Industrialization

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Glossary

Ideographic Epistemological perspective that focuses the research process on the detection of the uniqueness of each geographical location. It denies the nomothetic belief in the existence of universal patterns, and thus portrays reality in descriptive rather than explanatory terms.

Nomothetic Epistemological perspective that focuses the research process on the uncovering of universal patterns, regularities, or laws. It perceives reality as the interplay of 'surface characteristics' and 'deep structure' and attempts to explain the former in terms of the latter.

Industrialization: Definitions and Measurement

'Industrialization' is a generic name for a set of economic and social processes related to the discovery of more efficient ways for the creation of value. These more efficient ways are lumped together under the label 'industry' or 'the secondary sector' (the primary sector of economic activity referring to agriculture, hunting, fishing, and resource extraction, and the tertiary sector referring to services). Beginning with the late-seventeenth century, industrial activity has dramatically enlarged its scope and scale, as machinofacture began to replace manufacture. Historically, industrialization studies have concerned themselves primarily with the period known as the Industrial Revolution, although in geography this area of enquiry has been the focus of many economic geographers interested in the contemporary logic of the global economic landscape.

Using the criterion of the abruptness of change, one can distinguish two types of economic change: events (swift singular changes) and processes (protracted cumulative changes). Industrialization is a process, not an event. A process is an emergent property of a system (country or region) resulting from a collection of events that share a number of similarities and that unfold over a slower timescale than that of its component events. If one entrepreneur opens an industrial plant in an otherwise agrarian region, that singular event cannot be labeled as industrialization. If a collection of events of this same kind achieves sufficient significance for the local economy, scholars and policymakers alike are entitled to refer to it at a higher level of generalization, that is, they can speak of a process of industrialization changing the face of that regional economy. Two further conceptual problems require specification in this context.

First, one must distinguish between quantitative economic growth and qualitative economic change. If an already industrial region witnesses the opening of some new industrial plants, it is inappropriate to label that set of events as industrialization. Instead, we must refer to it as simply continuing industrial growth or economic growth. The concept 'industrialization' should be restricted to the qualitative economic change occurring whenever an agrarian economy becomes to such an extent affected by the opening of new industrial plants that it becomes misleading to continue referring to it as an agrarian economy. In other words, industrialization is an emergent property of an economic system, a qualitative leap resulting from the spatially patterned aggregation of a collection of economic events.

Second, one must pay attention to the measurement of the threshold above which it becomes appropriate to speak of a process of industrialization taking place. If one singular industrial event does not by itself constitute a process of industrialization, when does it make sense to refer to such a process? Geographers, economists, historians, and sociologists of industrialization have been rather casual in their approach to this measurement problem, relying on commonsense just as much as on specific quantitative cutoff points. There are three major ways to decide as to whether one national or regional economy is undertaking industrialization. The first requires a comparison of the relative contribution to the gross domestic product of the secondary sector (manufacturing industry) versus that of the primary sector (agriculture, fisheries, hunting, and extraction of raw materials). The second compares the percentage of the workforce employed in industry versus agriculture. The third is more subjective, but also more geographical, in that it assesses the extent of industrialization by simply observing the landscape of a region. Since industrial activities necessitate a drastic change of the physical landscape (e.g., fixed capital in the form of built environments), they are easier to spot than more subtle social processes such as exploitation, racism, or social stratification.

Explaining and Timing Industrialization

The fundamental question geographers have to ask is whether the concept industrialization has contributed in any substantive way to furthering scientific enquiry into how our social world works. There is probably no easy

way to answer in any meaningful form such a question, because the answer given would depend on the level of explanation at which the concept industrialization is being deployed. It has been argued that industrialization has been particularly fruitful in helping geographers and social scientists operate at the higher levels of explanation, or, at what might be termed 'big-picture' thinking. Scientists and lay people alike relate to the world by building a more or less detailed and accurate model of what the world consists in and of how it works. At a very general level, it becomes fertile to have an understanding of how the history of the world has unfolded, and such an understanding would need to include the saga of industrialization. As an illustration of 'big-picture' thinking, we can consider Alvin Toffler's depiction of the course of history as a succession of three waves. The first wave refers to the shift from hunter-gatherer societies to agricultural, sedentary societies. The second wave refers to the relative decline of agriculture and the growth of industrial activities. Finally, the third wave designates the shift from industry-based economic growth to service-based economic growth, and the relative decline of blue-collar workers in favor of white-collar workers.

Historians of industrialization have pointed out the fact that the timing of this process is crucial for understanding its nature. In particular, they identify three periods of industrialization: the first refers only to England and pertains to historical contingencies between 1763 and 1846. The second includes countries such as USA, USSR, Germany, and Japan, which became industrialized in the nineteenth century and the beginning of the twentieth century. The third refers to the countries that have started their industrialization after World War II (e.g., the tigers and dragons of Southeast Asia). The important observation in this context is that all other countries except England have had at least some other model of industrialization which they could imitate and emulate. England is unique in that there industrialization appeared spontaneously, unplanned, from scratch, through a set of economic initiatives that only in retrospect have been labeled 'industrialization'. The theories invoked to explain the English Industrial Revolution have not ceased to proliferate and to take into account hitherto ignored factors such as genes. Since for all other cases of industrialization the imitation factor has played a role, it follows that the geographical study of innovation diffusion is a required step in any serious attempt to make sense of this process.

Geography pretends to be a scientific endeavor and the hallmark of a scientific endeavor is the attempt to explain and predict phenomena. To explain something means to uncover the law-abiding mechanism that caused it. Scholars of industrialization have fallen short of this task, even though their work has converged on admitting the complexity of this process. There are several interlocked problems that together keep industrialization in the clouds of ambiguity. At the most general level, industrialization is a social process, and epistemologists of the social sciences have cast doubt over the feasibility of explanation in the social realm. The innumerable variables that contribute to social outcomes do not seem to allow the social sciences to aspire to the same level of explanatory rigor as the natural sciences. Therefore, a more modest goal would be to understand rather than explain the process of industrialization. Understanding results from describing and comparing the various historical and contemporary contexts in which industrialization has occurred, without assuming that there is a law-abiding mechanism through which industrialization necessarily emerges. The description and comparison of the aforementioned contexts allow researchers to detect both the nomothetic and the ideographic components of industrialization. The nomothetic components refer to those general facets of industrialization shared by all the various contexts in which it has occurred, whereas the ideographic components capture the unique, particular features that have stamped industrialization in a specific context.

A related insurmountable obstacle to the explanation of industrialization is that it is not possible to experimentally test and refute the various theories attempting to account for this phenomenon. Karl Popper made a forceful case for the idea that theories are scientific only to the extent that they are refutable. The problem with the scholarship on industrialization is that one can always invent a plausible 'just-so' story and propose it as the explanation for this process, without having to subject it to the risk of experimental refutation.

There is no single cause of industrialization. The process can emerge from a variety of causes. Similarly, the consequences of industrialization vary widely across geographical regions and historical times. In order to grasp these ideas in all their complexity, it is worth disentangling and studying the relations between the often confused concepts of capitalism, modernization, and industrialization.

Industrialization and Capitalism

Capitalism is a mode of production. A mode of production is a particular way of organizing the economy and of allotting the costs and benefits of economic activities. Economic historians have identified modes of production other than capitalism (primitive communism, slavery, feudalism, socialism, and advanced communism) and economic geographers have aptly noted that elements from these other modes of production can coexist, somehow 'etched' in the fabric of the dominant mode of production today – capitalism. There is no relation of

logical or causal necessity between capitalism and industrialization. This means that the two concepts do not entail one another either logically or causally. In plain language, capitalism does not necessarily lead to industrialization (although it has often been considered as a favoring factor for industrialization, especially in the scholarship on the first Industrial Revolution in England). Furthermore, industrialization can and has happened in noncapitalist regions (e.g., Stalin's Soviet Union, 1924–53; Mao's China; and Ceausescu's Romania). To look at these relations the other way around, it is worth noticing that industrialization does not necessarily lead to capitalism (see the cases of Cuba, China, or North Korea today) and that industrialization is not a necessary condition for the emergence of capitalism (e.g., Third World countries may have a capitalist economy based on agricultural export-oriented monocultures or on tourism). Statisticians' urge to remember that correlation does not imply causation is therefore particularly relevant when studying the relation between capitalism and industrialization: both across historical times, and across geographical spaces the two economic processes tend to go together. At first glance, one could speculate that they are mutually reinforcing processes, although counter-arguments to this hasty speculation can also be easily conceived.

To understand the issues involved, note that the most prominent argument for the virtues of capitalism consists in the neoclassical economic theorizing of free markets as best means for the efficient allocation of scarce resources to many needs. That argument, in turn, depends on the assumption of atomistic (innumerable) economic agents forced to coexist and fight with one another in a condition of perfect competition (i.e., none of them is powerful enough to be sheltered from competition). In other words, the alleged virtues of free markets collapse if the assumption of perfect competition is severely put into question by economic realities. The process of industrialization systematically does exactly that: on the one hand, technologies (one type of fixed capital) for the industrial process become yet more expensive (because they embody more and more knowledge), and this need for larger initial investments of capital encourages the concentration of capital in fewer hands (monopolies or oligopolies); on the other hand, the need for economies of scale acts as a catalyst for the further integration and concentration of capital.

However, it is not only the case that the logic of industrialization can subtly move capitalist realities far away from their idealized virtues: as Marxist geographers have amply documented, the logic of capitalism renders industrialization a very fragile achievement. Just as the logic of industrialization favors concentrations of capital, which in turn undermine the free-market conditions of healthy capitalism, so too the logic of capitalism favors the geographical relocation of capital, which in turn undermines industrial activities in old industrial regions. In the initial stages of the industrialization of a new region, the prospects of continuous growth seem safe and sure. Nevertheless, as time goes by, there is a tendency for the rate of profit of local capitalists to fall because of factors such as exhaustion of raw materials, new competitors entering the market, saturation of the market, increasing rent, new taxes (e.g., green taxes to internalize environmental externalities), increasing cost of labor because of unionization, etc. Since the logic of capitalism is the making of profits for profits' sake, the local capitalists can choose to close the now-unprofitable local plants and reinvest their money elsewhere, in regions where they can make higher rates of return on their investment. These new regions benefit from industrialization, whereas the older ones suffer the costs of the opposite process – deindustrialization.

In a long-term perspective, three observations become self-evident: the first is that, any apparent beneficiary of capitalist industrialization has its prosperous days counted before turning into one of capitalism's victims. Sometimes, these victims, because they are victims (i.e., high unemployment, therefore oversupply of labor, therefore cheaper labor) might attract new rounds of capitalist investment. Second, from a spatial perspective, industrialization and deindustrialization are processes that together express the historical geography of capitalism, its highly dynamic and uneven nature that so much impressed Marx and his followers. Third, from a political perspective, it becomes clear that the state has a crucial regulatory role to play in deciding the fate of industrialization. Many of the contemporary struggles over economic globalization emerge precisely because of the conflicts of interest between states and capitalists: the former care for economic development, high employment, and national flourishing, whereas the latter obey the different (transnational) logic of capitalist competition.

Industrialization and Modernization

As for the relation between modernization and industrialization, their conceptual knot is more difficult to untie. Modernization is the historical process whereby the social relations governing a human community have shifted from being based on kinship, tradition, collectivism, and magic/religion, to being based on rule of law, rationality, individualism, and scientific knowledge. The trick is to understand not only that modernization can be one of the unplanned effects of spontaneous industrialization, but also that political leaders keen to modernize their countries can deliberately use industrialization as a very potent means to that cherished end.

To give an example, Erving Goffman's account of the moral career of stigmatization and his discussion of 'tribal'

(i.e., collective) stigma, together with Karen Horney's work on collective neuroses have recently been deployed by geographers to shed light on the political performance of inferiority complexes and on their role in constituting marginal territories as 'in need of industrialization'. Specifically, Simandan showed how Romanian and Norwegian intellectuals educated in Paris in the nineteenth century, upon their return back home, put their countries on the path of industrialization and modernization by attempting to copy what they saw in France. Industrialization played the role of a difference-reducing engine between a deplorable economic backwardness and an intense longing for modernization. The positive stories of industrialization have played a major role in the invention of the modern nations, as an analysis of media and of general education school texts would clearly reveal. They have occupied a privileged position in the 'spaces of constructed visibility' where the imaginary geographies of the nation are fabricated (exhibitions, museums, textbooks, traditional and electronic media, and public ceremonies). Nevertheless, and of paramount significance, these stories have helped fabricating 'the modern fiction' of the nation, and not just some timeless collective identity.

Until recently, the parties concerned with the development of the Third World countries have encouraged their industrialization as a way out of backwardness and poverty and toward civilization, modernity, and prosperity. The problem with this encouragement is that it is value laden: it implies that the values of modernity (which happen to be the values of Western culture) are superior to the values of traditional cultures in the Third World, which is akin to saying that the Westerners are superior to the 'primitives'. Since Western scholars and politicians alike have publicly rejected the older assumptions of Western superiority and have embraced an egalitarian worldview according to which all cultures are equally valuable, the ongoing advocacy of industrialization as a solution for the Third World appears deprived of its most-entrenched rationale. To propose a solution implies that there is a problem, and if backwardness is not the problem, than what is it? These thorny questions could be left to the pondering of critical geographers and postdevelopment studies scholars and we could turn instead to the weighting of the overall costs and benefits of industrialization.

Costs and Benefits of Industrialization

Industrialization's legacy of delegation of responsibility for environmental problems has been well documented by geographers and industrial ecologists. The internalization of its negative environmental externalities remains an inconsistent and poorly enforced practice in many parts of the world. Furthermore, the deeper question of the limits of natural resource substitution has received sustained attention only from a few specialists, despite the fact that the fate of industries is written in the answer to that question.

Unlike the developed countries who became industrialized before World War II (England, USA, USSR, Germany, and Japan), the Third World countries who are currently trying to start or speed up the process are confronted with the lack of sufficient local capital. This means that for them industrialization can come only at the cost of increasing dependence on foreign capital. If they choose to specialize in export-oriented industrial production instead of import-substitution industrial production, this foreign dependence for capital is further amplified by a dependence on volatile and competitive foreign markets. Furthermore, given that current international economic policies set by the World Bank, the International Monetary Fund, and the World Trade Organization implicitly or explicitly support national economic specialization (Ricardo's principle of comparative advantage writ large), the least-developed countries in the world are pressured to participate in a global economic gamble in which their odds of winning are very long indeed.

Aside from modernization, the other most frequently invoked benefit of industrialization is economic development. The problem – as some Third World countries have found out – is that industrialization does not necessarily lead to massive economic development. Let us clarify the concepts involved. Economic growth refers to a quantitative increase in the gross domestic product of a country. Economic development refers to a qualitative structural change in a given economy. If a given country or region has some industrial plants specialized in the production of consumer goods and/or is totally export oriented, it runs the risk of witnessing economic growth without economic development. The respective industries are not organically embedded in the regional or national economy and play the role of the cherry on the cake instead of playing the more ambitious role of the yeast that makes the whole cake grow. This latter role usually is performed by capital goods industries, i.e., those industries that produce equipment needed for the development of other industries. The lesson to be gleaned from this brief analysis of economic growth versus economic development is that whether industrialization is beneficial or not critically depends on what kind of industrialization one is speaking about.

Scholars and policymakers have also argued that industrialization is the best way to fight excessive population growth in the Third World. Rural dwellers tend to have very large families partly because they are less educated than urban dwellers, and partly because for them children are a source of wealth and security in old age. The process of industrialization leads to increased urbanization,

increased general level of education, and increased income, all of which contribute to changing cultural and demographic patterns in the direction of massively reduced fertility rates. In statistical parlance, the impact of industrialization on fertility rates is mediated by the variables urbanization, education, and income.

Geography and Industrialization

The relation between the study of industrialization and the discipline of geography can be decomposed into: (1) an analysis of how the tools of geography enhance our understanding of industrialization, and (2) an analysis of how the interdisciplinary research of industrialization can add depth and context to the traditional concerns of economic and historical geographers. Geography is a generic name for a set of various scientific practices loosely held together by a common concern for the big themes of 'space' and 'society–nature relations', as well as by the networks generated through its having a distinct position in the academic division of labor. In other words, various texts count as geography to the extent that they emphasize the use of concepts such as 'space', 'place', 'distance', 'region', 'territory', 'landscape', and 'environment' as entry points into the investigation of the social world. To study industrialization from a geographical point of view amounts to embracing a style of thinking that is biased toward the aforementioned spatial categories. Is this bias justified? Instead of arguing that the geographical point of view is indispensable to the study of industrialization, we could make the more modest claim that geography provides a conceptual toolbox for qualifying the sometimes crude accounts of this process. Industrialization unfolds in space and produces space, and so do the related phenomena of deindustrialization, modernization, globalization, dependency, and pollution. The recognition of the spatial dimension of industrialization becomes significant only to the extent that geographers can extract the actual regularities, patterns, or 'laws' of the operation of this process. It is at this level of analysis that old and new challenges keep the geographical conversation open. One of the 'old challenges' comes from the fact that different political economic worldviews force divergent interpretations of the same economic processes. Thus, a geographical perspective indebted to neoclassical economics (e.g., older-style industrial location analysis) brings with it a more or less tacit endorsement of the beneficial effects of industrialization, whereas a Marxist perspective carries with it a strong normative baggage that urges sensitivity to issues of social justice. Rather than trying to endorse one view and to discard the remaining views, it might be preferable to think of these different approaches as theoretical resources with complementary roles to play. Each school of thought is a constellation of gains and losses: each take on the spatial logic of industrialization may be particularly insightful in one respect, and appallingly silent in other respects.

Once with the turn to culture in the Anglo-American human geography of the 1990s, the geography of industrialization has witnessed, among other revampings, an orientation toward institutional and evolutionary approaches to the analysis of the spatial dynamics of the industrial sector. These new directions have enriched the explanatory power of economic geographies, by showing how path dependency, institutional cultures, and geographical relations complicate the fabric of pure economic logic. Nevertheless, more quantitatively minded geographers lament the lack of clarity, rigor, and empirical support that the new vocabularies of these recent schools brought about.

One of the 'new challenges' that confronts the geography of industrialization comes from post-structuralism, feminism, and nonrepresentational theory. These approaches share a reluctance toward grand theories and criticize both neoclassical and Marxist perspectives on industrialization for their illusionary beliefs about an objective economic reality governed by laws about to be 'uncovered'.

This line of criticism alerts us to the limitations of a nomothetic study of industrialization within a presumed global space-economy and brings attention, at least indirectly, to the possibility of using other entry points to industrialization research. To illustrate this latter point, Simandan's recent attempt to integrate the field with the help of a master metaphor called 'recursive cartographies' starts with the simple but powerful idea that the world is the result of the interplay and mutual metamorphosis of 'three' elements: rhythms, events, and legacies. A short quote from the industrial geography literature is very helpful for understanding this model:

> …the historical process of industrialisation in North America and Europe is marked by stories of *small accidents* leading to the establishments of one or two *persistent centres of production.* Thereafter *cumulative processes* can generate a geographical structure of production which may be stable for long periods of time (italics added). (Hassink and Dong-Ho, 2005: 572)

Three words have been emphasized in the text. The first is 'small accidents' and in recursive cartographies this would be translated as 'events'. Anything that abruptly disrupts the preexisting order of things qualifies as event. The outstanding features of events are that they bring genuine novelty and they perturb the state of affairs, though in largely different extents. The discovery of electricity, political elections, a bankruptcy, a strike, a merger, a foreign investment, etc., are all events.

The second word emphasized is 'persistent centers of production', which in recursive cartographies would be labeled as 'rhythms'. Anything that regulates a place, bringing constancy, predictability, and structural identity to it, constitutes a rhythm. Five decades of communist rule in Cuba, the production of chocolate in Birmingham, the four seasons of the temperate climate, the urban time-tabling of the transportation network, and the legal system of a country, are all rhythms. They weave the fabric of a place, while being from time to time wounded by events that challenge their hegemony in processes of place formation. The advent of industrial activity to a rural area is an event; in its wake, that industrial activity becomes a rhythm that begins to reconstitute that area as 'industrial' (workers going to work at 8 am and returning at 5 pm, the schools adapting their curricula to prepare the new workforce, the streams of income in that local community becoming dependent on those industrial plants, etc.).

The third word emphasized is 'cumulative processes', which in recursive cartographies would be classified under the heading 'legacies'. Anything left in the world that is not either 'event' or 'rhythm' qualifies as 'legacy'. Put simply, the legacy of a place is the coagulation of its past events and past rhythms, with the critical observation that this does not mean that legacy is 'dead', lacking agency. Quite on the contrary, it contributes to place formation extensively: our actions are often guided by lessons learned from past actions, the stereotypes that produce the 'image' of a place come from past knowledge (and that image significantly influences present decisions – e.g., to invest or not to invest in a given regional economy), and a rhythm (e.g., the petrochemical industry) might rest on regional legacies (petroleum).

The many types of cartographies of industrialization to be found in contemporary geographical scholarship make research in this area reach a level of vibrancy and sophistication rarely found outside geography and promise to contribute to broader questions and critiques of our present condition.

See also: Capitalism; Development I; Diffusion; Industrial City; Industrial Districts; Industrial Location; Industrial Organization; Industrial Parks; Industrial Restructuring; Innovation; Modernity.

Further Reading

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Relevant Websites

www.fordham.edu
Industrial Revolution and the Standard of Living Essay.

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Industrialization website – a good brief overview of history and characteristics of The Victorian Web Site at Brown University. This site is useful for nutshell summaries of the Poor Laws, the Corn Laws, etc., lectures on The Industrial Revolution in England by Arnold Toynbee – lectures on The Industrial Revolution.