



The Relevance Of Logical Principles As The Basis For Scientific Thinking In The Development Of Management Science: A Systematic Study

¹Hilwa Rohmahdiniyah Nur Azizah, ²Trivena Gilang Permatasari, ³Agung Winarno, ⁴Subagyo

^{1,2,3,4}Universitas Negeri Malang, Indonesia.

¹hilwa.rohmahdiniyah.2504138@students.um.ac.id,

²trivena.gilang.2504138@students.um.ac.id, ³agung.winarno.fe@um.ac.id,

⁴subagyo.fe@um.ac.id

*Correspondence Email: hilwa.rohmahdiniyah.2504138@students.um.ac.id

Abstract: This study aims to analyze the role of logic in the development of management science and managerial decision-making. This study uses a qualitative research method with a literature review approach. The research population includes scientific articles, books, and academic publications that discuss the topics of logic, management theory, and decision-making. The research sample was selected purposively based on criteria of relevance, accessibility, and thematic suitability, resulting in a number of literature sources that were analyzed in depth. The research instrument was a literature analysis sheet used to assess the suitability of concepts, clarity of argumentation, and theoretical contributions of each source. The results of the study show that logic plays an important role as the basis of scientific reasoning in constructing management theory, helping to formulate consistent propositions, and supporting a systematic and unbiased decision-making process. Logic has been proven to strengthen the accuracy of problem formulation, consistency of argumentation, and objectivity of analysis in both research and managerial practice. Thus, logic not only functions as a philosophical concept but is also an essential instrument for improving the quality of scientific studies and the effectiveness of decisions in management.

Keywords: Logic, Management, Decision Making, Literature, Scientific Reasoning

INTRODUCTION

Management science continues to evolve in line with the growing need for organizations to make more effective and data-driven decisions. In this process, a coherent, systematic, and contradiction-free mindset is key to ensuring that decisions are not only intuitive but also scientifically accountable. This ability to think in this way is essentially based on the basic principles of logic. As the complexity of the business environment increases, the ability to reason logically becomes increasingly important because managers can no longer rely solely on experience or intuition. They are required to be able to process abundant information, select valid arguments, and draw conclusions that can be tested rationally. Thus, logic is not only a thinking



tool, but also a methodological foundation that enables the decision-making process to be consistent and replicable.

Although logic is often considered part of philosophy, various studies show that logic plays an important role in modern management. Understanding the principles of identity, non-contradiction, and the excluded middle helps managers construct consistent arguments, avoid contradictory conclusions, and produce clearer decisions. Ruisli et al., (2025) explain that the ability to understand logic is directly related to the effectiveness of managerial decision-making, especially when those decisions involve complex data and strategic considerations (Ruisli et al., 2025).

In the context of the information age, the role of logic is increasingly important. Andaryanto et al. (2024) emphasize that the principles of logic form the basis of scientific reasoning in filtering, analyzing, and evaluating today's rapidly disseminated information. Without logic as a foundation, organizations can get caught up in emotional, biased, or inconsistent decision-making. The application of logic is also closely related to critical thinking. Puling et al. (2024) examined how critical thinking built on logic can improve decision-making skills to be more mature, rational, and sustainable (Puling et al. 2024). With critical thinking, managers can evaluate alternatives more objectively, assess risks, and avoid careless decisions. In addition, recent studies also reinforce that logic has a real contribution to the managerial process, not only as a philosophical concept, but as a practical skill that can improve the quality of organizational decisions.

In addition, research conducted by Puspita & Andriani, (2019) shows that logical reasoning has a direct effect on the accuracy of decisions in the audit process. They explain that the ability to use logic not only helps auditors assess evidence more systematically, but also reduces the tendency to make analytical errors due to bias or carelessness. With a more coherent thought structure, auditors are able to distinguish between relevant and irrelevant information, resulting in more accurate and professionally accountable decisions. Therefore, this research is highly relevant: by reviewing the relevance of logical principles as the basis of scientific thinking, we can reveal the extent to which logic contributes to the development of management theory and daily managerial practices. The application of logic not only strengthens theory, but also serves as a practical instrument for organizations to make rational, structured, and evidence-based decisions.



The basic principles of logic are the main foundation in the scientific thinking process because they ensure that reasoning is consistent, valid, and free from contradictions. Since the time of Aristotle, the principle of identity, the principle of non-contradiction, and the principle of the excluded middle have been used as standard guidelines in the structure of argumentation, whereby every concept must retain its meaning, every proposition cannot be both true and false at the same time, and there is no third possibility between true and false (Aristotle, 2016). These principles were later clarified in modern logic through formal analysis of validity, soundness, and the structure of inference, as explained by Copi (1961), who emphasized that the relationship between premises and conclusions must follow a pattern of reasoning that is rationally accountable. Further developments were made by Tarski (1941), who introduced a deductive methodological approach and the concept of truth values in formal logic, making logic not only a tool for thinking, but also a mathematical system that can be rigorously tested. Therefore, the basic principles of logic are not only a legacy of classical philosophy but also an important pillar for every discipline that demands precision in thinking, including in the development of management science, scientific research, and decision-making processes.

Scientific thinking in management refers to the use of a rational, systematic, and evidence-based approach in understanding organizational issues and determining the most appropriate alternative solutions. This approach requires managers to make objective observations, clearly formulate problems, collect relevant data, and draw conclusions based on verifiable analysis. Daft (2015) emphasizes that the effectiveness of decision-making in management is highly dependent on the ability to use information accurately and avoid assumptions without empirical basis. In line with this, Schermerhorn (2012) asserts that scientific thinking helps managers reduce cognitive bias and improve the quality of decisions through a coherent and transparent analysis process. In the context of management research, Bryman (2008) explains that scientific thinking involves theoretical verification through hypothesis testing, data analysis, and critical evaluation so that the knowledge produced is truly academically accountable. Thus, the application of scientific thinking not only improves the quality of managerial decisions but also makes management a discipline that is methodologically sound, objective, and relevant in dealing with the complexities of modern organizations.



Management as a scientific discipline cannot be separated from the role of logical reasoning because every decision-making process, strategy formulation, and performance evaluation requires a systematic and rationally testable structure of thinking. The principles of logic help managers filter information, build valid arguments, and avoid errors in thinking that can interfere with organizational effectiveness. Robbins and Coulter (2016) emphasize that the ability to reason logically is at the core of modern management effectiveness because good decisions always start from the evaluation of accurate information. In addition, Drucker and Maciariello (2008) also emphasizes that the basis of effective managerial action is clear, coherent, and logical thinking before execution. In line with this, Kerlinger (1973) explains that scientific thinking is part of management practices that require the use of logical principles in formulating cause-and-effect relationships and developing testable theories. Therefore, management as a discipline based on logical reasoning requires intellectual rigor, objectivity, and the ability to construct valid arguments so that every decision made can truly be scientifically justified.

METHOD

This study uses a qualitative approach with a literature review method because the main objective of the study is to analyze the role of logic in the development of management science and decision making. The research population includes all academic literature discussing logic, management theory, scientific thinking, and decision making, ranging from national and international journal articles, textbooks, to scientific proceedings. From this population, samples were determined using purposive sampling techniques, namely selecting relevant, credible sources published in the last ten years, except for classical literature that has made fundamental contributions.

The research process was conducted through systematic searches of primary and secondary sources containing discussions on the principles of logic, scientific epistemology, and management theories. The literature was then analyzed through the stages of concept clarification, argumentative evaluation, and logical coherence assessment to identify how the principles of logic work as the foundation of scientific thinking. Furthermore, this study compiled a synthesis by comparing logical thinking structures with decision-making processes, theory development, and analytical models in management science. This approach allowed researchers to assess the extent



to which logical principles remain relevant, undergo adjustments, or even become an irreplaceable foundation in the methodological and theoretical development of management.

RESULT AND DISCUSSION

The Principle of Logic in the Formation of Management Theory

In management science, theories cannot simply appear out of nowhere. A theory needs to be constructed with a correct, orderly, and logical mindset. Therefore, the principle of logic is important in constructing a theory. Logic can help researchers understand the relationship between one idea and another, thereby providing an explanation as to why a managerial event can occur.

The scientific thinking process begins with a proposition or statement that can be evaluated as true or false. An example is the statement “Motivation improves performance,” which is a proposition. With this proposition, researchers can construct a logical argument and develop a theory. In management, this is done through two main ways of thinking, namely deduction or thinking from the most general to the specific, and induction or thinking from a specific fact to make a general conclusion. These two types of reasoning can help to ensure that a theory is not only reasonable, but also testable (Lubis et al., 2023).

Research conducted by Hendri (2024) found that understanding logic, such as propositions, how to draw conclusions, and argument structure, greatly assists researchers in formulating hypotheses, analyzing data, and drawing accurate conclusions from research results. This means that without logic, management theories may be inaccurate, unsystematic, or based solely on personal opinion.

Aninda (2025) also explains that logic has several important principles, such as analogy, syllogism, deduction, and induction, all of which can help researchers produce new knowledge that is more rational and reliable. In management practice, logical thinking can be seen when a manager compares situations, makes decisions based on facts, and draws conclusions based on the patterns they see.

Simply put, the formation of management theory is supported by the principles of logic in several ways:

- Develop a clear initial statement (proposition)
- Combine concepts and facts in a logical manner



- Draw a testable conclusion
- Keep a theory objective, free from the influence of emotions or personal opinions

Without logic, management theory would be weak and unable to explain why certain decisions or organizational behaviors occur. With logic, management theory can develop into a stronger, more organized, and useful science.

Logic as the Basis of Scientific Methods in Management Research

In management research, logic is the main pillar used for thinking in an orderly, systematic, and accountable manner. Logic helps researchers understand problems clearly, construct reasonable arguments, and draw conclusions based on existing evidence rather than assumptions or intuition. In scientific research, logic works through deductive and inductive thinking, namely by drawing conclusions from a theory to data, and from facts to generalizations. This research methodology book explains that the scientific method always involves a systematic, critical, and objective process, which in fact cannot be done without strong logical thinking skills (Tahir et al., 2023).

Management research deals with quite complex situations, such as responsibility for decision-making, risk management, strategy formulation, and organizational problem-solving. Therefore, logic is important to avoid bias, misjudgment, and conclusions that are not based on facts. For example, an article on mathematical logic demonstrates an understanding of logic, both propositional and predicate, which can help managers make more effective decisions because they can assess alternatives objectively and minimize errors in thinking (Ruisli et al., 2025).

There are studies on logic and rationality that confirm that rational and logical leaders are better able to assess information, consider consequences, and make decisions that are consistent with organizational goals (Aninda, 2025). In this case, logic plays a role through four main principles, namely deduction, induction, analogy, and syllogism. These four principles serve as mental tools to help researchers and managers assess data, test arguments, and ensure that the decisions or findings of a study are not erroneous.

In scientific methodology, logic is used from the very beginning of the research process, namely problem formulation, hypothesis development, method selection, and conclusion drawing. In the scientific methodology book by (Tahir et al., 2023), it is emphasized that good research needs to be objective, systematic, and rational, which relies on proper logic. Without logic, data



cannot be processed correctly, research results will be difficult to trust, and managerial recommendations will be weak. Therefore, logic is not only the basis of scientific thinking, but also the foundation for applying research findings to everyday management practices.

Simply put, logic serves as a bridge between data and decisions, theory and managerial actions. Logic ensures that every step of management research is carried out in a focused manner, can be tested, and produces knowledge that can be accounted for. Thus, logic forms the basis of the scientific method in management research. Without logic, research would merely be subjective opinion without convincing evidence.

The Role of Logic in Managerial Decision Making

Logic plays a significant role in the process of making managerial decisions, as it helps managers to think in an orderly, objective, and reasonable manner before taking action. The decision-making process is described as a series of steps, starting from problem identification, information gathering, alternative development, option evaluation, to implementation and further evaluation (Saputra et al., 2024). Many organizational decisions fail not because of a lack of alternatives, but because of errors in identifying the problem from the outset. Thus, logic can help managers distinguish between the symptoms and root causes of a problem, so that the resulting decisions are more targeted (Mahsuni et al., 2025).

To deal with an uncertain business environment, logic is also needed as a risk control tool. Research conducted by Zerlinda et al., (2024) explains how fuzzy logic and AHP are used to help MSMEs make more accurate decisions even when the available information is ambiguous or incomplete. This is in line with research conducted by Saputra et al., (2024), which explains that managers often encounter limited information and time pressure, so that a logical approach can help minimize bias and improve the quality of decisions amid these limitations.

Logic can help individuals better understand data, thereby becoming more objective. Logical reasoning training can help auditors and students make better decisions, assess evidence, understand cause-and-effect relationships, and draw correct conclusions. This shows that logic not only helps in the systematic decision-making process, but also helps with the cognitive abilities needed to make valid and accountable decisions (Puspita & Andriani, 2019).

In a managerial context, logic can help managers to:

1. Understand problems clearly



2. Choose solutions rationally based on data
3. Reduce the risk of error
4. Deal with uncertain and more measurable conditions
5. Consistently improve the quality of decisions

Therefore, logic is not only a thinking tool, but also an important skill for every manager so that the decisions made can be more accurate, effective, and beneficial to the organization.

CONCLUSION

This study confirms that the principles of logic play a fundamental role in the development of management science and managerial decision-making practices. Logic serves as the foundation of scientific thinking, making the reasoning process systematic, free of contradictions, and accountable. In the formation of management theory, logic enables researchers to formulate clear propositions, construct valid arguments, and draw conclusions that can be tested through scientific methods. In the context of management research, logic underpins all scientific stages, from formulating problems, developing hypotheses, selecting methods, to producing objective conclusions. Without logic, research risks becoming subjective, biased, and methodologically weak.

For managerial practice, logic has been proven to play an important role in improving the accuracy of problem identification, assessing decision alternatives, reducing bias, and dealing with uncertainty in a more measurable way. Logic helps managers think clearly, understand cause-and-effect relationships, and make decisions based on data, not just intuition. Thus, logic is not only a philosophical concept, but also a practical instrument that strengthens the quality of theory, research, and decision-making in management. The application of logic makes management more rational, consistent, and relevant in dealing with the complexities of modern organizations.

REFERENCE

- Andaryanto, A., Santoso, J. W., & Winarno, A. (2024). *Prinsip dan Peran Logika sebagai Dasar Penalaran Ilmiah di Era Informasi*. Dewantara: Jurnal Pendidikan Sosial Humaniora, 3(4), 189–198. <https://doi.org/10.30640/dewantara.v3i4.3524>
- Aninda, L. (2025). Logika dan Rasionalitas dalam Ilmu serta Implikasinya dalam Pengambilan



- Keputusan Sebagai Pemimpin : Systematic Literature Review. *Journal of Innovation in Teaching and Instructional Media*, 5(2), 479–489.
- Aristotle. (2016). *The Organon* (R. B. Jones, Ed.). ISBN-10: 1478305622. ISBN-13: 978-1478305620.
- Bryman, A. (2008). *Social research methods*. Oxford University Press. Retrieved from https://archive.org/details/socialresearchme0000brym_o2i8
- Copi, I. M. (1961). *Introduction to logic* (2nd ed.). Macmillan. Retrieved from <https://archive.org/details/introductiontolo0014copi>
- Daft, R. L. (2015). *Management* (12th ed.). Cengage Learning.
- Drucker, P. F., & Maciariello, J. A. (2008). *Management* (Rev. ed.). Collins.
- Hendri, Z. (2024). Peran Logika Dan Penalaran Ilmiah Mahasiswa Studi Kasus : Mahasiswa S1 Manajemen Angkatan Tahun. *Jurnal Cakrawala Akademika (JCA)*, 1(4).
- Kerlinger, F. N. (1973). *Foundations of behavioral research* (2nd ed.). Holt, Rinehart and Winston. Retrieved from https://archive.org/details/foundationsofbeh0000kerl_x7k9
- Lubis, N. S., Farleni, F., Juansah, D. E., & Nulhakim, L. (2023). Proposisi , Logika dalam Berpikir Sebagai Dasar Penalaran Ilmiah dalam Menghasilkan Pengetahuan Baru. *Jurnal Filsafat Indonesia*, 6(2), 276–283.
- Mahsuni, A. W., Astutik, P., Musyarrofah, H., & Akbar, A. (2025). Filosofi Manajemen : Keterampilan Pemecahan Masalah Dan Pengambilan Keputusan Dalam Organisasi. *Jurnal Rumpun Manajemen Dan Ekonomi*, 2(2), 1–8.
- Puling, H., Manilang, E., & Lawalata, M. (2024). Logika dan berpikir kritis: Hubungan dan dampak dalam pengambilan keputusan.
- Puspita, L. M. N., & Andriani, S. (2019). Pengaruh Penalaran Logis terhadap Kemampuan Membuat Keputusan dalam Proses Audit. *Jurnal Riset Terapan Akuntansi Politeknik Negeri Sriwijaya*, 3(1), 11–21.
- Robbins, S. P., & Coulter, M. A. (2016). *Management* (13th ed.). Pearson.
- Ruisli, M., Pradana, B. L., Brotosaputro, G., & Ramirez, S. (2025). Analysis of the Relationship Between Understanding Mathematical Logic and Managerial Decision-Making Effectiveness. *APTISI Transactions on Management (ATM)*, 9(1), 40–49.
- Saputra, A. A., Situmorang, G. F., Hidayat, R., & Kusumasari, I. R. (2024). Proses Pengambilan



Keputusan yang Diterapkan dalam Organisasi dan Manajemen. *Journal of Indonesian Management*, 4(3), 1–8.

Schermerhorn, J. R., Jr. (2012). *Management* (12th ed.). Wiley Global Education.

Tahir, R., Anggraeni, A. F., Thamrin, S., Yulianti, M. L., Lestari, W., Wahidah, A. N., Hidayah, A. J., Sa'dianoor, Pranata, A., Sari, N., Indahyani, T., Misno, Prisuna, B. F., Pangestuti, R., Rahman, R., Leuwol, F. S., & Patria, T. M. (2023). *Metodologi Penelitian* (Efitra & Sepriano (eds.); 1st ed.). PT. Sonpedia Publishing Indonesia.

Tarski, A. (1941). *Introduction to logic and to the methodology of deductive sciences* (O. Helmer, Trans.). Oxford University Press. Retrieved from <https://archive.org/details/in.ernet.dli.2015.471634>

Zerlinda, F. M., Zaidan, M. Z., Akifah, N., Devrida, S. P., & Sinaga, H. D. (2024). Analisis logika Fuzzy Sugeno dan Pengambilan Keputusan untuk meningkatkan produksi roti manis pada Tandi ' s Homemade Bakery. *JUTIN : Jurnal Teknik Industri Terintegrasi*, 7(4), 2539–2551. <https://doi.org/10.31004/jutin.v7i4.37688>