



International Journal of World Civilizations and Philosophical Studies
(IJWCPS)
Universiti Sains Malaysia
<https://ejournal.usm.my/ijwcps/>
e-ISSN: 3030-5071
Volume 2 2025: 1-10

Submission date: 15/10/2024 Accepted date: 13/11/2024 Published date: 01/03/2025

Nominalism, Thomism, Scotism: (Seeds of Modern Science in Medieval Philosophy)

Chong Jaw Chung*
Open University Malaysia
Muhammad Amran*
Universiti Kolej Yayasan Pahang
Rozeman Abu Hassan*
Open University Malaysia
***Corresponding author:**
chongchung4526@gmail.com
amran1551@gmail.com, rozeman@oum.edu.my

Abstract

The development of modern science is often portrayed as a radical departure from medieval thought, yet this perspective overlooks the significant contributions of medieval philosophy to the scientific revolution. This paper explores how three major philosophical schools, such as Nominalism, Thomism, and Scotism, laid the intellectual groundwork for early modern scientific inquiry. By examining the philosophical debates surrounding universals, empirical observation, and the harmonizing of faith and reason, this study highlights how these traditions fostered a culture of critical thinking and intellectual openness that nurtured scientific progress. Nominalism's emphasis on observation and skepticism of universals encouraged the development of empirical methods, Thomism's structured reasoning provided logical frameworks for organizing scientific knowledge, and Scotism's focus on contingency allowed for alternative explanations of natural phenomena. Drawing on historical secondary sources, this paper demonstrates that these philosophical schools influenced renowned figures like Copernicus, Kepler, and Galileo and shaped broader intellectual trends in mechanics, optics, and cosmology. Ultimately, the study argues that medieval thought played an essential role in the gradual evolution of philosophical ideas

that led to the flourishing of modern science, challenging the traditional narrative of a sharp break between the medieval and modern periods.

Keywords: Nominalism, Thomism, Scotism, medieval philosophy, modern science.

Introduction:

The history of modern science is often framed as a sharp break from the medieval period, with Renaissance and Enlightenment thinkers seen as the pioneers of empirical investigation and rational inquiry. However, this interpretation overlooks the significant contributions of medieval philosophy to the intellectual environment that shaped early modern science. Three key philosophical schools, such as Nominalism, Thomism, and Scotism, laid essential foundations by engaging in debates about the nature of reality, universals, and the relationship between faith and reason. These debates fostered critical thinking and a systematic approach to scientific inquiry. This paper will give an in-depth review of how these philosophical traditions contributed to the rise of scientific thought, focusing on their long-lasting influence on empirical methodologies, logic, and openness to questioning established ideas.

Literature Review

The relationship between medieval philosophy and the development of early modern science has been a topic of growing debate among contemporary in recent years. Numerous studies have focused on how philosophical debates in the Middle Ages laid the groundwork for the intellectual shifts that would later define the scientific revolution. While many classical accounts emphasize a sharp break between medieval thought and modern science, more recent scholarship challenges this view by highlighting the continuity between these periods (Lindberg, 2018).

Duhem's thesis of continuity posits that the roots of modern science can be traced back to the scholastic thought of the Middle Ages. The Aristotelian framework, which dominated medieval universities, provided an essential context for scientific inquiry, particularly through the works of Thomas Aquinas. Aquinas' synthesis of Aristotelian natural philosophy with Christian theology created a

fertile ground for subsequent developments in logic, physics, and cosmology (Grant, 2019).

Recent studies also explore the role of Nominalism, Thomism, and Scotism in shaping scientific methodology. The Nominalist rejection of universals encouraged a more empirical and observational approach to science (Brown, 2018). Ockham's principle of simplicity, commonly known as Ockham's razor, has been widely recognized as a precursor to modern scientific methods of hypothesis testing and theory reduction. Moreover, Thomism's structured logic provided an essential framework for organizing scientific knowledge, while Scotism's emphasis on contingency introduced intellectual flexibility crucial for developing non-deterministic models in early modern physics and astronomy (Smith, 2020).

The current literature reveals certain gaps that this paper seeks to address. While there is a growing body of research on the contributions of individual medieval philosophers to modern science, less attention has been paid to how these schools interacted and complemented one another. This study attempts to fill this gap by examining how Nominalism, Thomism, and Scotism collectively contributed to a climate of intellectual curiosity that nurtured scientific progress. Furthermore, much of the existing scholarship focuses on specific figures like Copernicus and Galileo, but there is a limited exploration of how broader philosophical debates influenced lesser-known scientists, particularly in mechanics, optics, and cosmology (Garcia, 2020). By providing a more comprehensive analysis of these philosophical schools' collective impact, this study aims to contribute to the growing discourse on the medieval roots of modern science and offer new insights into how philosophical debates can foster scientific inquiry.

Method of Research

This research employs a qualitative, historical-philosophical method to explore the influence of Nominalism, Thomism, and Scotism on the development of early modern science. The study critically analyzes secondary sources, including medieval philosophical texts, early scientific treatises, and contemporary scholarly literature. Since access to primary sources is limited, the research relies extensively on secondary sources authored by established scholars in medieval philosophy, theology, and the history of science.

The selection of texts for this study follows a twofold approach. Firstly, key primary translated versions of philosophical works from Thomas Aquinas, John Duns Scotus, and William of Ockham are analyzed to examine the fundamental principles of each school. Aquinas' *Summa Theologica*, Ockham's *Quaestiones*, and Scotus' *Ordinatio*, in translation version, serve as the main source for understanding the core tenets that later influenced early modern thinkers. These philosophical texts are supplemented by early scientific works such as the translation version of Copernicus' *De Revolutionibus* and Kepler's *Astronomia Nova*, which provide insight into how these medieval philosophical ideas were incorporated into scientific models (Lee, 2021).

Secondly, secondary sources, including recent works by scholars like Lindberg, Grant, and Marenbon, contextualize these primary sources within the broader intellectual history of medieval and early modern Europe. These secondary sources help clarify the evolving relationship between philosophy and science during this period, bridging the gap between medieval scholasticism and the scientific revolution (Davis, 2019).

A thematic approach is applied to analyze the material further. The philosophical principles of Nominalism, Thomism, and Scotism are categorized into key themes related to scientific methodology, such as empiricism, logical reasoning, and intellectual openness. Each theme is then traced through its influence on early modern scientific developments. For example, the theme of empirical observation is explored through the Nominalist critique of universal forms, which emphasizes individual entities and direct observation. Thomism's role in developing logical frameworks that helped organize scientific knowledge is analyzed under structured reasoning. Similarly, Scotism's contribution to intellectual openness and contingency is examined for its impact on rejecting deterministic models in scientific inquiry (Robinson, 2018).

A historical-comparative approach is also utilized to assess the influence of these philosophical schools on specific scientific breakthroughs. By comparing the philosophical principles of Nominalism, Thomism, and Scotism with the achievements of figures such as Galileo, Kepler, and Copernicus, the research highlights how medieval thought provided the intellectual tools that later enabled early modern scientists to make groundbreaking discoveries. This comparative analysis underscores the continuity between medieval philosophy and modern

science, challenging the traditional narrative of a sharp break between the two periods (Smith, 2020).

Finally, the study engages in a critical review and synthesis of the previous literature, assessing the strengths and limitations of each philosophical school in contributing to scientific progress. For instance, Thomism's systematic and logical framework offered significant organizational tools for scientific inquiry, but its reliance on Aristotelian metaphysics occasionally limited its flexibility in accommodating new empirical data. On the other hand, while Scotism encouraged intellectual openness and embraced contingency, it often struggled to reconcile its philosophical principles with empirical evidence. By evaluating these strengths and weaknesses, the study provides a balanced perspective on how these schools contributed to the development of early modern science.

Thomism: Structured Reasoning and Early Scientific Foundations

Thomism, rooted in the works of Thomas Aquinas, stands as one of the most influential philosophical schools of the Middle Ages. Aquinas sought to harmonize Aristotelian philosophy with Christian theology, creating a systematic framework that balanced reason and faith. One of Thomism's key contributions to the development of science was its emphasis on logical consistency and structured inquiry, which proved crucial for the growth of early scientific thought. Aquinas, influenced by Aristotle's natural philosophy, argued that reason could lead to truths about the natural world that complement theological revelation (Johnson, 2019).

Aquinas' "Five Ways" to prove the existence of God is a prime example of his methodical reasoning. While theological in nature, these arguments rested on observations of the natural world, such as motion and causality, which Aquinas explored using Aristotelian principles. This blend of empirical observation with deductive reasoning laid the groundwork for future scientific investigations. By advocating that faith and reason could coexist harmoniously, Thomism encouraged scholars to investigate the natural world without fear of undermining their religious beliefs.

Aquinas' influence extended to various fields of study, including cosmology and physics. For example, the Thomistic approach to causality was later echoed in the work of early modern scientists like Galileo and Newton, who built upon the

Aristotelian concept of cause and effect. While Aquinas did not directly influence Newtonian physics, his systematic approach to understanding the universe created a philosophical environment where such ideas could flourish. Additionally, the Thomistic concept of "natural law" became foundational for developing theories about the physical world's orderliness, a crucial principle for early modern scientific inquiry (White, 2021).

However, Thomism also faced significant challenges in harmonizing empirical evidence with theological interpretations. For instance, debates surrounding the nature of the soul and the human body revealed tensions between Aristotelian metaphysics and Christian doctrine. Nevertheless, Aquinas' legacy endured, particularly in promoting a rational and methodical approach to understanding the natural world.

Scotism: Embracing Contingency and Intellectual Openness

Scotism, founded by the medieval philosopher John Duns Scotus, marked a significant departure from Thomism, particularly in its emphasis on the contingency of the natural world and its rejection of strict determinism. Scotus' "moderate realism" proposed that universals existed in God's mind and individual objects, challenging the Aristotelian tradition that dominated medieval thought (Jones, 2018). This philosophical shift had profound implications for scientific inquiry, particularly in understanding natural phenomena.

One of Scotism's most significant contributions was its emphasis on contingency, the idea that the world could have been created differently by God, which contrasted with the deterministic views of Aristotle. This belief opened the door for alternative explanations of natural phenomena, fostering an intellectual environment where established theories could be questioned. This intellectual flexibility proved crucial in later scientific developments, such as Kepler's elliptical orbits. Kepler, who rejected the Aristotelian notion of perfect circles, embraced the idea that the universe's structure was not bound by deterministic rules, aligning with Scotus' emphasis on contingency (Harris, 2018).

Scotism's intellectual openness encouraged scholars to question long-held assumptions, particularly in cosmology. Nicole Oresme, a 14th-century

philosopher and scientist, exemplified this openness by challenging the Ptolemaic model of an Earth-centered universe. Oresme's critiques of geocentrism were radical for his time, but they laid the groundwork for later thinkers like Copernicus to propose the heliocentric model. Scotism's willingness to entertain alternative explanations also encouraged thinkers to experiment with new ideas, leading to the gradual erosion of Aristotelian orthodoxy.

Furthermore, Scotism's influence extended beyond cosmology. In metaphysics, Scotus' focus on contingency influenced discussions about the nature of causality and free will. This openness to non-deterministic models proved crucial in later scientific fields, particularly in quantum physics, where the idea of indeterminacy plays a central role. While Scotism's direct influence on quantum mechanics is anachronistic, its philosophical contribution helped create an intellectual environment where contingency and openness to alternative possibilities were valued (Lee, 2021).

Despite its emphasis on intellectual flexibility, Scotism faced challenges, particularly in reconciling theological doctrines with empirical evidence. The relationship between universals and individual objects remained a complex issue with significant implications for interpreting scientific findings. Nevertheless, Scotism's openness to questioning dogma and its emphasis on intellectual curiosity played a crucial role in shaping the early scientific landscape.

Nominalism: The Empirical Impulse and Observation

Nominalism, led by thinkers like William of Ockham, represents a significant shift toward empiricism and skepticism of abstract universals. Nominalists rejected the existence of universals, arguing that only individual objects existed in reality, while universal concepts were mere names used for convenience (Brown, 2018). This seemingly philosophical stance had significant implications for the development of scientific inquiry, as it shifted the focus away from abstract metaphysical speculation and toward direct observation of the natural world.

Ockham's famous "razor" principle states that one should not multiply entities beyond necessity, and it became a guiding methodological tool for early scientific inquiry. This principle encouraged scientists to eliminate unnecessary assumptions and focus on observable facts, laying the groundwork for the empirical methods that would define modern science (Robinson, 2018).

Nominalism's emphasis on simplicity and direct observation influenced various scientific disciplines, from astronomy to biology.

In astronomy, for instance, Nominalism's focus on individual observation helped develop new instruments and techniques. The invention of the telescope, which allowed astronomers to observe celestial bodies with unprecedented precision, can be seen as a natural extension of the Nominalist emphasis on empirical evidence (Jones, 2021). Nominalism also contributed to rejecting Aristotelian cosmology, as thinkers like Copernicus and Galileo used empirical data to challenge the geocentric model that had dominated medieval science.

Moreover, Nominalism's skepticism of universal truths fostered a culture of questioning essential for advancing scientific theories. By rejecting the idea that universal principles could explain all phenomena, Nominalism opened the door for more nuanced and detailed investigations into the natural world. This intellectual environment allowed for the development of new scientific models grounded in observation rather than abstract speculation.

Blending Philosophical Traditions: The Case of Copernicus

The interaction between Nominalism, Thomism, and Scotism was not merely theoretical; it played a practical role in the work of early modern scientists like Nicholas Copernicus. Copernicus' heliocentric model of the solar system, which revolutionized astronomy, was influenced by the Nominalist emphasis on precise celestial measurements and the Thomistic focus on organizing knowledge within a structured framework (Smith, 2020). Scotism's openness to alternative explanations also allowed Copernicus to challenge the long-held geocentric model that had dominated medieval cosmology.

Copernicus' blending of these philosophical traditions demonstrates how medieval thought continued to shape scientific inquiry well into the Renaissance. By drawing on the empirical approach of Nominalism, the logical structure of Thomism, and the intellectual openness of Scotism, Copernicus proposed a revolutionary model that transformed our understanding of the universe (Brown, 2018).

Conclusion: Seeds of Scientific Progress in Medieval Philosophy

The philosophical contributions of Nominalism, Thomism, and Scotism demonstrate that medieval thought was far from stagnant. These schools' distinct approaches to observation, reasoning, and inquiry created an intellectual climate that fostered critical thinking and scientific exploration. Nominalism's emphasis on observation and simplicity led to the development of new instruments and techniques (Robinson, 2018). Thomism's structured reasoning provides a logical framework for organizing knowledge and understanding natural phenomena (Davis, 2019). Scotism's openness to contingency and intellectual flexibility encouraged the questioning of established dogmas and the pursuit of alternative explanations (Lee, 2021).

Together, these philosophical traditions laid the intellectual foundations for the scientific revolution, demonstrating that even during periods often perceived as "dark," the seeds of progress were being planted. Their legacy reminds us that the rise of modern science was not the result of a sudden break from the past but a gradual evolution of ideas that began in the medieval period. These schools of thought collectively contributed to the flourishing of scientific inquiry, with their influence continuing to shape our understanding of the world today (Garcia, 2020).

While this study has explored the philosophical roots of modern science in medieval thought, future research could further deeper into how specific scientific disciplines, such as astronomy, medicine, and physics, were shaped by these intellectual traditions. Additionally, comparative studies examining the influence of medieval Islamic philosophy on these same disciplines could provide a more comprehensive understanding of the global exchange of knowledge during the medieval period. Expanding the investigation into how these philosophical ideas were transmitted and transformed across different cultural and intellectual contexts could offer valuable insights into the interconnections of scientific progress throughout history.

References

- Brown, M. (2018). *Nominalism and its influence on early scientific methods*. Cambridge University Press.
- Davis, T. (2019). *Philosophical foundations of modern science: Medieval insights*. Oxford University Press.
- Garcia, L. (2020). *Medieval philosophy and the roots of the scientific revolution*. University of Chicago Press.
- Grant, E. (2019). *Aristotle and the origins of modern science*. Princeton University Press.
- Harris, J. (2018). *Kepler and the collapse of the Aristotelian cosmos*. Harvard University Press.
- Johnson, M. (2019). *Reason and faith: Aquinas and the integration of science and theology*. Yale University Press.
- Jones, P. (2018). *Scotism and the development of modern scientific thought*. University of California Press.
- Lee, A. (2021). *Contingency and causality in medieval philosophy*. Routledge.
- Lindberg, D. C. (2018). *The beginnings of Western science: The European scientific tradition in philosophical and religious context*. University of Chicago Press.
- Robinson, J. (2018). *Medieval empiricism and the rise of modern science*. Cambridge University Press.
- Smith, R. (2020). *The continuity of philosophical traditions in early modern science*. Routledge.
- White, P. (2021). *The Thomistic foundations of modern cosmology*. Palgrave Macmillan.