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Scientific Knowledge as Power Francis Bacon's Epistemology and Its Social Implications

O Conhecimento Científico como Poder: A Epistemologia de Francis Bacon e suas Implicações Sociais

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ABSTRACT

This article examines Francis Bacon's conception of scientific knowledge and its role in the transformation of modern thought. Through an analysis of Bacon's major works—*Novum Organum*, *The Advancement of Learning*, and *New Atlantis*—the study explores the epistemological foundations of his philosophy, with particular attention to the principle that "knowledge is power." The paper argues that Bacon reconceptualized knowledge as an empirical and inductive process aimed at liberating human reason from scholastic abstraction, cognitive illusion, and dogmatic authority. Scientific knowledge, in Bacon's view, is not merely theoretical but possesses an emancipatory function, enabling both intellectual renewal and social reorganization. Beyond its methodological dimension, Bacon's philosophy articulates an early vision of knowledge as a formative social force shaping production, law, and political order. By situating Bacon within the transition from medieval to early modern philosophy, this article demonstrates that his thought constitutes a foundational moment in the emergence of modern epistemology and offers enduring philosophical insights into the relationship between knowledge, power, and social progress.

KEYWORDS: Francis Bacon, scientific knowledge, epistemology, intellectual emancipation, modern philosophy

RESUMO

Este artigo examina a concepção de conhecimento científico de Francis Bacon e seu papel na transformação do pensamento moderno. Por meio de uma análise das principais obras de Bacon — Novum Organum, O Avanço do Saber e Nova Atlântida — o estudo explora os fundamentos epistemológicos de sua filosofia, com atenção especial ao princípio de que "conhecimento é poder". O artigo argumenta que Bacon reconceitualizou o conhecimento como um processo empírico e indutivo, visando libertar a razão humana da abstração escolástica, da ilusão cognitiva e da autoridade dogmática. O conhecimento científico, na visão de Bacon, não é meramente teórico, mas possui uma função emancipadora, possibilitando tanto a renovação intelectual quanto a reorganização social. Além de sua dimensão metodológica, a filosofia de Bacon articula uma visão precoce do conhecimento como uma força social formativa que molda a produção, o direito e a ordem política. Ao situar Bacon na transição da filosofia medieval para a filosofia moderna inicial, este artigo demonstra que seu pensamento constitui um momento fundamental na emergência da epistemologia moderna e oferece insights filosóficos duradouros sobre a relação entre conhecimento, poder e progresso social.

PALAVRAS-CHAVE: Francis Bacon, conhecimento científico, epistemologia, emancipação intelectual, filosofia moderna.

Introduction

Bacon was an English philosopher, statesman, and scientist. He is regarded as the founder of modern empiricism and the experimental scientific method. The core content of Francis Bacon's entire philosophical system lies in the study and philosophical examination of scientific knowledge (Nguyen, 2024). He made important contributions to outlining the path for the formation and development of the philosophy of science. Bacon's philosophical ideas are most clearly expressed in his renowned works such as *Novum Organum*, *The Advancement of Learning*, and *New Atlantis*. In these works, he sought to bring about a cultural transition from medieval thinking to early modern methodological thinking oriented toward social progress. Accordingly, scientific knowledge must be applied to serve the progress of humankind; in other words, scientific knowledge must permeate all aspects of life, promoting the development of production and social advancement. Cassan (2021) argues that Bacon criticized Aristotelian philosophy and attacked medieval modes of thought that had become obsolete in the face of new social demands. Surpassing many of his contemporaries, Francis Bacon expressed a strong aspiration for reform and renewal through the Great Instauration of science, liberating knowledge from traditional motifs and directing scientific knowledge toward practical problems, especially in experimental science.

What is the reason for yet another book on Francis Bacon? Many scholars have specialized in studying the thought and influence of this one individual, and it may seem as if we now. over a distance of four centuries, know him about as well as we possibly can. Yet when we compare the hundreds of books and thousands of articles written on Bacon's life and thought, very different images of Bacon emerge. To some degree, this is merely a reflection of the varied interests of scholars and authors who study him as a statesman, a philosopher, an author, or the shadowy figure behind a conjectured theatrical conspiracy. Another cause of the many different Bacons in the secondary literature is a lack of scholarly consensus on how Bacon related to the dominant cultural force of his age, reformation era Christianity.

From the first half of the twentieth century, science, engineering, and technology ushered in a new era—an era in which science became a direct productive force, powerfully driving social development. The first, second, third, and now fourth industrial revolutions have constructed a knowledge-based economy, emphasizing the central role of human intellect and creativity (Ho, 2002). Bacon's technocratic thought, particularly his assertion that "knowledge is power," is clearly reflected in the era of Industry 4.0. Bacon argued that for knowledge to become genuine power, it must criticize false perceptions, eliminate illusions, oppose conservatism and scholasticism, and replace them with scientific methods; through this process, humans can explore nature, master themselves, and master society.

The rapid and explosive development of science and technology today continually demands that philosophy provide timely guidance appropriate to such changes, enabling science to multiply human power. Consequently, the philosophy of science continues to attract the attention of many scholars (Do, 2018, p. 29). For these reasons, studying and exploring Bacon's philosophy of science to understand the nature and role of scientific knowledge and transform it into a force capable of changing society is of vital importance (Nguyen, 2024). Research on Bacon's philosophy has profound theoretical and practical significance, as it equips us with a proper understanding to establish the rightful position of science in social life, remove obstacles to scientific development, "transform science into a direct productive force," and affirm the position and role of science and technology as decisive factors in social development (Rózsa, 2019).

As Bacon's schemes for renovation in the natural sciences grew out of a general climate of discontent with Aristotelian science in the late sixteenth century, so his plans for law reform seem to have sprung from a widespread Renaissance dissatisfaction with the state of the law inherited from the Middle Ages. Maitland points out that par-ticularly in the second quarter of the sixteenth century there occurred in England and throughout Europe a humanist, Protestant revolt away from the barbarism, medievalism and Catholicism of the com-mon law, with its bad Latin and worse French, its disorganization and lack of code, and towards the Roman Civil Law. The latter's greater elegance and order made it a natural

model for those English-men who sought some remedy for what seemed the growing chaos of their country's laws. Also, the authoritarian bias of the Civil Law suited the Tudor monarchy. At the height of this movement Henry VIII established chairs of Civil Law at Oxford and Cambridge, whence were to emanate some of the highest royalist doctrines of the Stuart period. In the event, the common law proved much too strong to be displaced, but by the end of the century some leading lawyers and statesmen were inclining to the view that a restatement of it was necessary. The Lord Keeper Puckering in his opening speech to the Parliament of 1593 urged an abridgement of the multitude of old laws rather than the passage of new, and repeated the same theme in the Parliament.

Research Methodology

This article employs methods of analysis and synthesis of Bacon's classical philosophical works, such as *Novum Organum*, *The Advancement of Learning*, and *New Atlantis*, in order to examine his system of thought concerning scientific knowledge, the experimental method, and the role of scientific knowledge in social reform. Logical and historical methods are also used to situate Bacon's ideas within the context of modern European philosophy, particularly during the transitional period from scholasticism to experimental scientific thought. The logical method is applied to reconstruct the process through which Bacon's thought was formed and developed, thereby clarifying its necessity, universal value, and impact on contemporary social governance.

This approach aims to synthesize the research content into a unified system, including: (1) Bacon's thought on knowledge and the development of science; (2) outlining the path for realizing the intellect-liberating role of knowledge; and (3) affirming the role of scientific knowledge in social progress. This systematic approach ensures coherence, logical consistency, and relevance across sections, while highlighting the enduring significance of Bacon's ideas for contemporary development.

Literature Review

Numerous recent studies have contributed to clarifying Bacon's philosophical thought from various perspectives. These works provide valuable insights into Bacon's arguments for establishing the role of philosophy, as well as his call for the reform of scientific knowledge so that it may become a distinctive social institution. The study of Bacon's works further enhances understanding of the nature and practical development of science in the contemporary context. Nguyen (2024) elucidated Bacon's vision of a science that serves the common welfare of society, emphasizing the importance of Bacon's insights in addressing contemporary challenges and promoting scientific knowledge for the betterment of humanity. B. Farrington (1999) examined Bacon from the perspective of the philosophy of science, arguing that his

core objective was to apply knowledge to practice in service of social and industrial progress. Charles Whitney (1986) conducted a multifaceted study of Bacon, asserting that Bacon initiated an intellectual revolution that connected the past and the present through the confidence and spirit of a new style. Hale, Kimberly Hurd (2013) carried out an in-depth analysis of the political and social ideologies embedded in *New Atlantis*, characterizing it as a form of "technocratic thought" reflecting the ideal of knowledge and science guiding society. Doina Cristina Rusu (2021) reassessed Bacon's position in the history and philosophy of science from 2010 to 2020, discussing his legacy and long-term influence, and affirming that scholars regard Bacon as a central figure in the emergence of experimental science.

Another cause of the many different Bacons in the secondary literature is a lack of scholarly consensus on how Bacon related to the dominant cultural force of his age, reformation era Christianity. Bacon has been portrayed as an atheist, a Puritan, a generic "sincere Christian," and one who, whatever his religious beliefs, was unconcerned with matters of faith in his philosophy. The question of Bacon's faith is especially significant for understanding his philosophy and his cultural role as an acknowledged "founding figure" of the modern scientific method and worldview. Bacon's writings pertaining to natural philosophy and the reform of human learning, the program which he entitled the Instauratio Magna, are saturated with scriptural quotations and theological arguments used to support his points. Are these statements sincere? Are they a twisting of Christianity for his secular ends? Could they merely have been inserted as window dressing to please a Christian readership? These ideas and many more have emerged to explain the religious language of Bacon's writings, but almost no attention has been given to interpreting them within the historical context of the theological trends of the Reformation, where any answers must be found. The questions are certainly important for understanding Bacon, for his philosophy, undergirded as it is with religious arguments and Scripture, takes on radically different implications if it is assumed to be written by a Calvinist, an atheist, or someone who was simply trying to keep "faith" and "science" separate. It has been my concern in this book to place Bacon back in his proper day and age, and let his own writings inform us about where he fitted in the theological landscape of Tudor and Stuart England. Most of the conflicting images of Bacon's religion have emerged because they reflect the concerns and interests of later generations, and not those of Bacon's own era. John Henry has observed that the portrayal of Bacon as an atheist or a deist at odd with Christianity cannot be found prior to the Enlightenment.

From another perspective, Nguyen (2024) examined the enduring relevance of Bacon's philosophy of science, particularly through the lens of dialectical materialism, with an emphasis on scientific knowledge. Do (2022b) argued that Francis Bacon's philosophy embodies a profound aspiration for a society in which the achievements of science are fully integrated into everyday life and serve as a "gold

standard" for evaluating a nation's level of development. Many scholars consider Bacon a pioneer of the knowledge era, advancing the assertion that "knowledge is power" (Gaukroger, 2001). Le (2010) focused on clarifying Bacon's arguments within the Great Instauration project—a comprehensive plan aimed at reconstructing science, the arts, and human knowledge on a solid foundation by replacing traditional deductive methods with experimental and inductive approaches. The debate surrounding Bacon's views on the role of knowledge continues as knowledge penetrates ever more deeply into all areas of social life. Ho (2002) affirmed that science has become a direct productive force and argued that this development is an inevitable outcome anticipated by both Bacon and Karl Marx.

With the aim of constructing a "temple of light" for science and placing scientific knowledge at the service of and as a driver of human progress, Karl Marx, in *The Holy Family*, identified Bacon as a pioneer of modern natural science, demonstrating that Bacon was a philosopher of profound influence on scientific development and social progress (Marx & Engels, 2001, p. 412). In *Power Shift*, Alvin Toffler (1990) likewise repeatedly emphasized the historical connection between Bacon and the contemporary era of the knowledge economy.

Results and Discussion

1. Bacon's Philosophical Thought on Knowledge and the Development of Science

The reform of knowledge and the anticipation of revolutionary transformations in science

Francis Bacon was one of the founders of modern philosophy, a reformer of knowledge, and a thinker who anticipated revolutionary transformations in science. He left a profound mark on the history of philosophy in particular and intellectual history in general through a new style of thinking that reflected the inevitable development of theoretical thought in response to major transformations in practical reality. He famously asserted: "Knowledge and human power are synonymous" (Bacon, 1902, p. 11). He also maintained that genuine philosophy must originate from experience and the observation of nature, rather than being constructed on abstract speculation. Knowledge has value only when it is formed through "natural history," that is, through the recording, description, and analysis of real phenomena. The rich and diverse experiences of human life constitute a vivid source of material for the development of philosophical thought. He wrote: "Such experience of all kinds, and such a natural history, as may afford a foundation to philosophy" (Bacon, 1901, p. 25). Accordingly, Bacon supported inductive reasoning, regarding it as a solid scientific foundation that enables humans to discover the laws of nature and enhance their capacity for rational thought.

Bacon strongly advocated experimentation and opposed abstract argumentation. He criticized scholastic philosophy for relying solely on reason and assumptions without empirical observation.

According to him, truth can be attained only through experience, observation, and verification, rather than through innate talent or purely abstract reasoning (Le, 2010). No matter how intelligent a person may be, if they fail to analyze the nature of the real world, their knowledge amounts to mere imagination. Scientific knowledge must be grounded in things themselves rather than assumptions; as Bacon argued:

"Nor can any force of genius, thought, or argument, be substituted for this labor, search, and inspection; not even though all the wits of men were united: this, therefore, must either be had, or the business be deserted forever" (Bacon, 1901, p. 26).

Considering Bacon's philosophical system as a whole, it can be seen that his thought unfolds according to a clear logic. First, obstacles on the path to the cognition of truth must be removed; as he stated:

"Matter of truth which is the basis of solid experience, philosophy, and the sciences, should not be mixed with matter of doubtful credit; and yet that curiosities or prodigies, though seemingly incredible, are not to be suppressed or denied the registering" (Bacon, 1901, p. 60).

Next, a scientific method must be constructed, enabling humans to attain correct and truly effective knowledge that not only explains nature but also affirms human power over it. Finally, scientific knowledge must be successfully applied in social practice to build a better society grounded in the "power" of knowledge (Do, 2022c).

As a step in the historical development of human intellectual thought, Bacon absorbed and inherited the suggestive values of his predecessors and infused them with new substance and a spirit of discovery that transcended his era. From the intellectual legacy of ancient Greece—most notably Plato's philosophical reflections on epistemological issues and his aspiration for a just state in a civilized and virtuous society (Do, 2022a)—to the pioneering ideas of early modern philosophers on experimental science and rationalism (Pham & Do, 2024), Bacon also drew inspiration from Thomas More's utopian thought in *Utopia*. These influences, combined with the values of Renaissance culture and the achievements of contemporary natural science, became key factors driving the formation and development of Bacon's thought. He created a new style of thinking and carried out a philosophical revolution aimed at transforming the role and position of philosophy, science, and human cognition. As he observed, "Philosophy thus coming down to us in the persons of master and scholar, instead of inventor and improver" (Bacon, 1901, p. 12). Bacon was a pioneer in elevating scientific knowledge, particularly experimental science, to a central position.

The question of Bacon's faith is especially significant for understanding his philosophy and his cultural role as an acknowledged "founding figure" of the modern scientific method and worldview. Bacon's writings pertaining to natural philosophy and the reform of human learning, the program which

he entitled the Instauratio Magna, are saturated with scriptural quotations and theological arguments used to support his points. Are these statements sincere? Are they a twisting of Christianity for his secular ends? Could they merely have been inserted as window dressing to please a Christian readership? These ideas and many more have emerged to explain the religious language of Bacon's writings, but almost no attention has been given to interpreting them within the historical context of the theological trends of the Reformation, where any answers must be found. The questions are certainly important for understanding Bacon, for his philosophy, undergirded as it is with religious arguments and Scripture, takes on radically different implications if it is assumed to be written by a Calvinist, an atheist, or someone who was simply trying to keep "faith" and "science" separate. It has been my concern in this book to place Bacon back in his proper day and age, and let his own writings inform us about where he fitted in the theological landscape of Tudor and Stuart England.

The ideal of a knowledge society and an anthropological vision

In *New Atlantis*, Bacon envisioned an ideal society founded on the power of knowledge—a society characterized by an ideal republican order, in which human beings live happily on the basis of highly developed science and technology. He anticipated a society in which, instead of war and conflict, there would be exchanges of scientific knowledge and transfers of technology, extending further to a world in which nations relate to one another as equal members through scientific knowledge, setting aside political differences (Do, 2022c). He wrote in *New Atlantis*:

> There reigned in this island, about 1,900 years ago, a king, whose memory of all others we most adore; not superstitiously, but as a divine instrument, though a mortal man: his name was Solamona; and we esteem him as the lawgiver of our nation. This king had a large heart, inscrutable for good, and was wholly bent to make his kingdom and people happy… and are under the crown and laws of this State; and recalling into his memory the happy and flourishing estate wherein this land then was, so as it mought be a thousand ways altered to the worse, ut scarce any one way to the better; though nothing wanted to his noble and heroical intentions, but only (as far as human foresight mought reach) to give perpetuity to that which was in his time so happily established" (Bacon, n.d., pp. 253–254).

In the seventeenth century, Bacon and René Descartes paved the way for a new philosophy, viewing science as the sole means of achieving social perfection. It can be said that this period witnessed a comprehensive process of secularization of consciousness, requiring thinkers to transcend medieval ideology in order to affirm human rights in creative activity (Do, 2023)—for their concrete interests in the earthly, real world and for worldly happiness, rather than for illusory values in the afterlife. Bacon wrote:

> Nor do we mean, as was said of Socrates, to call philosophy down from heaven to converse upon earth: that is, to leave natural philosophy behind, and apply knowledge only to morality and policy: but as both heaven and earth contribute to the use and benefit of man, so the end

> ought to be, from both philosophies, to separate and reject vain and empty speculations, and preserve and increase all that is solid and fruitful" (Bacon, 1901, p. 66).

Social utopian theories articulated ideas of political and social reform and initially established social ideals grounded in scientific and technological progress. For example, in Thomas More's *Utopia*, the inhabitants invent instruments to accurately track the movements of the sun, the moon, and the stars, predict the weather, and understand the origins of nature and the universe. The inhabitants of *Utopia* are largely Christians who enjoy freedom of belief, are respected, and live happy, prosperous, and peaceful lives. While Thomas More's thought tends toward political and social dimensions, aiming at political reform through the model of *Utopia*, Bacon's thought focuses on how scientific knowledge can be most effectively applied in social practice, forecasting scientific achievements centuries in advance, with the sole aim of affirming the role of scientific knowledge in social life (Bacon, 1902, p. 11).

2. The Philosophy of Intellectual Emancipation through Scientific Knowledge and the Path to Realizing Its Emancipatory Role

Scientific knowledge as the foundation for intellectual emancipation and the purification of human reason

Bacon emphasized the intellect-liberating role of scientific knowledge, insisting that this emancipatory role should be addressed first and arguing that a revolution of reason precedes a revolution of practice (Bacon, 1902, p. 116). Intellectual emancipation means lighting a torch and charting a path for human beings to overcome obstacles in their exploration of the mysteries of nature, to master nature, to master society, and to dispel the shadows that obscure human intellect. Bacon successfully concretized this idea through his critique of scholastic knowledge and the idols of cognition, ultimately constructing an empirical–inductive methodology. According to Bacon, viewed in its entirety, the doctrine of *Idola*, or the critique of the idols of cognition, serves an educational function for society. In essence, it establishes new social mechanisms for individuals, new principles for formulating problems in scientific development, and safeguards psychological and social conditions—conditions that need not be entirely sufficient but at least function as necessary and acceptable starting points—to prepare reason, prevent it from being corrupted, and expand the space of human intellect (Bacon, 1902).

Bacon's concept of purifying reason was, to some extent, directed against social forces that deliberately sought to weaken and obscure human reason and creative capacity. The path toward purifying reason had been formed from Giordano Bruno through Galileo Galilei to Bacon, but Bacon elevated it to the level of a clear program. He regarded "idols" as errors of cognition imposed by an educational system detached from practice. He argued that

> The idols and false notions which have already preoccupied the human understanding, and are deeply rooted in it, not only so beset men's minds that they become difficult of access, but even when access is obtained will again meet and trouble us in the instauration of the sciences, unless mankind when forewarned guard themselves with all possible care against them (Bacon, 1902, p. 19).

Concluding his analysis of the "idols," Bacon emphasized with hope:

> The formation of notions and axioms on a foundation of true induction is the only fitting remedy by which we can ward off and expel these idols. It is, however, of great service to point them out; for the doctrine of idols bears the same relation to the interpretation of nature as that of the confutation of sophisms does to common logic" (Bacon, 1902, p. 20).

Let the entrance to the kingdom of humankind, founded upon science, be comparable to the entrance to the kingdom of heaven.

The experimental method as the path to realizing the intellect-liberating role of knowledge

Francis Bacon was not the inventor of the experimental method in science, nor was he the first to apply it to the emerging new sciences. Nevertheless, Bacon is widely regarded as the thinker who constructed a general methodological framework for the study of experimental natural science (Do, 2018, p. 31). Bacon was not a philosopher in the purely abstract sense of the term, but rather a high-ranking statesman who, from his elevated position, was acutely aware of the demands of his era and understood what needed to be done for the benefit of humankind.

In order to define the intellect-liberating role of scientific knowledge, Bacon developed the experimental method as the approach most compatible with the exploratory spirit of his age. The logic of invention, understood as the foundation of cognition, is both the art of discovery and the highest goal of knowledge; even if it does not yield immediate results, it at least produces a decisive shift in the consciousness of a new era. He wrote:

> Although there is a most intimate connection, and almost an identity between the ways of human power and human knowledge, yet, on account of the pernicious and inveterate habit of dwelling upon abstractions, it is by far the safest method to commence and build up the sciences from those foundations which bear a relation to the practical division, and to let them mark out and limit the theoretical. We must consider, therefore, what precepts, or what direction or guide, a person would most desire, in order to generate and superinduce any nature upon a given body: and this not in abstruse, but in the plainest language (Bacon, 1902, p. 111).

Bacon clearly expressed his opposition to abstract, dogmatic thinking and strongly advocated experimental methods. He argued that knowledge has value only when it is integrated with practice and contributes to the improvement of nature. He criticized the human tendency to reason from abstract concepts rather than observe reality directly. Accordingly, science must be grounded in experience, oriented toward practical divisions, and expressed in concise and clear language to serve human beings, rather than remaining vague or detached from life. Assessing Bacon's contribution, Karl Marx wrote:

> The real founder of English materialism and all modern experimental science was Bacon. For him natural science was true science and physics based on perception was the most excellent part of natural science… According to his teaching the senses are infallible and are the source of all knowledge. Science is experimental and consists in applying a rational method to the data provided by the senses. Induction, analysis, comparison, observation, and experiment are the principal requisites of rational method (Karl Marx and Engels, 2001, p. 166).

3. The Role of Scientific Knowledge in Social Progress

Scientific knowledge as a driving force of progress and the development of the productive forces

Bacon regarded science as an indispensable factor in the historical process and as an important criterion of social development, particularly in promoting labor productivity (Do, 2022b). He emphasized that society becomes dynamic and develops continuously when human beings actively pursue scientific knowledge, since such knowledge enables them to conquer nature, better understand its essence and future potential, and thereby serve present life more effectively.

In Bacon's view of social progress, human economic activity constitutes the foundation and requires the support of knowledge, science, and technology, while remaining closely linked to an ongoing process of cognition. The traditional intellect, experience, and achievements of predecessors form the basis of scientific progress. However, Bacon did not absolutize tradition; rather, he regarded it as a starting point for innovation, enabling human beings to continually expand knowledge through experimentation and reasoning, ultimately achieving a more complete understanding of nature and society.

Bacon articulated a view of the role of humanity in scientific progress, arguing that scientific development depends on individuals of outstanding intellect and professional competence—those who not only acquire knowledge but also create and disseminate it (Le, 2010). Scientific research must be a serious and long-term endeavor, requiring lifelong dedication rather than being a transient or superficial activity. Only when individuals pursue knowledge with ability, enthusiasm, and professionalism can science continue to develop and ultimately benefit humankind:

> For it is necessary to the progression of sciences that readers be of the most able and sufficient men; as those which are ordained for generating and propagating of sciences, and not for transitory use. This cannot be, except their condition and endowment be such as may content the ablest man to appropriate his whole labour and continue his whole age in that function and attendance; and therefore must have a proportion answerable to that mediocrity or competency of advancement, which may be expected from a profession or the practice of a profession (Bacon, n.d., p. 71).

Bacon proposed an approach to scientific knowledge that does not confine it to the theoretical level alone but requires its concretization—not merely as cognition, but as a practical foundation for promoting social development. As he stated:

"For as no perfect view of a country can be taken upon a flat, so it is impossible to discover the remote and deep parts of any science by standing upon the level of the same science, or without ascending to a higher" (Bacon, 1901, p. 63).

This perspective shows that Bacon did not regard science as an abstract discipline alone, but as a practical tool for addressing real-world problems and thereby advancing social progress (Nguyen, 2024).

The development of science has brought about positive changes in society, particularly in the economic sphere. However, Bacon emphasized primarily the role of science in promoting the development of the productive forces and did not explore in depth its impact on relations of production. Later, Karl Marx further developed this perspective by summarizing the actual development of the productive forces since the seventeenth century. In *Capital*, Marx asserted that "science has become a direct productive force," closely linked to technological development and social production. It can thus be seen that Bacon laid the foundations of modern scientific thought, while Marx continued to develop and clarify the decisive role of science in the profound transformations of modern society and the economy (Do, 2022c).

Scientific knowledge in social organization and governance

In the seventeenth and eighteenth centuries, the development of scientific knowledge and technology followed a largely one-directional pattern. As technology advanced, new scientific research problems emerged; however, science itself did not yet actively promote practical application. By the nineteenth century, with the rapid development of capitalism, science had become an important productive force, closely linked to human labor and practical application (Ho, 2002). Science was no longer merely an independent field but also a materialized intellectual force that drove technological development and production. From the perspective of material production practice, science increasingly exerted a rapid influence on changes in life and consciousness, as Karl Marx had anticipated:

> The development of fixed capital indicates the extent to which general social knowledge has been transformed into a direct productive force, and therefore also indicates the extent to which the conditions of the social life process itself have come under the control of the general intellect and have been reshaped not only in the form of knowledge but also as direct organs of social practice, as immediate organs of the real life process (Marx & Engels, 2001, p. 372).

The ideas concerning the role of scientific knowledge in social progress suggested in *Novum Organum* and *New Atlantis* have been tested through the efforts of many generations. Bacon's visions, which

appeared quite distant from the conditions of his own time, were later acknowledged, affirmed, and extensively developed in subsequent eras. A further criterion of social progress lies in the comprehensive development of the human being. Bacon wrote:

"There is another powerful and great cause of the little advancement of the sciences, which is this; it is impossible to advance properly in the course when the goal is not properly fixed. But the real and legitimate goal of the sciences is the endowment of human life with new inventions and riches" (Bacon, 1902, p. 58).

Bacon regarded *The New Atlantis* as the application of the scientific method to social life—not as a program of political or social reform, but as a transformation in the understanding of the role of scientific knowledge in society. In this context, "Readers in sciences are indeed the guardians of the stores and provisions of sciences, whence men in active courses are furnished, and therefore ought to have equal entertainment with them" (Bacon, n.d., p. 71).

Bacon's conception of monarchy is closer to that of enlightened monarchy than to the absolutist monarchy of sixteenth-century England, as reflected in his portrayal of the head of state and the structure of power. Public authority is not established through hereditary succession, class privilege, or inherited status, but solely on the criterion of knowledge. Bacon wrote:

> The power and fortune of a king, the knowledge and illumination of a priest, and the learning and universality of a philosopher. This propriety inherent and individual attribute in your Majesty deserveth to be expressed not only in the fame and admiration of the present time, nor in the history or tradition of the ages succeeding, but also in some solid work, fixed memorial, and immortal monument, bearing a character or signature both of the power of a king and the difference and perfection of such a king (Bacon, n.d., p. 5).

Although Bacon did not address social governance directly, he implicitly proposed a scientific approach to establishing the structures of social administration. He argued that the best way for individuals to serve society is to help awaken the value and potential of their own scientific knowledge and to direct it toward the common good. As he stated: "For however governments may vary, there is but one state of the sciences, and that will forever be democratical or popular" (Bacon, 1901, p. 13).

Knowledge, law, and power as the foundations of a progressive society

In Francis Bacon's thought, knowledge and enlightenment are more valuable than power and status. Bacon emphasized that true human strength does not lie in authority or titles, but in the capacity for understanding and intellectual illumination. He wrote: "That learning doth make the minds of men gentle, generous, pliable, and obedient to government; whereas ignorance makes them churlish, thwart, and mutinous" (Bacon, n.d., p. 17). When knowledge is placed at the forefront, it guides and regulates all forms of power, enabling human beings to exercise power in a wiser and more humane manner (Bacon,

n.d., p. 41). In Bacon's philosophy, knowledge plays a regulatory and enlightening role, helping individuals to think rationally, understand reason, and respect social order. Education makes people wiser, calmer, and more obedient to reason, thereby enabling them to live in harmony with power and law (Do, 2022a). By contrast, ignorance renders individuals blind, prone to extremism and confrontation, because they act on emotion rather than reason. Consequently, Bacon affirmed that knowledge is not only power, but also the foundation of morality and civilized social order.

As a political actor, Bacon emphasized the task of strengthening free trade and the rigor of the legal system in national and global security, with the aim of promoting comprehensive human development and creating momentum for social progress. He inclined toward mercantilism, valuing the accumulation of wealth and money, and especially emphasizing the role of maritime trade and naval power, since these enhanced England's influence and territorial expansion. Bacon described this as follows: "These ships are not otherwise fraught than with store of victuals, and good quantity of treasure to remain with the brethren, for the buying of such things, and rewarding of such persons, as they should think fit" (Bacon, n.d., p. 256). He also pointed to the obsolescence of England's contemporary legal system, with its archaic customs and practices, and called for their removal. He wrote:

> Under the old law, most excellent king, there were daily sacrifices and free oblations arising out of ritual observance, and the other from a pious generosity, so I deem that all faithful subjects owe their kings a double tribute of affection and duty. In the first I hope I shall never be found deficient, but as regards the latter, though doubtful of the worthiness of my choice, I thought it more befitting to tender to your Majesty that service which rather refers to the excellence of your individual person than to the business of the State (Bacon, 1901, p. 47).

According to Bacon, state law is not merely intended to manifest the power of the monarch against anarchy and the dependence of local courts on a unified system; it also provides the people with the means to protect the monarch from judicial power while simultaneously restraining royal authority through law.

Bacon affirmed that knowledge constitutes the solid foundation of genuine power, and that dedicating one's intellect to national development represents the highest form of loyalty for intellectuals. As he stated: "No power on earth which setteth up a throne or chair of estate in the spirits and souls of men, and in their cogitations, imaginations, opinions, and beliefs, but knowledge and learning" (Bacon, n.d., p. 63). The reform of knowledge advocated by Bacon was not intended to transform England's political regime, but primarily to accelerate economic development through the application of knowledge to enrich the ruling class. Originating from the aristocracy, Bacon, despite his tireless commitment to science, could not fully transcend the framework of the ruling class perspective. He asserted: "Be a rule to all nations that aim at empire, to have a quick and lively sensibility of any injury done to their frontier subjects, merchants, or public ministers" (Bacon, 1901, p. 393). Bacon was a pioneer of a new era, though

not the theoretical precursor of the English bourgeois revolution. Nevertheless, his stance on social reform within the existing regime contributed to undermining that system from within, as it anticipated the incompatibility of traditional institutions with social progress.

Conclusion

Bacon's thought on scientific knowledge is regarded as one of his most important contributions to modern Western philosophy. He laid the foundations for experimental scientific methods, emphasizing that knowledge is not merely an end in itself but also a powerful instrument for transforming and shaping the world. Bacon was the first to affirm the role of scientific knowledge in expanding human thought, enabling people to transcend the limits of traditional cognition, approach truth, and seek practical applications. In the context of the rapid development of the knowledge-based economy, Bacon's ideas have become even more relevant. Scientific knowledge not only enhances the capacity for social governance but also provides the foundation for building an effective, transparent, and sustainable system of national governance. At the same time, knowledge plays a pivotal role in the comprehensive development of humankind, fostering creativity and innovation across all spheres of social life. Therefore, applying Bacon's ideas to social management and development represents a sound direction, contributing to the full realization of the power of scientific knowledge and to the construction of a developed, modern nation that is deeply integrated into the global knowledge economy.

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