the Middle Ages In Europe was feudalism. In principle, it arose from a deficiency. The early mediaeval kingdoms were not in a position to build up a central administration, a taxation system and a corresponding army such as had been the features, or were still the features, of the Roman State or other advanced cultures such as China. Instead, the territorial rulers deputed military functions (feudal military service) together with administration and jurisdiction to retainers who were each granted, in return., the right of usufruct over a tract of land. These manorial landlords, in turn, allotted parts of their grant of land to serfs, who cultivated it as payment.

This already marked the advent of a key element of the European institutional system, namely, the juridification of social relationships. They were based, in essence, on contractual rights and obligations: in return for certain forms of labour performance and dues rendered by the peasants, their Landlords provided personal protection, administration and lower jurisdiction (Rosenberg and Birdzell, 1986, p.62), Although over the course of the Middle Ages they increasingly conflicted with the proportionality of the performances concerned, in that they imposed an ever-heavier burden on the peasants, the nature of these social relationships remained, in principle, unchanged.

But it also resulted in what was a characteristic feature of European feudalism, namely, the splitting of power between territorial rulers and landlords (the subsequent estates of the realm) as well as a regional fragmentation. It was always possible for the individual to avoid particular centres.

What was decisive for the subsequent institutional structure however, was the emergence of the European city. It developed from markets and market regions. Market privilege, usually royal, guaranteed the latter immunity from the surrounding countryside and granted them the right to establish their own courts and to create law. This was, in any case, necessary for what may be termed a technical reason, since the Germanic law which applied in rural areas proved unusable for commercial activities. Furthermore, very early on the actual market participants gained influence over the administration of the market, since its founders had a considerable interest in attracting traders and craftsmen. All of these nascent features come to full fruition in the mediaeval European city (Bindseil and Pfeil, 1999) . Its political system gradually developed into a form of government by merchants for merchants. Although this was as a rule confined to the well-to-do strata, within these strata it was conducted on essentially democratic lines.

A major contribution by the city to the institutional structure which made industrialization possible consisted in growing legal security. Disagreements in commercial life were brought before the courts for settlement. Burghers were free as a matter of principle (*“Stadtluft macht frei, Landluft unfrei”*, i.e. serfs who came to live in a town or city for a year and a day automatically became freemen and were able to feel safe from arbitrary intervention by a feudal landlord or territorial ruler. A classic description of this political entity has already been given by Max Weber:

"As a mass phenomenon, an urban community in the full sense of the word was known ... only to the Occident ... For it implied a settlement of an at least relatively pronounced craft-production/trading nature which exhibited the following features: (1) establishment; (2) a market; (3) its own court and to at least some extent its own law; (4) the nature of an association and consequently (5) at least partial autonomy and self-leadership, and hence administration by authorities in whose appointment burghers, in their capacity as such, had some kind of voice" (Weber, 1972. p,7367 as cited by Dilcher, 1996. P. xxiii).

In this atmosphere it again became possible to develop, in contrast to the part-ownership of feudalism well-defined property rights which apart from allowing an expansion of trade also strengthened the incentives for economic activity. However, this institutional structure led to increased individualization of the city burghers since he was thereby singled out not only from society as a body but also from the kinship group or extended family (Dilcher, 1996, p. 295).

It must not, of course, be forgotten that trends towards individualization also developed outside the cities. The first point to be emphasized is that the European peasant of the Middle Ages was certainly not a slave: he still possessed legal capacity. Furthermore, however, in rural areas there was a limited form of self-administration and collaboration in the lower level of jurisdiction (Mitteis and Lieberich, 1981, p. 203).

In addition, an important contribution to this development was made by the institution known as the "Master/servant relationship" (Mitterauer, 1992, p.301). This relationship ensued from the generalized custom of children being consigned, from the age of puberty, into the care of external households for the purpose of training and gainful employment. They remained in that form of economic activity until the age of around 30, after which they either returned to the parental business or got married and established a household. In craft production the system had a counterpart in the form of apprenticeship. This essentially Western and Central European institution was the underlying reason for the "European marriage pattern" (Hajnal, 1965), which differed markedly from all other cultures in that marriage took place very late, i.e. after the master/servant relationship had ended.

This marriage system had a number of consequences. First, labour became to a large extent mobile. The passage from youth to full adult status does not take place abruptly, as in many other cultures, but gradually: the process of reaching maturity is given time. Family ties are loosened. Frequent movement provides a variety of opportunities for socialization. In the city young people form group associations. Eventually they attain a degree of financial independence which enables them to make a choice of marital partner independently, to a large extent, of their parents. In summary, this institution too can be regarded as an element contributing to European individualization (Crone, 1992, p.171). It should be noted, incidentally, that late marriage reduced the number of children and so European society was less often caught in the "Malthusian trap". None of this, of course, applied to the upper strata, where marriage was subject to calculated decisions based on power politics and wealth distribution.

Economic activity in mediaeval cities was carried on within widely varying institutional frameworks, production and regional trade were organized in guilds. Although these were also self-governing bodies, they controlled the conditions for production and trade very strictly. Production methods, product quality, prices and

customer groups were all fixed, as were entry into the trade concerned and the number of skilled artisans and apprentices.

The manner in which inter-regional and international trade developed was in total contrast to this. Here, leaving aside the taxes and duties which were levied on trade channels, the co-ordination of supply and demand was effected through the market itself. It must not, of course, be forgotten that the intensification of these trade relationships brought with it new institutions - a commercial moral code - which reduced entrepreneurial risk and lowered transaction costs. Observance of these moral standards was originally achieved without state intervention (Rosenberg and Birdzeli, 1986, p.114). Given that in the case of industrialization of the guild system the best that can be achieved is to recreate its legal nature, it is inter-regional and international trade which points the way to the future system of market co-ordination.

Lastly, a displacement process left its mark on the nature of cities in a very particular manner, i.e. as regards the scientific discourse that was so significant for industrialization. Prompted by the Decrees of the Third and Fourth Lateran Councils (1179-1215) the sources of knowledge shifted increasingly from the monasteries into the cities. This engendered a revival of the cathedral schools: the number of independent teaching magistri increased, and it was from this process that in the 13th century the universities were gradually established. As a result not only did the cities develop into centres of education and science but this was accompanied by the emergence of a new aristocracy alongside the urban patriciate (Le Goff, 1978, p.53).

Quantitative revolution and technical progress

The second half of the Middle Ages witnessed a decisive transformation among the urban citizenry (and in the monasteries) in the way in which Europeans measured reality: a change of mentalité. This change is described as the "quantitative revolution" (Crosby, 1998). Although it found expression in diverse ways, it was always characterized by a quantitative approach to problems.

Examples included the "linearization of time", which was made possible by the invention of the mechanical clock; the plotting of reliable nautical charts and land maps; the adoption and successful further development of Arabic mathematics; the

development of double-entry book-keeping; the introduction of perspective in painting; and the invention of music notation, which divided melody into temporal quantities and fostered polyphony. All in all, it heralded the transition from the mystic view of the world of the early Middle Ages to the rationalism of The Enlightenment.

And this adjustment was also reflected in European production techniques. To begin with, i.e. in the early Middle Ages, the increase in productivity occurred in agriculture. This initially related to the use of the wheeled plough with iron ploughshares, which made it possible to plough deeply and drain the soil. The two-field system brought the possibility of intensive grazing with quasi-automatic fertilizing. The scythe increased labour productivity significantly, and the introduction of the three-field system increased crop yields by a third. The resultant possibility of cultivating oats allowed the use of the horse, which was considerably stronger and faster than the ox. Its successful use in fieldwork was also made possible by the fact that with the horse-collar a usable form of harness was developed.

As a result of all these processes there arose around 1100 especially in Northern Europe, a zone of rural prosperity (White Jr., 1978, p.92). This meant that sufficient agricultural surpluses could be produced to allow further urban development.

The start of the next millenium saw a decisive technical advance achieved through the rapid spread of water-mills. Originally used mainly for grinding grain, they also became used to an increasing extent in industrial production. In addition, their application was aided by the invention of the camshaft and the gear wheel, so that not only were stamping-mills introduced for processing hemp but also many drive mechanisms for iron and metal production. Water-mills were followed by tidal mills and windmills.

Further technical advances were brought by the development of the crank and the flywheel. A high point in this process unquestionably came with the invention of the mechanical clock, which in practice formed the basis of precision instrument-making in Europe. This development was assisted by the advent in the 13th century of spectacles, which virtually doubled the output of skilled workers over the course of their working life.

Many such techniques were adopted by Europe from China, This seems to be particularly true of the spinning-wheel and the loom. Paper likewise is a Chinese invention; however, in Europe it was manufactured mechanically and so made much cheaper, which led to the explosive spread of letterpress printing.

As far as the demand for production techniques was concerned, the accoutrements of battle were naturally also important. The adoption of the stirrup allowed the effective use of armoured horsemen. Suits of armour gradually developed into mechanical and aesthetic works of art. However, in the late Middle Ages this battle technique was replaced by firearms, whose manufacture once more demanded considerable abilities of a mechanical nature. The most important thing about this development was that a tendency towards continuous technical innovation gradually began to establish itself in industrial production. A structure of informal institutions developed which produced behaviour engendering an unending interest in technical innovations in the production process. A kind of technical-innovation discourse slowly got under way. This "passion for mechanization" (White jr., 1978 p. 100) did not exist in any other culture-area. By around 1500 Europe was markedly superior to other cultures in technical development - and hence also in military terms.

Hostile encounters with other civilizations also came about as a result of technical innovations, namely, those in seafaring. Shipbuilding and tackling improved; cranes loaded and unloaded vessels; the compass was adopted from China and accurate nautical charts were plotted. The conquest of the world began,

Formation of states and mercantilism

With the change in military techniques, the feudal system came to an end. The development of firearms, in particular, meant that armour-clad horsemen lost their combat effectiveness. Of their responsibilities towards the peasant farmers under their control, the landlords retained only administration and lower jurisdiction, protection and security increasingly became the province of centralized power: state monopoly of the use of force began to emerge. However, the nobility was able to continue commandeering the leading positions in the army and the administration. Serfdom persisted (albeit in diluted form) up till the 19th century as an effective instrument of income redistribution. Alongside it however, the urban citizenry had established itself as a (predominantly economic) power factor which because of its specialized competence gradually gained influence over the central system of rule, particularly as regards its financial affairs.

However, the cities likewise lost the strong and independent position they had enjoyed under feudalism. This too was partly due to military reasons. The traditional fortification by encircling walls no longer provided protection against modern artillery, and cities no longer had any means of resisting the ever-larger armies of the territorial rulers. But in addition to this they had lost their social compactness. Growing differentiation between social groups within the city and its consequences (domination by an urban nobility) led to rising social tensions. In these clashes, often involving the use of force, the parties often called for assistance from the territorial source of rule and hence inevitably endowed it with increased political and legal influence.

From this point on, in order to fulfil their military ambitions territorial rulers were compelled to turn to different ways not only of raising armies but, above all, of financing them, since such troops were not under any axiomatic obligation to perform unpaid military service. However, the mediaeval states were by no means ready for this. The territorial rulers derived their income essentially from their crown estates and lands and certain duties and levies, and this was often less than the income of many landlords. Taxes for extraordinary purposes such as wars had to be approved by the very social strata from whom they were collected,

Given the latter's reluctance to authorize such taxes, territorial rulers looked for new - regular - forms of revenue within their sphere of competence. To do this they followed widely differing routes, which were to have consequences for the subsequent process of industrialization insofar as they influenced the functioning of the market. In Spain and France in particular, the sale of privileges yielded an important source of revenue. It mainly involved guilds and similar organizations which in this way were able to secure monopoly positions for themselves (North, 1988, p.154). Since these new revenues had to be fixed, collected, supervised and managed, they necessitated an extension of the administration system.

Thus, the loss of the nobility's military importance and the new financial requirements led to an increased tendency towards the formation of the central state. This process was, of course, frequently attended by bloody civil wars and produced differing results in the social distribution of power: in England, for instance, power was vested to a considerable extent in Parliament. The common factor, however, was the repression of regional autonomy.

But the phase of the transition to mercantilism included not only the expansion of

central administration but also the unification of the legal system. Territorial rulers increasingly changed over to regulating whole areas of life in society by means of laws. Although this initially related predominantly to criminal law, civil- and commercial-law rules became more and more common. Thus comprehensive formal institutions were already being created.

However, the replacement of knights-at-arms by foot soldiers exhibited a dynamic of its own which accentuated the above development still farther. The so-called "military revolution" (Parker, 1996) which took place from the 16th century onwards centred around three focal elements: the increased fire power of rifles and artillery, the erection of gun emplacements which were difficult to capture (the *trace italienne*) and warships armed on both sides. This development of battle techniques increased the financial burdens entailed. Consequently, most European governments often operated right up to or beyond the limit of their financial capability (see, for instance, Goodman, 1999) .

The economic consequences of these military innovations remain, as yet, an open question. For the high tax burden involved arose from an enormous public demand for commodities which were extremely advanced in technical terms. This applies not only to the manufacture of a modern battleship but also to firearms; here, there was very soon a move on to standardization and mass production. There is, of course no doubt that devastating long-drawn-out wars such as the Thirty Years' war set back the regions affected by decades, whether that is also true of the numerous cabinet wars remains unclear.

The essential contribution to economic development in this epoch was that made by the new position taken up by the state with respect to the national economy. As already mentioned, a relatively high degree of legal security had in fact always existed in Europe. In the past, arbitrary confiscation of inhabitants' property had very rarely occurred. Instead, in order to generate revenues the state had concentrated its efforts on extracting funds. Under the influence of mercantilist writings, there now came a complete change of thinking. Governments took explicit cognizance of the relationship between the level of economic activity and tax revenues. In political terms, the consequences of this realization consisted in fostering the economic expansion of the state in question: for the first time there emerged something like a coherent economic policy - "all-round commerce".

The fundamental aim of this policy was to maximize the national product, that was to

be achieved by increasing production and deliveries. Economic growth was also to be fostered by protecting the national market against foreign competition. Surpluses on the balance of payments were to be achieved in order to build up a reserve of precious metals. To this end, countries created commercial authorities which were responsible for implementing economic policy. National territory was fused into a single economic area with tariff protection against the outside world. The infrastructure was built up, schools were established and compulsory school attendance introduced, and the beginnings of a social policy were put in place.

Trade with distant countries, which had in any case enjoyed princely favour since the Middle Ages, was now directly promoted, partly through foreign-policy or military activities and partly through the formation of trading companies (Pohl, 1999, p. 154). The deciding factor, however, was the breakthrough in goods production: the guild system was largely broken up by the central authorities, and forms of production outside its area of operation were established. The manufacturing system was born, i.e. goods production which, although still predominantly based on the labour of skilled craftworkers, grouped together a large number of such workers under one roof and thus allowed the control and targeted organization of production. Of even greater importance was the outworking system, in which predominantly middlemen supplied raw materials to individual rural processors and, after the goods had been manufactured, took charge of the marketing process. All these entrepreneurs no longer satisfied purely local demand but also supplied external markets. This meant that entrepreneurial experience was accumulated not only in foreign trade but also in terms of production. Lastly, the state did not stop at merely promoting production in various ways but also changed over to setting up enterprises itself, in some cases with considerable success.

The intellectual background against which this economic policy developed was the Enlightenment in which the attitudes of the Middle Ages as portrayed above had taken firmer shape and which dominated 18th century thinking to such an unchallenged degree that not only the general citizenry but also members of the nobility and the clergy right up to territorial rulers such as Frederic II of Prussia or the Habsburg Emperor Joseph II subscribed to it. It saw itself as the ideology of "reason". i.e. rational thought, in contrast to one governed by religious thinking. The concepts which flowed from it were high esteem of the individual, equality before the law for all, and the perception of the state as a social contract. Obviously, this climate of

rationalism was highly conducive to scientific thought.

The great breakthrough

Towards the end of the 18th century the Industrial Revolution got under way in Britain and in the following decades was quickly followed by similar transformations in the USA and continental Europe. Although it seems that even then per capita income in Europe exceeded that in other civilizations (Maddison, 1970, p.36), the differences did not become immediately obvious - the second Ottoman siege of Vienna, at any rate, occurred as late as 1683 - but subsequently manifested themselves increasingly strongly.

This marked the onset of the process which Kuznets called "modern economic growth", i.e. steady economic growth on a scale which could no longer be disrupted by short-term setbacks (Kuznets, 1966) . Although between 1500 and 1800 there had already been an increase in per capita income in Europe, it was unevenly distributed regionally and over time and on a modest scale of around 25% overall (van Zanden and Horlings, 1999. p.39). Now, quite different proportions were achieved.

The entire economic and social structure underwent a profound transformation, Agriculture, which previously had dominated the whole productive apparatus, increasingly declined in importance in the decades which followed. Its place was taken by industry. The latter's main feature was the factory, an organization which not only brought together a large number of workers in a single place but in which production was based on the use of machines whose operation applied new means of inanimate power. Whereas formerly the bulk of the population had been country dwellers, the city now became the focus. Illiteracy was increasingly reduced as a result of education of various levels. Egalitarian elements infiltrated the hierarchical structures of society.

"The industrial Revolution also transformed the balance of political power - within nations, between nations, and between cultures; revolutionized the social order; and as much changed ways of thinking as ways of doing" (Landes, 1999 p.187).

To begin with, the production process was driven forward by a few leading sectors.. The major technical breakthroughs took place first in the textiles and iron and steel

industries. These were followed by mechanical engineering, and it was not until the second half of the 19th century that chemicals and electrical engineering were added. Transport was revolutionized: for the first time in history the mass transportation of people and goods overland became possible, as a result of the railways. Steam navigation did not take over until later, but the competition it represented prompted important technical improvements to sailing ships, so that high productivity increases were also achieved at sea.

The essential driving force of this development was the coal-fired steam engine in its form as developed by James Watt. In this there had been created the prime mover which not only produced an incomparably higher power than all previous sources but, above all, was independent of location. It now became possible to set up, anywhere, factories in which large numbers of workers operated machines.

The central element of this radical change lay in technical progress, in the sense of the improvement of production techniques and organization of the production process, which now, however, in contrast to the past continued on a permanent basis. A prerequisite for this was, of course, a corresponding level of scientific knowledge. What appears to be still more important, however, is an atmosphere in which this technical knowledge is applied to improving production. And here we come to the crucial point. In Europe the sciences were in a continuous process of development which had already reached a high level by the end of the 18th century. However, this academic basis was accompanied by a generalized interest in things technical which had seized relatively large sections of the population. It found expression in numerous technical societies such as, in Britain, the Royal Society.

Within this context scientists engaged in debate with interested laymen, many of whom had experience of economic activities. And it was precisely such amateurs who successfully made the most important inventions and hence set the Industrial Revolution in motion. James Hargreaves, who in 1764 invented the spinning-jenny, was an engineer; Richard Arkwright, who improved it, was a hairdresser and wigmaker; Samuel Crompton, who developed it further in the form of the spinning-mule, was a textile worker; Edmund Cartwright, the inventor of the power-loom, was a parish priest and writer; and so on. It was not until the second half of the 19th century that any systematic collaboration between academic research and development became established,

And it is here that at least a possible answer is to be found to the old and much-

disputed question.. "Why was Britain first?". For whereas in terms of actual inventions the latter was surpassed at that time by France, nowhere else was interest in technical and economic matters i.e. relevant debate, as widespread as it was in Britain (Mathias, 1969). This climate fostered the rising generation of early inventors. "From his days as a young apprentice In London James Watt participated in what we came to see as the distinctively British culture of applied science" (Jacob, 1998, p.69).

Important institutional changes once again, of course, also played a part, Although this interest in things technical seems to have existed in its own right, its application to production was certainly stimulated by the introduction of patents legislation granting an inventor the sole right, for a specified period, to profit from any proceeds derived from the invention concerned. Here again Britain was in the lead, with its enactment of the Statute of Monopolies in 1624 (North, 1988. p.169).

Nor must we overlook the long-established commercial experience of this maritime trading nation or, lastly, the fact that it was in Britain that civil freedoms were first established and that, as a result, the characteristic type of man first emerged.

The product of centuries

If we try to summarize all this and draw conclusions from it, it may be said that the Industrial Revolution is the result of a process of development dating back over centuries into antiquity. In the course of this process there was created a particular institutional structure - a particular culture - which shaped forms of behaviour that brought about a fundamental transformation of society and the economy unique throughout the world. More specifically, the following necessary - and manifestly adequate - conditions developed;

1. The high social value of labour, which was not the case in any other culture. Upper classes there had to fight, to pray and to hunt. This new assessment of labour was the outcome of Christian religion – “pray and work”! Christianity elevated work to the status of moral duty. But it was not only the high esteem of it, because mediaeval scholastics developed a dynamic attitude towards work. It should have been done not only honestly but rationally and successfully. This approach was notoriously

intensified by Protestantism. And this element of the European governance structure leads to the next one.

2. The individualistic European type of man, prepared to assume responsibility entrepreneurial and self-assured, which was already present in the Greek "polis". The latter integrated citizens into the political decision-making process and opened up to them considerable freedom of action. Political participation offered them opportunities for exerting a formative influence, but also demanded a readiness to assume responsibility. This sense of personal responsibility required a firmly realistic analysis of the surrounding world, which may have accounted for the rational approach of European thinking. The Roman Empire, although not offering the same degree of freedom, preserved many democratic and egalitarian elements. The mediaeval cities carried on the tradition of antiquity in their system of extensive self-administration by burghers. Its restriction by the territorial state barely affected the economic sphere, moreover there developed along with this political institution the ideology of The Enlightenment, which made the above mentioned characteristics of citizens explicit and backed them by force of argument. It was from this type of man that there was drawn the capitalist entrepreneur (as also the inventor, the resourceful government official and the politician) who made full use of his opportunities for taking action.

3. Another feature which must be regarded as characteristic of this type of man is the technical and scientific nature of his thinking. The "quantitative revolution" of the later Middle Ages marked the point when mystic and religious thinking was abandoned and rationalism became the foundation of European intellectuality. It was on this basis that the scientific elite now took a good look at the world around them. And this scientific awakening eventually led to rapid and widespread advances in technology. As already described, however, it was not the academic sciences that proved to be the determining factor for the Industrial Revolution, but the emergence of a science-laden atmosphere which encompassed broad sections of the population and, above all, the continuous innovation that had become a "routine" (Landes) .

4. A key determinant of capitalist development in Europe lies in the rule of law. It signifies that every individual is as a matter of principle subject to the law, that disputes are dealt with before courts and hence that personal power plays no part in the enforcement of the law. As a result, the individual is protected against arbitrary encroachments on his rights by third parties. The beginnings of this are also to be found in the "polis" but were developed more positively by Roman law. Although the

latter was not passed on directly into the rule-making systems of the mediaeval cities (its adoption came at a later stage), they likewise all developed, despite differing legislation, in the direction of a state governed by the rule of law. And even the new territorial states remained characterized - despite absolutism - by broad codifications of the existing law. That does not mean to say that all areas of the legal system always favoured economic activities, but the mainpoint here lies in legal security, proper access to courts and authorities and the absence of corruption in the dispensing of justice and administration. Not only did this ensure that entrepreneurs could plan business operations on a long-term basis, but in this way transaction costs decreased decisively, which in turn led to the expansion of markets and more intensive division of labour and hence to the reduction of production costs.

5. In the pre-industrial era all the factors named here are typically connected with trade with distant countries. For many hundreds of years the latter was not necessarily something specifically European. However, In the Middle Ages continental foreign trade begins to take on characteristic features, here again under conditions of considerable freedom for traders and explicit encouragement by territorial rulers. In this context numerous intra-European trade fairs came into being in France and Flanders and, above all, a series of institutional and technical innovations emerged. Banking developed In Northern Italy, and in general cashless payment transactions and control of the conduct of business. Differences of opinion were settled autonomously. From early modernity onwards, maritime trade acquired particular importance, attaining a previously unknown geographical extent and a quantitatively immense volume. Not only did it drive forward technical development in shipbuilding and navigation, but it had a decisive effect in that entrepreneurial operation on a large scale became, as a result, possible and customary. This engendered an atmosphere which enabled this knowledge from the sphere of trade to be communicated to that of production.

"With the rise of commerce came a rise in shipping and, perhaps more important, a rise In the institutions of credit and commerce; and above all a rise of men devoted to commerce: men concerned with fine calculations of profit and loss, men of wide horizons, whose attitudes communicated themselves in various ways throughout their societies" (Rostow, 1960. P,31).

Europe's uniqueness

Identifying these key factors which shaped the complex process of industrialization also provides the answer to the question: why Europe, and why only Europe? For we find that these crucial determinants of industrialization failed to develop in the comparable advanced cultures i.e. the Arab-Turkish, the Indian and the Chinese. Certainly, each of these had particular characteristics of its own (such as the caste system In India) which constitute supplementary reasons for the fact that no industrialization process took place there, but there are other explanatory features which are common to them all.

For example, the distinguishing attributes of the capitalist type of man were far less pronounced there. The explanation for this lies, once again, in institutional development. In the noneuropean civilizations, with their large, unbroken land masses, central or territorial (usually despotic) power was able to maintain its grip time after time. This also applies to the (far less numerous) cities, which were always dominated from outside by aristocratic landowners with their non-commerce-oriented set of values. Any kind of autonomous development comparable to that in Europe remained unknown in these regions. Nowhere, therefore, did a relatively free citizenry emerge. A contemporary visitor to Islamic countries would have come across magnificent buildings in the cities.

"But he looked in vain for the 'burgher'. The latter was superfluous in an Islamic world united in belief In Allah. Here, it was only the believer who counted. For the state, as an instrument of divine will, neither had any need of a secular authority and system of dispensing justice nor countenanced any notion of an area of life beyond the reach of religious law and its custodians. From the very hour of the birth of Islam, therefore, the concept of the religious community had ousted all idea of the state as an assemblage of free citizens who are subject only to the law. The word of God axiomatically ruled supreme over both everyday and public life" (Dahlheim, 1999, p.181).

This view of things preordained a policy under which scientific research (which in the early Middle Ages had reached a high point in the Spanish universities) was subjected to restrictions and, to this end, letterpress printing was prohibited since it was only likely to assist the spread of undesirable ideas (Jones 1990, p.184).

And this also meant a block on all scientific and technical development. In all of these civilizations, of course, and particularly in China, there were outstanding scientific achievements. But they never led to the onset of any process of industrial growth because scientific work was confined to a narrow circle. There was never any of the generalized and ongoing discourse which drives scientific knowledge forward. For thousands of years Chinese society remained self-satisfied, convinced that it represented the centre of the world and closed off from outside influences. Even its confrontation in the 17th century with the then scientifically and technically far superior European culture merely led it to dismiss the latter or ascribe its knowledge to more ancient Chinese sources (Landes, 1998, p.335). And this also precluded the development, at least within their own country, of a stratum of technically minded, dynamic entrepreneurs who could have translated the results of academic research into economic innovations.

Japanese society, similarly, kept itself sealed off from the outside world during the 17th and 18th centuries, it did, however, successfully adopt a few particular European products and manufactured them itself, such as spectacles and mechanical clocks. The latter, it is true, were of limited value since Japan, as had been the case in the Europe of antiquity, had no standardized system of time measurement. Nevertheless, this demonstrated a certain willingness to learn. Furthermore, Japanese society exhibited a number of developments similar to those in Europe. For a start, there was a growing tendency on the part of feudal lords to monetarize the rent paid by peasants. It was also possible in Japan to flee into the city. And there, obviously, there also emerged an independent, commerce-based bourgeoisie who developed a specific work ethic. Seemingly there also gradually developed a position of central power for state and economy similar to that in European mercantilism. Investment in the infrastructure began, with the purpose of promoting economic development. In addition, a proto-industrialization unfolded on the basis of cotton processing. Large urban consumer centres such as Edo (the present-day Tokyo) and Osaka were established. The Meiji Restoration was therefore able to build on a useful basis. There is no doubt that its sweeping success was founded firstly on the Japanese work ethic, which exhibited features similar to that in Europe, but also on the eager adoption of European experience. In the view of Landes, Japan would have been the only region capable of implementing industrialization of its own accord (Landes, 1998, p. 350).

A second key element of the difference between Europe and the Asiatic cultures is the presence (or otherwise) of the state governed by the rule of law. The ability of the central powers to assert themselves which was mentioned at the beginning of this section led to continual intrusions into the private lives of their subjects. Although in different epochs and to a differing degree, time and again there were instances of arbitrary confiscation of assets. In such circumstances it was neither possible to embark upon long-term, extensive investments nor deemed advisable to accumulate major assets. In India things reached the point where inhabitants built humble-looking houses in order not to attract attention (Landes, 1999, p.157). This also made it virtually impossible for a stratum of potential capitalists to emerge.

A further element which held back development was probably that in these civilizations subjects were taxed excessively (Maddison, 1970, p.38). This meant that no resources could be accumulated for investment. Luxury consumption in the ruling strata of these civilizations, particularly in India, is said to have been far in excess of that found in Europe (Jones, 1990, p.196). The annual income of the Mogul Aurangzeb was ten times that of Ludwig XIV! (Landes, 1999, p.156). Where this was not true of a central power, as in the case of China, a corrupt civil service produced the same result. These were certainly also contributory factors in precluding the development of an autonomous, prosperous bourgeoisie.

Differences in foreign trade are the least noticeable. All of these civilizations engaged in such trade up till the late Middle Ages. In some cases it was then halted administratively, as in the case of China, where in 1480 the Emperor prohibited all maritime trade. (The very fact that such a ban could be imposed is also attributable to the absence of a strong, actively trading bourgeoisie.) In other cases it was the Europeans who suppressed Asiatic competition, once their ships were more technically advanced they had larger capital resources at their disposal and, lastly, they possessed superior military strength (Landes, 1998, p.20).

But institutional structures are the explanation not only for differences in economic development between the major cultures but also for such differences within them, including Europe and America. One of the most striking examples is offered by a comparison of development in North and South America. Both regions were discovered and settled by the Europeans at roughly the same time. At the beginning of this period per capita income in the South exceeded that in North America, yet nowadays income levels in the two halves of the continent are worlds apart.

Table 1. The Record of Gross Domestic Product per Capita in Selected New World Economies, 1700-1997.

Here too the main reasons lie in the institutional circumstances. In the northern half of the continent there were highly motivated, small agricultural landowners and (owing to the shortage of labour) highly paid employees: an atmosphere which fostered liberalism, individualism and initiative and in which status was determined by economic success. Here, the advent of technical progress fell on fertile ground, and early manufacturing industry experienced explosive growth on such a scale that British entrepreneurs attempted to force through a ban on production in the colonies. By 1820 industrial labour productivity in the USA already outstripped that in Britain. Shortage of labour combined with fast-growing consumption led to standardized mass production based largely on machines. The absence of historical institutions gave free rein to the innovatory spirit, in short, it may be said that in North America an egalitarian society emerged which was characterized by the free, individualistic and entrepreneurially minded. citizen who was receptive to innovation.

In South America things were quite different. There, the intellectual climate was suffused with the influence of dwindling Spanish (and Portuguese) imperial power, with the unfettered dominance of a Catholic church, opposed to all reform and ruled by the Inquisition, which suppressed freer creative and competitive thinking. The production system of uninterested aristocratic latifundia owners was accompanied by a mass of unskilled, mostly unfree and therefore also unproductive labour (Landes, 1998, p,310) . Its administration was directed solely towards extracting high revenues from the colonies, while no value was attached to their economic development. The holders of high-ranking administrative posts had to come to an arrangement with the powerful groups such as the Church, religious orders, large landowners and traders. Lower-ranking administrative posts were sold; their occupants received no pay, but later a share of the taxes collected. As a result, there was never any development of a system of objective commercial and public relationships within the framework of law, but one relying on personal contacts, in many cases based on corruption (Schröder, 1999, p.143).

The persistence of history

And this historical legacy has continued right up to the present. In the so-called Third world, even today there is in many cases no bourgeoisie which is individualistic, willing to take responsibility, self-assured and entrepreneurially minded, and an inadequate and corrupt legal system is virtually a characteristic of these regions. In many instances the development of human capital is still only just beginning and these societies are unsettled by social tensions. Their characteristic feature nowadays lies in the lack of correspondence between formal and informal institutions. For political and economic legislation everywhere in the world has been more or less adapted to the European or American models. Yet informal institutions, that is, the unwritten rules which are shaped by the behaviour of economic subjects ("The 'inner environment' of mental residues, including the cognitive and normative cultures human capital, work habits, and social and political aspirations, collective identities and their potential for social conflict ..." (Elster, Offe and Preuss, 1998, p.191), sometimes deviate considerably from the laws, i.e, formal institutions , and are still influenced to a great extent by historical determinants: path dependence.

The Arab culture, which had reached its pinnacle in the Middle Ages, was already experiencing its first setbacks towards the end of this period; and by the 19th century the Ottoman Empire had become the "Sick Man of Europe". And according to Landes, for example, nothing about this has changed up to the present day. The oil-producing countries may be characterized by excessive wealth, but this has not led to any kind of indigenous production. (However, in the case of services, such as ports, airports or banks, something does seem to have happened.) At the start of the 1960s the average income in South-East Asia (excluding Japan) was significantly lower than that in the Arab States; today, it is more than double the latter. To this day the Arab States remain dictatorships, in some cases with the uninterrupted influence of the Mohammedan clerics. They were not in a position to train up a skilled potential labour force. The illiteracy rate is high - particularly among women, whose position in society there is deplorable anyhow. Just as before, the Arab countries are filled with distrust of the West's technologies or ideas. All this has repercussions on economic development (Landes, 1998. p.393).

These shortcomings are especially pronounced in sub-Saharan Africa. Incompetent

governments, inadequate technology, poor education. These countries are characterized by poverty, hunger and disease. The average income is barely increasing at all.. In 1965 oil-exporting Nigeria generated a higher per capita income than Indonesia: today, that of the latter is three times that of the former. Wars between each other are the order of the day. Under the "kleptocracy" system the rulers of the day seek to appropriate as large a proportion as possible of public revenues for themselves and transfer these funds abroad (Rowley, 2000). In some cases even the formal institutions, i.e. the legal framework, seem inadequate. The informal institutions, of course, are still less appropriate to the needs of an industrial society. The population's achievement motivation is low; the individual is rigidly integrated within the clan - any activity he engages in requires the consent of its oldest member and he has to share his income with the group. Under the "kleptocracy" system a certain clientele enjoys special favour. This means that budgets are always in deficit and national debts enormous. Agriculture, which is in any case fairly unproductive, is far more heavily taxed in Africa than it is in other regions, partly because state purchasing monopolies make this easy to do, but it paralyses initiatives in this sector (Schröder, 1999. p-148),

However, it is not only in non-European regions that such shortcomings impede economic growth. The same is true of Europe and America. Just as before, there is today an immense income gap between North and South America. Individual countries which before the First World War had attained a respectable per capita income, such as Argentina, have again fallen far behind. This inability to initiate a catching-up process is still largely attributable to the Spanish/Portuguese legacy.

Even today, the apparatus of state is incompetent and corrupt, and this applies equally to the judicial system. The result is that transaction costs are driven upwards. Economic policy is for the most part shaped to the advantage of certain interest groups, to whom substantial resources are also diverted by way of the budget: rent seeking is the order of the day. Despite occasional attempts at imposing a social-policy approach, the income gap between the upper stratum and the bulk of the population remains blatant. Protective tariff policies and excessive exchange rates benefit the former in particular and also urban workers, at the expense of agriculture.

Education also appears to be inadequate, especially at primary and secondary level. And social security chiefly covers the relatively well-paid urban labour force, not the main bulk of the population (Schröder, 1999, p.119) .

These historical determinants have precluded, right up to the present day, the development of an informal institutional structure corresponding to the formal one, i.e. that of a developed, capitalist industrial state.

Similar phenomena are however, also to be witnessed in present-day Europe, The problems encountered in the transformation of the former Eastern bloc countries are likewise attributable to a discrepancy between formal and informal institutions. Although even the creation of an adequate legal basis presented a formidable challenge, these countries succeeded in renewing the formal institutional structure fairly quickly, but the adaptation of informal institutions represented a far more laborious task. Russia offers a particularly graphic example. Corruption and inadequate personal and legal security impede economic activity and are contributory factors in preventing the emergence of a stratum of dynamic entrepreneurs (Nowotny, 1999).

It can thus logically be said that, if a country wishes to establish an efficient industrial economy with a correspondingly high income level, there is no way round the European institutional structure.. "The country that is more developed industrially only shows, to the less developed, the image of its own future" (Marx, 1962. p.xix),

And in the past few decades most East Asian countries have succeeded in setting a process in motion following this pattern. Few of them proved to be exemplary democracies, but their political system ensured scope for economic activity, together with the essentials of legal security, i.e. properly functioning courts and administrative authorities. What is more, the more or less authoritarian governments directed their policies at the economic interests of their respective countries and not, in general, at serving a special clientele, nor (with the exception of Indonesia) was their aim massive personal enrichment.

This was matched, on the part of the general population, by a notoriously high work motivation and a similar eagerness to learn which was given full rein by a comprehensive education System. A strong tendency towards thrift was also characteristic of these countries, as was correct behaviour towards third parties and the state. This informal institutional structure can also be traced back to historical traditions. However, it was at the same time sufficiently flexible to accommodate adjustments to the new circumstances of an industrial society without any social disruption. This provided a viable basis for the emergence of a highly effective economic policy. These countries established an appropriate infrastructure and also

retained their identity: agriculture was not discriminated against but promoted, by measures including land reform. Industrial policy was geared to properly functioning competition primarily at domestic level.

Although in the initial stages of industrialization a protective tariff policy was operated, this was gradually relaxed and eventually replaced by an export promotion policy. High savings and investment ratios facilitated expansion, which was not held back even by high taxes or an excessive state apparatus,

The outcome of this particular set of circumstances is there for all to see: since 1960 the "Asian tiger" economies have grown come three times faster than those in South America and five times faster than those in sub-Saharan Africa (Schröder, 1999, p.87).

The role of women in Europe

In the foregoing an attempt has been made to sketch in the essential features of the industrialization process. Although this has necessarily taken the form of a condensed account, it must not be allowed to disguise the fact that many problems should be explored in more detail. The causes of the quantitative revolution in mediaeval Europe should, for example, be investigated more in detail. In addition, the role of women in relation to industrialization needs to be examined. This question arises because it is another of the aspects in which European society differed fundamentally from the other advanced cultures.

In the latter, a woman was generally assigned a wholly subservient function within the family and with respect to her husband. In accordance with Muslim beliefs, for instance, this inferior position even meant having no independent identity, and externally, that women had to be fully veiled when appearing in public (as is still the case today in many Islamic countries). In China they also had to accept physical disfigurement (bound feet), as they also did in many African countries (excision of the clitoris). In most of these cultures polygamy was the norm for - of course - the more prosperous group.

In Europe, on the other hand, women occupied a fundamentally different position.

Although within the family context a woman also had to accept subjection to her husband to a large extent, she was still recognized as a person in her own right. This had also been the case even in antiquity:

In *confarreatio*, the solemn marriage ceremony of Roman law, the wife was given explicit recognition as a legal person. Although this legal identity may have been mainly confined to the urban aristocracy and have represented the optimum possible situation, it is still a characteristic indicator of the position of women in Europe.

Under Germanic law, although the husband acted in the wife's name in all legal matters involving the outside world, within their relationship she possessed the authority to wield control through her "Schlüsselgewalt", i.e. her authority to act in her husband's name in matters concerning the household (Mitteis and Lieberich, 1981, p.22). Her special position as compared with other civilizations was also expressed through monogamy, which became widely established, at the latest, with the progress of Christianity.

Over the course of the Middle Ages women acquired growing importance. In the aristocracy they were often the vehicles of education and science. Their status in European society is also evident from the fact that in the context of the Catholic Church they were able to form female religious orders possessing the same rights as monastic orders. Their abbesses sometimes attained a prominent position in becoming accepted discussion partners of leading secular and ecclesiastical officials - something quite inconceivable in other advanced civilizations. But it was also possible that women led a life of religious discipline alone in the city. The mystic Agnes Blannbekin is recorded in the early 14th century in Vienna, where she led a solitary existence although in constant (and critical) contact with the outside world (Oppl, 1998, p.162).

Women also played an important role in production. In all cultures they had to perform (heavy) work, in many cases as the main workers. In European agriculture, however, this was done in co-operation with the husband or head of the family, performing specifically assigned functions to suit their particular capabilities:

"In the case of Central European peasant farming it can be said, as a rough simplification, that field, meadow and forest were primarily assigned to the man's work sphere. In the barn he had to care for the draught animals, i.e. horses and oxen, with which he also did the pulling work. Other typical areas of the man's work were building and repair tasks on the house, work buildings, roads and fences and the

making of tools. The woman's province included - in simplified terms - the stall-rearing of cows, young cattle and pigs, milking, small-animal rearing, gardening and the associated types of plant-growing such as herbs, poppies, root vegetables or flax. The further processing of flax, including spinning, leads on to household management. In addition to making clothes, the tasks here notably include the production of foodstuffs, i.e. baking, dairy processing of milk, preserving meat, fruit and vegetables, etc. In addition, there are then domestic activities in the modern sense, such as cooking, laundering and - always central among women's tasks - caring for the children!' (Mitterauer, 1992. p.30).

In general, it can be said that men tended to be allocated tasks which entailed working farther away from the house, involved greater risk and demanded more physical strength (Mitterauer, 1992, p.29). The male preserve also included protecting the family and acting on its behalf with respect to the "outside world". From this originally functional division there then developed stereotypes, with "typical" male and female jobs.

In the case of urban craft trades during the early Middle Ages there was no such close interconnection in the production process. But in the course of the time the position of women became ever more important. This was not only evidenced by the fact that if a craftsman died his widow was able to carry on running the business, but by women becoming themselves masters of – predominantly textile - crafts and even bosses of guilds.

It is also notable that the master/servant form of employment during youth that was described earlier, i.e. gainful activity outside the home performed in various households, was as typical for girls as it was for boys. The individualizing tendencies which accompanied this, together with securing an income of their own, gave women a relatively independent position. They became free to make their own choice of husband and also acquired a stronger position with respect to him in terms of property rights.

Although it seems, as if towards the Early Modern Times women lost their position as qualified labour in towns, they gained importance as untrained cheap labour. In manufacturing and commerce in Lower Austria for example women represented during proto-industrialization around two thirds of all employees in manufacture (Otruba, 1960. p.171) . And with the advent of industrialization proper this development continued particularly in the textiles. Work as an employee was poorly

paid, since the general perception was that women's work constitutes only a supplementary source of income for the family. It must, of course, be remembered that it was only the legally relatively independent position of a woman in Europe which enabled her to engage at all in paid work outside the home. In other cultures (particularly Islam) the professional activity of women outside the home seems to have become customary only in more recent times. In the wake of industrialization almost all young unmarried women, outside agriculture, engaged in some kind of gainful work outside the home.

The perception of men and women as principally equal is also evident from the fact that as a result of The Enlightenment at least primary-school education was introduced for both sexes. This brought consequences for the labour market which were not only direct but also indirect: well-educated mothers pass on their knowledge to the children and hence improve their learning abilities. It is true that in the 19th century political affairs as well as secondary and academic education remained the prerogative of men for a long time. In the upper middle classes there was a new division of functions to the extent that the married woman dropped out of the production and earning process. She now concentrated more on running the household and bringing up the children, but within this context assumed more and more social functions. She not only took charge of maintaining important social contacts for her husband, but also developed many general cultural and political activities. The era of the "Salon" had arrived.

Although research on the topic is still in its early stages there obviously exists some evidence, that industrialization was given considerable momentum by the specific position of women in Europe. It was not only possible to utilize the potential of population for work as well as for human capital far more intensively than in other cultures, but European women contributed to the development of that type of man, which became the carrier of the Industrial Revolution.

Literature:

Bindseil, U., Pfeil, Ch., Specialization as a Specific Investment Into the Market: A Transaction Cost Approach to the Rise of Markets and Towns in Medieval Germany, 800-1200, Journal of Institutional and Theoretical Economics (JITE), Vol.155, 1999.

- Crone, P., Die vorindustrielle Gesellschaft, München 1992.
- Crone, P., Hinds, M., God's Caliph. Religious authority in the first centuries of Islam, Cambridge 1986.
- Crosby, A.W., The Measure of Reality. Quantification and Western Society 1250-1600, Cambridge, 1998.
- Dahlheim, W., An der Wiege Europas, Frankfurt a.M., 1999.
- Dilcher, G., Bürgerrecht und Stadtverfassung im europäischen Mittelalter, Köln-Weimar-Wien, 1996.
- Elster, J., Offe, C., Preuss, U.K., Institutional Design in Post-Communist Societies, Cambridge, 1998.
- Frambach, H., Arbeit im ökonomischen Denken. Zum Wandel des Arbeitsverständnisses von der Antike bis zur Gegenwart, Marburg 1999.
- Goodman, D., Armadas in an Age of Scarce Resources: Struggling to Maintain the Fleet in Seventeenth-century Spain, The Journal of European Economic History, 1/1999.
- Grant, M., Das Römische Reich am Wendepunkt. Die Zeit von Mark Aurel bis Konstantin, München 1972.
- Hajnal, J., European marriage patterns in perspective in Glass, D.V., Everley, D.E.C. (eds.), Population in history, London 1965.
- Hägermann, D., Karl der Große. Herrscher des Abendlandes, Berlin, München 2000.
- Jacob, M. C., The Cultural Foundations of Early Industrialization: A Prospect, in Berg, M., Bruland, K., Technological Revolutions in Europe. Historical Perspectives., Cheltenham-Northampton (USA), 1998.
- Jones E.L., The European Miracle. Environments, economies and geopolitics in the history of Europe and Asia, Cambridge (1987), 1990.
- Knight, J., Social Institutions and Human Cognition: Thinking About Old Questions in New Ways, Journal of Institutional and Theoretical Economics, Vol. 153/1997.
- Kubon-Gilke, G., Verhaltensbindung und die Evolution ökonomischer Institutionen, Marburg, 1997.
- Kuznets, S., Modern Economic Growth-Rate. Structure and Spread, London, 1966.
- Landes, D.S., East is East and West is West, in Berg, M., Bruland, K. (eds.), Technological Revolutions in Europe. Historical Perspectives., Cheltenham-Northampton (USA), 1998.
- Landes, D.S., The Wealth and Poverty of Nations, New York/ London, 1999.
- Le Goff, J., Die Stadt als Kulturträger 1200-1500 in Cipolla, C.M., Borchardt, K. (Hrsg.), Europäische Wirtschaftsgeschichte, Bd.1, Mittelalter, Stuttgart/New York, 1978.
- Maddison, A., The Historical Origins of Indian Poverty, Banca Nazionale del Lavoro Review, Nr.92, March 1970.

- Maddison, A., *Explaining the Economic Performance of Nations. Essays in Time and Space*, Aldershot, 1995.
- Marx, K., *Das Kapital*, Bd.I, Stuttgart, 1962.
- Mathias, P., *Who unbound Prometheus? Science and technical change.*, *Yorkshire Bulletin of Economic and Social Research*, 1/1969.
- Mendels, F.F., *Agriculture and peasant industry in eighteenth century Flanders*, in Parker, W.N., Jones, E. L. (eds.), *European peasants and their market*, Princeton 1975.
- Mitterauer, M., *Familie und Arbeitsteilung*, Wien/Köln/Weimar 1992.
- Mitterauer, M., *Die Entwicklung Europas – ein Sonderweg?* Wien 1999.
- Oppl, F., *Leben im mittelalterlichen Wien*, Wien/Köln/Weimar 1998.
- Otruba, G., *Zur Geschichte der Frauen- und Kinderarbeit im Gewerbe und in den Manufakturen*, *Niederösterreichs Jahrbuch für Landeskunde von Niederösterreich*, (34), 1960.
- Parker, W.N., Jones, E.L., (eds.), *European peasants and their market*, Princeton, 1975.
- Mitteis, H., Lieberich, H., *Deutsche Rechtsgeschichte*, München 1981.
- Pirenne, H., *Sozial- und Wirtschaftsgeschichte Europas*, München 1971.
- Pohl, H., *Economic Powers and Political Powers in Early Modern Europe*, *The Journal of European Economic History*, 1/1999.
- Nee, V., Strang, D., *The Emergence and Diffusion of Institutional Forms*, *JITE*, Vol. 154, 1998.
- North, D.C., *Theorie des institutionellen Wandels*, Tübingen, 1988.
- North, D.C., *Institutions*, *Journal of Economic Perspectives*, 3/1991.
- Nowotny, T., *Die Krise in Rußland*, *Europäische Rundschau*, 2/1999.
- Parker, G., *The Military Revolution. Military innovation and the rise of the West 1500-1800*, Cambridge, 1996.
- Rosenberg, N., Birdzell Jr., L.E., *How the West Grew Rich. The Economic Transformation of the Industrial World*, New York, 1986.
- Rostow, W.W., *The Stages of Economic Growth*, Cambridge, 1960.
- Rowley, C.K., *Political Culture and economic performance in sub-Saharan Africa*, *European Journal of Political Economy*, Vol. 16 (2000).
- Schröder, R., *Konfliktbewältigung, soziokulturelles Erbe und wirtschaftlicher Fortschritt*, Tübingen 1999.
- Sokoloff, K.L., Engermann, St. L., *Institutions, Factor Endowments, and Path of Development in the New World*, *Journal of Economic Perspectives*, Vol. 14, 3/2000.
- Sombart, W., *Der Bourgeois*, München und Leipzig, 1923.
- van Zanden, J.L., Horlings, E., *The rise of the European economy*, in Aldcroft, D. H., Sutcliffe, A. (eds.), *Europe in the International Economy 1500-2000*, Cheltenham, U.K.; Northampton,

MA, USA, 1999.

Weber, M., Die Wirtschaft und Gesellschaft, 5.Aufl., Tübingen, 1972.

Weber, M., Die Protestantische Ethik und der Geist des Kapitalismus, (1904), Weinheim, 1996.

White jr., L., Die Ausbreitung der Technik 500-1500 in Cipolla, C.M., Borchardt, K. (Hrsg.) Europäische Wirtschaftsgeschichte, Bd.1, Mittelalter, Stuttgart/New York, 1978.

*The Record of Gross Domestic Product per Capita in Selected
New World Economies*

1700 through 1997

	GDP per capita relative to the United States			
	1700	1800	1900	1997
Argentina	–	102	52	35
Barbados	150	–	–	51
Brazil	–	50	10	22
Chile	–	46	38	42
Cuba	167	112	–	–
Mexico	89	50	35	28
Peru	–	41	20	15
Canada	–	–	67	76
United States				
GDP per capita in 1985 \$	550	807	3.859	20.230

S: Sokoloff, K., Engerman, S. L., "History Lessons. Institutions, Factor Endowments, and Paths of Development in the New World", *Journal of Economic Perspectives*, 2000, 14(3), p. 217-232.

© 2001 Österreichisches Institut für Wirtschaftsforschung

Medieninhaber (Verleger), Hersteller: Österreichisches Institut für Wirtschaftsforschung • Wien 3, Arsenal,
Objekt 20 • A-1103 Wien, Postfach 91 • Tel. (43 1) 798 26 01-0 • Fax (43 1) 798 93 86 •
<http://www.wifo.ac.at/> • Verlags- und Herstellungsort: Wien

Die Working Papers geben nicht notwendigerweise die Meinung des WIFO wieder

Verkaufspreis: ATS 100,- bzw. EUR 7,27