

INDUSTRIAL CIVILIZATION

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Summary

This chapter outlines how industrial civilization involved an inter-locking series of social, economic, and political institutions and ways of life which became increasingly prominent from the 18th century. They embrace technological and organizational change, as well as the application of science and reason to social affairs. In many ways, it may also be said that industrial civilization has also been a co-production of the West and the East. Industrial civilization nonetheless has a paradoxical character, being simultaneously associated with material progress and social conflict, higher overall living standards as well as inequality, a more scientific attitude to problem-solving and environmental degradation. In the concluding sections of the chapter, it is shown how these conflicts and challenges set limits to industrial civilization. This in turn paves the way for the emergence of alternative forms of post-industrial modernity.

1. Introduction

Over the last 250 years, the rapid advance of industrialization, industrial technology and science has made a profound impact on human society. The set of systematic and far-reaching changes to human institutions and culture involved amount to a new type of civilization, centered on industry, markets, and secular knowledge. Industrial civilization is also highly significant as the first truly global civilization, integrating all parts of the globe into a single unit for the first time. These profound transformations in social life have however brought with them both major opportunities for advances in human welfare linked with the unprecedented economic dynamism of the Industrial

Revolution, but also many profound challenges and problems. These include ways of ensuring that the benefits of economic dynamism are combined with principles of social security and equity able to create social justice and minimize risks for all peoples and classes involved in industrial civilization. But they also extend to the environmental sustainability of a civilization based on industry and a recognition that the application of scientific knowledge and technology to human life is equally fraught with risks and opportunities

The multiple economic, social and political changes involved in the making of industrial civilization were dominated in the first instance by Western Europe and North America and the global networks of trade, investment and raw material extraction which they commanded. These networks drew both on pre-industrial institutions of trade, knowledge and state-building, the legacy of other world civilizations in the Middle East and Asia, and upon the material resources of the European and non-European worlds. In this sense, the coming of industrial civilization may be seen as a co-production of Western and non-Western worlds, even though the dominant centers of change were concentrated within and controlled by the West.

The economic, technological and scientific successes of industrial civilization had by the 20th century, led many to suppose that this pattern of social life was a plausible model of development for all nations. There was nonetheless a striking paradox that the continuing diffusion of industrial civilization occurred at a point when its limits and problems were being increasingly identified, both by critics in Europe and North America and in regions elsewhere, such as India, marked by different civilizational traditions. This has led to a faltering of confidence in industrial civilization as a model for the future, and the search for alternative principles upon which a new civilization might be built.

In this chapter we shall look first at the basis of industrialization and the Industrial Revolution, to clarify exactly what type of civilization was created, and to address some misleading assumptions about the processes involved. This will be followed by an exploration of the limitations of industrial civilization as seen by its critics. Attention will then be given to the development of post-industrial society and its relationship with industrial civilization.

2. Industrial Civilization and Industrial Revolution

To qualify as a civilization it is necessary for a particular mode of social organization to meet a number of criteria. These involve:-

- (a) a systematic pattern of economic, political, social and cultural life that is robust, enduring over a significant length of time and which spreads across space to a significant degree.
- (b) a pattern of this kind that is distinct in key respects from other patterns

Industrial civilization, in contrast with previous civilizations is distinctive not simply for the leading role of industry in its make-up, nor for its sustained economic dynamism, crucial though these have been. Its distinctiveness is more broadly connected with a

change in the relationship of economic activity to the priorities of human life in general, and to the transformation of human capacities to exploit nature for human advantage. All previous civilizations required some kind of successful economic foundation whether through agrarian activity, trade, or Imperial domination of others. Nonetheless their distinctiveness centered more on bounded patterns of political, cultural and religious activity based on states and/or communities of religious authority, than on economic activity alone. Major innovations, such as the development of agriculture, cities, writing, political self-government and codified law were significant in some cases, while the achievement of social cohesion through ritual practices predominated elsewhere.

Compared with all this, industrial civilization is noteworthy both for the striking intensity of social change, and for innovations that transformed the relations between economy and society, and economy and nature. The economy became far more sharply differentiated from the remainder of society as market exchange and private property rights in capital were progressively freed from political and customary regulation. Notions of free trade meant that food and other necessities of life could be sold on the market at the best possible price for the producer, with no account having to be taken of the need or resources of the starving and the poor. The private property rights of holders of capital required that no other criterion enter into the choice and location of investment other than expectations of profit. No individual, from this perspective had a right to be employed, if it did not pay any producer to provide work. In place of traditional notions of a just price for food, or customary forms of community support for the needy, the new civilization asserted economic priorities above social responsibilities. Rational pursuit of economic self-interest and the harnessing of science to industrial technology would, it was assumed, provide a new secularized basis for the advancement of human welfare.

Simultaneously nature was seen as a resource to be exploited for human benefit with little concern for natural resource depletion or for the longer term sustainability of the industrial energy requirements and technologies. This is not to say that a number of previous civilizations had not exploited nature. Problems such as soil erosion arising from de-forestation were, for example, known to the classical Mediterranean civilizations. Nonetheless the pace and intensity with which industrial civilization exploited natural resources through the application of scientific understanding to resource extraction industries was unprecedented. The processes whereby the burning of fossil fuels have led to detectable increases in global warming can also be traced back to the 19th century advance of industrial civilization.

The coming of industrial civilization is often associated with the Industrial Revolution. Revolutions involve radical changes in social arrangements of some kind. In the case of the Industrial Revolution, a multi-dimensional set of changes are involved. These extend from new technologies across a range of industries including textiles, iron and steel, new forms of work organization centered on factories, where workers sold their labor power and worked under new work disciplines geared to the systematic pursuit of profit, and new forms of economic exchange, marketing and distribution, enhanced by improvements to transportation and communication. Market expansion was fuelled both by cheaper transportation by land and sea, and by increased aggregate incomes arising

from economic growth. Meanwhile changes to agriculture were also involved, through a more gradual process that included increased mechanization and an increased sensitivity to market opportunities rather than production for immediate use. As new industries and transport centers expanded attracting significant segments of rural populations to new sources of employment, industrial cities, such as Manchester, Dusseldorf, Lille, and Pittsburgh became increasingly important features of the urban landscape.

All such changes were moreover stimulated by increased global activity, whether through the transatlantic slave trade, the search for raw materials, markets for manufactures or outlets for capital. Industrial civilization did not create globalization, which has existed in archaic and pre-industrial forms for several millennia. Its more precise role was to extend the spatial reach and intensity of cross-border interdependencies equipped with more efficient technologies of production, transportation, communication, and administration. The military and naval power required to achieve an economically sustainable global industrial civilization also drew on technological changes including iron ships, steam power and the mechanization and standardization of armaments.

Such global processes were organized partly through Western states, partly through industrial cities like Manchester, and partly through financial centers. These included London, Amsterdam, and New York and were connected with further global networks of commercial port cities including Bombay, Buenos Aires, Singapore and Shanghai. The Industrial Revolution, in this sense, is then a key episode in the history of globalization, albeit one in which economic leadership and power was increasingly concentrated, for the first time, in the hands of Europeans. The transatlantic slave trade and the slave plantations of the new world are a graphic reminder that industrial civilization was built, in part at least, on violence and coercion, and not simply on economic innovation and scientific progress.

The idea of an Industrial Revolution is certainly warranted in the sense that a *long-term* upswing in self-sustaining economic growth occurred in the period 1760-1914, affecting output, productivity, incomes, and population. The dramatic expansion in output is reflected in a hundredfold increase in world output of coal, and a four hundredfold increase in world output of iron and steel in the century after 1785. The increases in production and productivity also meant a shift in the trajectory of population growth. Previously throughout world history, periods of population growth based on agrarian expansion and trade has always met an upper limit, where food supply was unable to match continuing population growth. Pressure on population on land available for cultivation led to food shortage, increased disease and poor health and ultimately increased mortality. Population then typically fell back, as happened during the Europe-wide subsistence crisis of the mid 14th century, dramatized by the coming of the Black Death.

For the first time in history, the increased productivity associated with 19th century industrialization meant that food supply limits were no longer automatically experienced leading to food shortage, increased morbidity and mortality. This change permitted a steady overall expansion of population throughout the 19th and 20th centuries. While serious doubts may now be expressed about the continuing

sustainability of world population expansion, much current world starvation is a product of market failure to distribute food surpluses to the poor and those hit by drought, rather than by a productivity limit reached in the production of food.

A longer-run conception of the Industrial Revolution is preferred, for the purposes of the present discussion, to the shorter term focus of many historians. This has looked for a shorter 50 or 60 year phase of intensified change, typified by Rostow's, idea of a 'take off' into self-sustainable growth in late in the 18th and early 19th centuries. Many also distinguish a further burst of science-based technological change in the second half of the 19th century associated with steel, shipbuilding and chemicals, as a 'Second Industrial Revolution'. While it is the case that processes of change in particular industries or localities were often concentrated into a shorter time-frame, a longer-term focus brings continuities of change across time into sharper focus. These continuities remind us that the coming of industrial civilization involved changes that were often gradual and cumulative rather than revolutionary. These included the more incremental process of making steam power more efficient, or improving agricultural productivity through new crop varieties and crop rotations.

Industrial civilization was therefore created over a longer period than sometimes thought, and this drew on developments prior to the late 18th century, as well as being longer-term in its take-up and diffusion. Such developments included the legacy of earlier changes in dynamic regions of England and Holland, including an undermining of traditional constraints on markets and private property rights, the construction of nation-states favorable to capitalist expansion with the capacity to promote both internal stability and security from external threat, capital accumulation from domestic and overseas trade, and the increasing impact of scientific endeavor on senses of human potential. de Vries has drawn attention to the significance of what he calls 'industrious revolutions' in the lead-up to the Industrial Revolution period whereby small households satisfied more of their demands through the market expanding demand for products and stimulating productivity growth

Added to these developments, are what have been seen as a civilizing phase of social and intellectual life associated in the 18th century with the figures like Johnson, Sterne and Fielding, Hogarth and Gainsborough, Voltaire, Rousseau and Diderot, Buffon and Lavoisier. This is often associated with the idea of the Enlightenment, an 18th century movement in support of secularized reason as a means to the liberation of humankind from religious faith and superstition. Humankind had the potential to make and remake the social order which was not fixed by nature or God. Society could be changed and changed for the better through human initiative. Enlightenment and industrial civilization then went very much hand in hand, linked by the assumption that social life and the human condition could be transformed for the better through reason and its application to the economy and political system.

Nef, though offered a more muted appreciation of its role. He agreed that political stability, faith in the rational powers of the mind, and aspiration to higher moral standards were crucial if educated people were to be confident that the benefits of scientific and technical knowledge might outweigh its disruptive and destructive effects. As it turned out confidence generated by intellectual certitude was to turn to

complacency. The civilizing intellectual influences of the 18th century were gradually undermined as the Industrial Revolution became consolidated. In particular, the art of living life as a whole became subordinated to more utilitarian aims.

As we have already seen, industrial civilization was not restricted to radical economic and technological innovation, but amounted to radical change within an entire social system. Some social observers such as Marx, stressed the *capitalist* character of the multiple changes involved in the Industrial Revolution. He focused primarily on the property rights that turned labor power into a commodity and permitted systematic profit-seeking by capitalists within deregulated markets. Such changes were both dynamic in driving forward economic expansion, but simultaneously created social conflict and political instability. The new social classes of industrialists, inventors, and technologists, experienced social tensions with older ruling groups based on inherited landed wealth, social status, and the profits of public office. For Marx, the contemporary state was becoming ‘an executive committee for managing the common affairs of the bourgeoisie’. Conflicts between land and industry, would be replaced by even sharper conflicts with the new working class populations in mines and factories.

It is important however to avoid the presumption that the new industrial order produced immediate and automatic changes to politics and culture. While industrialization over the longer term increased the political influence of manufacturers and reduced that of the landed aristocracy, such changes did not happen overnight. Conflicts between landed interests and industrial capitalists were resolved to a significant extent through a mix of political incorporation of the middle class into governing elites, and inter-marriage between industry and land. Western Europe was ruled by a combination of landowners, bureaucrats, professionals, industrialists and shopkeepers well into the early 20th century.

Allied with the continuing political role of landed interests were continuities in forms of social status and hierarchies based upon them. Successful industrialists often married into the landed classes, or aped the lifestyle of the aristocracy, seeking out the superior status that this world still possessed. Individual achievement through work it seems was not enough. New elements in the status order also included a hardening of racial classifications in which white or European populations saw themselves as superior to Africans, Asians and the indigenous peoples of the Americas. Quasi-scientific justifications of such racial distinctions indicate that 19th century racism was far from being a carry-over of traditional prejudices, and far more a re-invention of inequalities of social status based on spurious assumptions about skin color and visible difference. Such racial ideologies served both to justify the use of slave labor in plantations supplying food and raw materials to the Industrial Revolution and to provide poor working-class white populations with a sense of superior status over others.

Marx had focused on the capitalist nature of industrial civilization, and exaggerated the sense in which an industrial capitalist economy meant a capitalist state and culture that transformed the older status order into a society dominated by class. Others, meanwhile, picked out somewhat different features of industrial civilization for attention. Max Weber, for example, emphasized on its rationalistic character. He meant by this the increased domination of technical calculation and a concern for systematic knowledge

of the most efficient technologies for economic activity and public administration, taking precedence over the social values that might or should be expressed within industry. One effect was to turn the social psychology of economic achievement into a permanent vocation that stands apart from tradition and community. The asceticism and denial necessary for effective entrepreneurship, was paralleled in this rationalized environment by the incorporation of workers into the work ethic. Put simply, we must 'live to work' rather than 'work to live'. Over time this has indeed undermined much of the status order based on landed wealth and racial difference, substituting for them a sense of individual achievement independent of status privileges derived from social background.

The efficacy of such new orientations, were, for Weber, highly amenable to being institutionalized in hierarchies through bureaucratic means of control. In contrast with Marx, he believed this meant that socialist versions of industrial civilization would be equally unable to satisfy human desires for a meaningful and satisfying life, as were capitalist versions of industrial civilization. Interestingly early Soviet attempts to incorporate mass production assembly line techniques into Soviet industrialization or the later Soviet involvement in the space race beginning with the Sputnik project, reflect shared features of industrial civilization that span the ideological divide between capitalism and socialism/communism. We shall return to this theme below.

Taken together, Marx and Weber indicate that industrial civilization is far more than a matter of technology and the factory system. It extends to the broader social and cultural objectives and the social roles and personality types encouraged and fostered in this type of civilizational order. Fundamental changes to social and political objectives center on the primacy of the secular objectives of social progress freeing the individual from poverty, ignorance and the dead hand of tradition. This sense of progress associated as have seen with science and the Enlightenment. These aspirations raised to prominence the social roles of industrial entrepreneur, technological inventor and innovator, scientist, and professional manager. While industrial civilization did not create the role of innovator or scientist for the first time, it did much to foster the autonomy of such occupations from patronage, and increase their influence over the reshaping of society. Meanwhile the advent of the professional manager reflected a greater scale and complexity of business organization that was beginning to outgrow the capacities of family-based enterprises.

Social roles of this kind created personality types which were seen variously as heroic or pathological by social commentators. The innovator or entrepreneur driven by the premium on social change through individual achievement is reflected in the heroic qualities invested in people like James Watt, Benjamin Franklin, or Thomas Edison. Such figures, it should be emphasized, were part of broader communities of innovation, characteristic of industrial civilization. Watt, for example was involved with the Birmingham Lunar Society, which counted amongst its members, the innovating entrepreneurs Matthew Boulton and Josiah Wedgwood, the scientist and political radical Joseph Priestley and Erasmus Darwin, grandfather of Charles Darwin, the 19th century evolutionary scientist. Over a hundred years later the circle of American entrepreneurs and scientists around Thomas Edison, supported his pioneering work at

Menlo Park, a pioneering example of the industrial scientific research laboratory, a new institution that became more widely diffused in the 20th century.

Industrial civilization created radically new conditions of work both for those in paid employment and within the private sphere. Within the new factory system tighter industrial discipline now operated according to the rhythm of mechanized production compared with the looser rhythms of the agricultural seasons. Just as industrial civilization transformed the social organization of space on a global scale, so to did it radically change social conceptions of time. Adages like ‘time is money’ and ‘never put off until tomorrow what you can do today’ testify to a new measurement of human endeavor in terms of economic output linked to work-discipline. ‘Clocking in’ and the organization of tasks according to standardized measurements of time increased replaced craft ideals of quality of work and the cultural integrity of communal work practices.

Industrialization created new demands for manual and mental skill, but incessant technological change also undermined many older craft skills in areas such as textiles and engineering. Industrial work became increasingly rule-bound and rationalized. This created an initial resistance of many to work in factories, and, once the factory system had been established continuing tensions over changing work processes and regulation. Some trades, such as printing, saw little technological change until the 20th century, while the expansion of professional employment in industrial administration, education and health from the later 19th century reminds us that industrial civilization depended on far more than low skill labor.

Major conflicts between labor and capital over wages, conditions, and the broader exclusion of workers from political power became, over the course of the 19th century, the major social cleavage within industrial society. Labor movements based on occupational and sometimes class solidarity grew in organizational strength and social influence. These were not uniform across all industries and economic sectors, but depended in large measure on a particular set of single industry settings in which occupational communities formed. These included factory towns based on textiles, mining communities, and transport industries around docks and railways. By the early 20th century such movements were gaining increasing political strength, creating a new group of labor leaders across Europe. This included figures such as Keir Hardie in Britain, Jules Guesde in France, and Karl Liebknecht in Germany.

Such conflicts may have been partly stabilized in the longer term through the development of universal suffrage and citizenships and by welfare states, nonetheless industrial conflict and unrest has been a chronic feature of industrial civilization. This has prompted concern for alternatives, such as a socialist version of industrial civilization, or perhaps a restructuring of work that might somehow restore the intrinsic values of occupational community reminiscent of medieval guilds to modern conditions.

While the employment of women in factory work increased in the early phases of the Industrial Revolution, a move to exclude women from what were seen as the more dangerous and heavier work then ensued. A trend is then observable to separate women from the workplace and to regard the male as the sole bread-winner. While on the land,

women have always been involved in economic activity, this waned with the assumption that married women's place was in the home. This assumption was not however fully realized in industrial society, partly because sectors like textiles and light manufacturing and domestic work always employed women, and partly because new opportunities for women's employment in retail, clerical, and human service delivery opening up in the late 19th century and early 20th centuries. It remained a matter of unresolved social controversy, nonetheless as to how far women's (and especially married women's) participation in public economic and political life should be extended. Here again significant elements in the status order of industrial civilization asserted gender differences between men and women that were regarded by many as a basis of male superiority and female submission. Women's movements aiming at greater access for women to education and the professions, as well as the vote became a major feature of struggles to redress status-based discrimination and its economic, political and cultural consequences. An enlarged citizenship and greater social inclusion within industrial civilization were products of conflict rather than inevitable consequences of rationalism and economic development.

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Biographical Sketch

Robert Holton is Professor of Sociology at Trinity College, Dublin. He is author of a number of books and articles on globalization, social theory, historical sociology, immigration and ethnicity, including *Cities, Capitalism, and Civilization* (1986), *Talcott Parsons on Economy and Society* (1986) and *Max Weber on Economy and Society* (1989) (both with B.S. Turner), *Economy and Society* (1992) 'Classical Social Theory' in *The Blackwell Companion to Social Theory* (1996), *Globalization and the Nation-State* (1998), and *Making Globalization* (2005). He is currently researching global networks, and cosmopolitanism.