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Xinzhe Wang
Xing Sun
Min Luo

Handbook of Industrial Culture



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Preface

Industry is the foundation of a strong nation, and culture is its soul. President Xi emphasizes that cultural soft power, being the most core and highest level of a country's comprehensive strength, serves as the cohesion of a nation's whole spirit and vitality. Over more than three centuries of global industrialization, culture has demonstrated a fundamental, enduring, and decisive influence on the progress of industrialization and industrial revolutions. Industrial culture has been developed, accumulated, and elevated in the process of industrialization, and is bound to play an increasingly vital role in future modernization and economic growth.

The industrialization of P.R. China has cultivated the Daqing Spirit, the Two Bombs-and-One-Satellite Spirit, the manned spaceflight spirit, and other exemplary industrial cultures reflecting the times. Numerous outstanding enterprises have emerged, showcasing the power of industrial culture and contributing to industrial development across different historical periods. Since the reform and opening-up, China has achieved remarkable progress in industry, becoming the world's largest manufacturing nation. However, the challenge to develop from a large to a truly strong industrial power remains prominent, with notable gaps in industrial structure, independent innovation capacity, product quality, and brand development compared with advanced countries. This is to a great extent attributed to the underdeveloped state of industrial culture, which is evidenced by insufficient innovation, superficial focus, and lack of credibility. These issues have seriously restricted the upgrading of China's industrial quality and efficiency.

The strategy of building a strong manufacturing nation requires not only advancement of hardcore technology but also soft resilience of culture. We should firmly establish and implement the development concepts of innovation, coordination, greenness, openness, and sharing; closely focus on the strategic deployment of a robust manufacturing country; and strive to cultivate an industrial culture that meets the requirements of the times under the guidance of socialist core values. As outlined in *Made in China 2025*, it is essential to "cultivate a manufacturing culture with Chinese characteristics and realize the historical leap of manufacturing from big to strong." We need to promote societal awareness of the importance of industrial culture and enhance China's industrial soft power. First, we should vigorously promote the spirit of innovation, strengthen the cultivation of scientific spirit and creativity, and make planning, promoting, and implementing innovation a voluntary

and spontaneous action. Second, we should vigorously promote the spirit of craftsmanship, cultivate skilled talents committed to excellence and quality, and guide enterprises to persist in for years sharpening their competitive edge by advancing along the development path of specialization, refinement, uniqueness, and innovation. Third, we must uphold credibility, encouraging enterprises to operate lawfully and ethically, providing consumers with high-quality products and services at competitive prices. Fourth, it is crucial to foster entrepreneurship by accelerating the cultivation of entrepreneurial teams with global vision and a grasp of the pulse of the times, and by stimulating innovation and entrepreneurial vitality across society. Fifth, it is essential to preserve and protect endangered industrial cultural heritage, showcase China's outstanding traditional industrial legacy, and continuously innovate their presentation to infuse them with contemporary content.

The construction of industrial culture is a long-term, systematic endeavor requiring coordinated efforts from government agencies, industrial enterprises, industry associations, and the academia. The *Handbook of Industrial Culture*, a systematic exploration of the concepts, evolution, value, industry practices, and other aspects of industrial culture, represents a significant theoretical innovation and practical summary in this field. By showcasing the richness of industrial culture, this handbook aims to bolster China's industrial soft power and advance its vision as a global manufacturing leader. Beyond being a reference, it is a call to action—inviting readers to join the movement in preserving, innovating, and shaping the future of industrial heritage.

March 2026

Wei Miao

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Part I

Conception of Industrial Culture

Industry Creates Modern Civilization

1

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Abstract

This chapter delineates the foundational role of industry as the engine of human progress and modern civilization. It traces the origins of industry to primitive tool-making, positing that the conscious creation and use of tools, alongside the mastery of fire, not only distinguished humans from animals but also laid the material groundwork for primitive handicrafts and subsequent civilizational evolution. The chapter identifies industrialization as the pivotal event in socio-economic history, which, through the large-scale application of science and technology, broke the Malthusian Trap, enabling sustained productivity growth and social wealth accumulation. It further examines the Industrial Revolution as a historical watershed that transformed production modes from manual workshops to machine-based large-scale industry, reshaped social structures (e.g., the rise of the bourgeoisie and proletariat), and updated ideological landscapes (e.g., the spread of scientific rationality). The analysis confirms that industry is the core force behind material wealth creation and that industrialization has profoundly reconfigured human lifestyles, global development patterns, and the trajectory of civilization.

Keywords

Industrial civilization · Primitive tool-making · Industrialization · Malthusian Trap · Industrial Revolution

1.1 Introduction

From a historical perspective, industry has been the fundamental driving force behind human progress. In the course of human evolution, the most notable change was the learning to use tools and fire. Subsequent developments in world civilization and social progress have been driven by technological innovation and advances in tools, forming a development model centered on productivity enhancement and industrial transformation. In terms of socioeconomic development, it is industrialization, the most significant event of the past 3000 years, that has created modern civilization.

1.2 Industrial Culture as the Driving Force of Social Development

1.2.1 Civilization Starts with a Tool

In *The Dictionary of Chinese Characters and Phrases* (*Cihai* 辞海), the word 工业 (*gongye*, industry) is defined as “a sector of social production that organizes mining natural resources and processing or reprocessing raw materials for industrial and agricultural production (Xia & Chen, 2009).” In *Modern Chinese Dictionary* (DEOIL, CASS 2016), it refers to “a group of productive enterprises that make use of natural resources to manufacture means of production and means of livelihood, or to process agricultural products and semi-finished goods.” According to the two definitions, the birth of many historical and cultural activities of human beings just stemmed from industry. When people consciously manufactured tools in a massive way and applied them to fruit-collecting, fishing, hunting, constructing, and other activities in their daily life, the embryo of primitive industry or handicraft industry came into being. In terms of the development process of human culture, the primary industry or the first industry should be industry instead of agriculture, because the development of human civilization and social progress began with the invention of tools and the rise of handicraft industry and then promoted by scientific and technological progresses (He, 2015). Industrial and technological innovation and the upgrading of industrial structure have always been the initial driving force of the productive forces.

Initially, the ancestors of mankind, not unlike other animals, used their hands and teeth to hunt and gather food. Gradually, they cultivated their brain through tool and fire making and step-by-step developed intelligence. In the process of obtaining food and defending security, human beings consciously or deliberately began to use fire, wooden sticks and stones, and communicated the experiences and skills in groups to

inherit and transmit. Accordingly, with more evolved brains, higher level of intellectual development, and stronger learning ability, their posterity not only learned how to light a fire but also found the way to improve tools to make them easier to use. For example, after a hunting, they accidentally discovered preys could be easily dissected by gravels with sharp edge, and then they realized such crushed stones with sharp edge could be obtained by breaking one stone against hard rocks. Finally, they figured out a way to make sharp-edged stone by hitting a stone against another. This is what historians call the making of chipped stone tools, which is the origin of tool making by hominids. When the hominids made the first batch of stoneware with natural stone materials, they opened the first page of human history. There began the first stage of primitive society, namely, the development stage of human material culture marked by the use of chipped stone tools—the Paleolithic Period.

The discovery of archaeological relics also confirms stone tool making and wooden tool making are the oldest handicraft industries. Until now, the oldest stone tools, which were discovered in Koobi Fora of Kenya, East Africa, and Omo and Hadar regions in Ethiopia, have a history of 2–2.5 million years. Then the Olduvian culture and the Acheulean culture, the two cultural traditions of stone tools, were formed in Africa. About 1.5 million years ago, *Homo erectus*, a more evolved human species, emerged. They learned how to use fire and make more complicated stone tools, and their scope of activities expanded from Africa to Asia. For example, the stone tools used by *Homo erectus* in Zhoukoudian, China, included scrapers, choppers, cusped tool, and early bone tools. The earliest evidence of human activities in Europe is a more advanced hand axe used by humans about 1,000,000 years ago.

With the manufacturing technology they had mastered, human beings were able to achieve many goals and overcome their own obstacles, transforming more natural materials to something useful to meet their own needs in clothing, food, housing, and transportation. And with sharp tools in their hands, human beings finally dominated the world and became a species distinguished from other animals. Knowing how to use and make tools are the fundamental differences between human beings and animals, which distinguishes men from apes and the evidence that proves why humans are humans. Hegel says, for the tool we make, we gain the power to dominate the external nature; its labor that creates human beings, and labor starts from the invention of tools. In this sense, we can conclude that the technology of making tools realized human evolution from animals to humans. In other words, it is the technology that creates the mankind. As tools made by human beings in early era became more and more complex, human brains became more and more developed, thus providing a breeding ground for language and culture of their communities.

The primitive society includes the Paleolithic Age and the Neolithic Age. The cultural achievements of human beings in the Paleolithic Age mainly consist of three aspects. The first one is the making and use of stone tools, which is the most important evidence to distinguish man from animal. The second one is the use of fire, which is a milestone in the process of human evolution. The last one is the production of primitive arts such as rock paintings, rock inscription, and carvings. On the premise of these three aspects, languages and written characters came into being. Archaeologists call the activities of chipping stone tools the primitive

industry; although there is a dispute about whether it can be called industry, what we cannot deny is only with the progress of primitive stone tool making could, human collecting, and hunting activities be promoted. Meanwhile, the making of stone tools also created conditions for the birth of the primitive construction industry and provided constant improvement in human residences and settlements.

Primitive agriculture developed gradually in the Neolithic Age. Around 8500 BC, humans who lived in the Middle East invented a lifestyle called slash-and-burn cultivation. They used stone axe, later used iron axe, to cut off the withered roots and stems on the ground and then dried and burned them into ashes. Mixing the ashes with rotten leaves, they made the fertilizer and applied it before sowing. After the fertility of the land was exhausted, they would move to other lands to start the next round of cultivation.

The making of tools on a large scale created conditions for the development of primitive agriculture. The emergence of industries like the manufacturing of grinding stone tools, pottery making, primitive agriculture, and livestock breeding became the symbol of the early Neolithic Age and the four elements of early culture. Dozens of compositions that were found densely placed with tools on a regular order were found on the Cishan site in Wu'an County, Hebei Province, China. Those compositions can be dated back at least 7000 years ago. Most of them were mainly composed of stone grinding plates, stone rods, stone shovels, stone axes, ceramic pots and brackets, the general four pieces in almost every composition most of which were grouped and placed according to their functions such as production tools (stone shovels, stone axes, etc.), threshing tools (stone grinding plates, stone rods, etc.), and cooking utensils (pottery pots, brackets, etc.). According to the archaeological discoveries, the ancestors of that time had already finished their nomadic life and had relatively stable settlements. They made a living mainly by millet growing, with gathering, fishing, and hunting as supplementary means. Besides that, they also raised livestock such as dogs and pigs.

In the late period of the primitive society, human beings experienced three major social divisions of labor—agricultural and nomadic tribes' separation from hunter-gatherers, the separation between handicraft industry and agriculture, and the division of labor brought about by the merchant class. In the long history of the primitive society, agriculture and handicraft industry were the only major departments of material production. To certain extent, human material productive activities firstly started in handicraft industry. In the initial stage of the development of handicraft industry, the production activity was marked by people using natural materials or agricultural and animal husbandry products as raw materials to process and make tools for production and living. With the development of fishing and hunting economy, the handicraft industries of bone, horn, tooth, clam products making, leather making, and weaving appeared. Thereafter, the handicraft industries like pottery, textile, and architecture needed for the adaption of settled agricultural life emerged. In the last phase of primitive society, new branches of handicraft industry such as jade making and ivory carving were derived on the basis of the traditional manufacturing of stone tools, bone products and horn products, and the copper industry also appeared.

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