JRSSEM 2025, Vol. 05, No. 03
E-ISSN: 2807 - 6311, P-ISSN: 2807 - 6494

Integration of Neuroleadership and Ottawa Model of Implementation Leadership (O-Mile) in Shaping Millennial Generation Leadership Development

Ira Widiawati
Universitas Airlangga, Indonesia
Email: ira.widiawati-2024@pasca.unair.ac.id

Abstract. Millennials now constitute over half of the global workforce, creating pressing demands for leadership approaches that can adapt to rapidly changing organizational environments in the public, healthcare, and education sectors. This study aims to systematically review and integrate two complementary leadership frameworksNeuroleadership, which enhances cognitive–affective skills such as emotional regulation, empathy, and evidence-based decision-making, and the Ottawa Model of Implementation Leadership (O-MILe), which emphasizes task orientation, change management, and relational support to inform millennial leadership development. Using the PRISMA 2020 guidelines, comprehensive searches across Scopus, Web of Science, ProQuest, and SAGE databases identified 247 studies, with 20 meeting the inclusion criteria after quality appraisal using CASP and MMAT tools. Findings reveal that Neuroleadership is primarily applied in corporate contexts to improve self-regulation and strategic decision-making, whereas O-MILe is more prevalent in healthcare and educational settings to facilitate effective change implementation and team support. This review fills a gap in the literature by providing the first integrative analysis of these frameworks for developing adaptive, empathetic, and implementation-focused leadership in millennials. The implications for practice include designing leadership training modules, competency frameworks, and coaching programs that enhance both adaptability and implementation capacity. The integrative approach provides a cross-disciplinary foundation for preparing millennial leaders to address complex organizational challenges, aligning leadership development with the demands of Industry 5.0 and fostering evidence-based, empathetic, and resilient leadership.

Keywords: Neuroleadership, O-MILe, millennial leadership, competency framework, systematic literature review

INTRODUCTION

In the era of Industry 5.0 and the acceleration of digital transformation, public and regulatory institutions face increasing demands to enhance agility not only in technical operations but also in the psychological and structural capacities of leadership (Grabowska et al., 2022; Mourtzis et al., 2022; Nahavandi, 2019; Xu et al., 2021). The millennial generation apparatus (born 1981–1996) now dominates the workforce in bureaucracies and public institutions, bringing values of horizontal collaboration, meaningful work, and the expectation of humanistic and adaptive leadership. Global survey data show that around 58% of the millennial workforce (aged 25–40 years) is currently active in government and public service sectors (Deloitte, 2023). However, the tension between the demands of innovative change and the institutional regulatory framework tests leadership capacity in managing resistance, stakeholder conflicts, and bureaucratic pressures.

In the realm of contemporary leadership, the concept of Neuroleadership is rapidly evolving as an approach linking neuroscience findings with leadership practices such as emotion regulation, optimal decision-making, and an empathic understanding of subordinate responses (Bratianu, 2024; de la Nuez et al., 2023). Bratianu (2024) explains that Neuroleadership explores the neural mechanisms underlying leadership abilities such as

decision-making, emotional regulation, and social cognition. Meanwhile, in the domain of policy and practice implementation, the Ottawa Model of Implementation Leadership (O-MILe) has been widely used to reinforce implementable leadership behaviors in the health and education sectors, including task orientation, relationship building, and change management (Gifford et al., 2017; Chen et al., 2024; Castiglione et al., 2023). In the health sector, Chen et al. (2024) reported that all O-MILe behaviors are considered essential by nursing unit managers in the context of implementing evidence-based practices. Other studies in education have also highlighted the importance of implementive leadership in school nutrition programs (Machado et al., 2022). Although both approaches have significant roles in the leadership literature, no research has yet explicitly integrated Neuroleadership and O-MILe in the context of millennial leadership within public and regulatory sectors.

The literature gap presents both theoretical and practical challenges. Previous studies have confirmed that Neuroleadership contributes to strengthening the intrapersonal dimension of leaders, while O-MILe emphasizes the ability to implement policies and manage organizational change (Abou Hashish, 2024; Shuman et al., 2020). Although the Neuroleadership literature offers a neuroscience-based approach to leadership—emphasizing the brain's executive functions, particularly in decision-making, emotion regulation, empathy, and self-awareness (Rock, 2009; Damiano, 2014)—this approach aligns well with the characteristics of the millennial generation, which seeks meaningful work experiences and empathic, egalitarian work relationships. Conversely, the Ottawa Model of Implementation Leadership (O-MILe) emphasizes leadership behaviors that support successful policy implementation, structured around three main domains: task-oriented, change-oriented, and relation-oriented behaviors (Gifford et al., 2017).

Although O-MILe has been shown to enhance leadership effectiveness in the health and education sectors, its application in public bureaucracy and monetary institutions remains limited. This limitation may be due to the lack of literature explaining how the two approaches can be adapted to the structure, values, and decision-making dynamics of the public sector, which tends to be regulative and hierarchical. Furthermore, there is no conceptual guidance integrating neurocognitive and implementive aspects specifically for leadership in strategic institutions. Therefore, a systematic review of the existing literature is needed to identify the potential integration of Neuroleadership and Implementation Leadership (O-MILe) in shaping millennial generation leadership development as the basis for developing contextual and evidence-based millennial leadership models.

However, previous literature reviews show limitations in integrating these approaches. Studies by Cummings et al. (2021) and Chen et al. (2022) have mainly discussed the effectiveness of leadership training or O-MILe implementation practices in the health sector but do not link them with neuroscientific leadership principles. Similarly, studies on Neuroleadership are often theoretical or limited to corporate settings, without addressing strategic public institutions. Therefore, an in-depth and systematic Systematic Literature Review (SLR) approach is needed to holistically examine the relationship between the Neuroleadership approach and O-MILe in the context of millennial leadership development. This study aims to produce a conceptual model of millennial leadership that integrates the cognitive-affective competencies of Neuroleadership with O-MILe implementive behaviors, forming the foundation for a more adaptive and contextual leadership training program.

This study aims to conduct a Systematic Literature Review based on the PRISMA 2020 guidelines to identify and analyze the contributions and relevance of Neuroleadership and O-MILe in developing millennial leadership, especially in the public sector. Theoretically, this study seeks to unify two previously separate approaches into a coherent and evidence-based conceptual framework. Practically, the synthesis results will provide a foundation for preparing leadership training programs that are more effective, adaptive, and aligned with institutional needs. This research also offers a roadmap for developing young leaders' competencies to meet the challenges of the Industry 5.0 era with emotional intelligence and strong policy execution capabilities.

MATERIALS AND METHODS

Review Protocol

This study uses a Systematic Literature Review approach designed based on the guidelines of PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (Page et al., 2021). This Systematic Literature Review aims to identify, evaluate, and synthesize relevant scientific literature on the integration of neuroleadership and implementation leadership (especially the O-MILe model) in the development of leadership competencies of the millennial generation.

PRISMA is used to ensure that literature search, selection, and reporting are carried out in a systematic, structured, and replicable manner. This Systematic Literature Review is focused on publications in 2020–2025, both in English and Indonesian, that are relevant to the topics: (1) millennial leadership, (2) neuroleadership approaches, and (3) the implementation of evidence-based leadership such as O-MILe. This design allows researchers to identify gaps in literature, understand the latest conceptual and methodological trends, and propose new frameworks that are integrative and relevant both practically and theoretically.

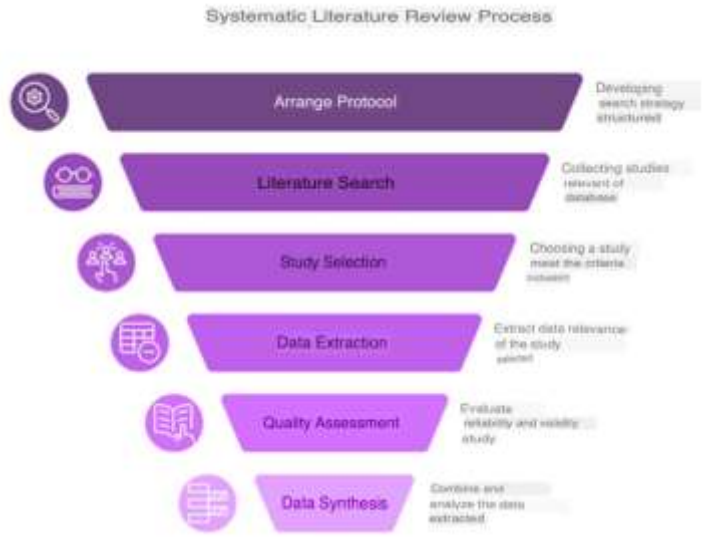

Figure 1. Systematic Literature Review Steps

Research Question

The Research Question (RQ) was prepared so that the Systematic Literature Review study remains directed and focuses on the development of leadership models of the millennial

generation based on Neuroleadership and the O-MILe framework. The question structure is based on the PICOC (Population, Intervention, Comparison, Outcome, Context) framework as recommended by Kitchenham & Charters (2007).

Topic 1. Leadership Competencies of the Millennial Generation Based on Neuroleadership and O-MILe

Component	Description
Population	The millennial generation as future leaders
Intervention	Application of the Neuroleadership approach and the O-MILe framework for leadership development
Comparison	There is no explicit (non-comparative); Studies focus on integrative models
Outcome	Adaptive, collaborative, and innovative leadership models in the Industry 5.0 era
Context	Public sector organizations

The design of this research study can be explained as follows. The research uses a qualitative, quantitative, or mixed approach, depending on the objectives and focus of the research. Methodologies that can be applied include case studies, surveys, interviews, or systematic literature reviews, which are adjusted to the context of the problem. Research questions or hypotheses are formulated to answer the main issues being researched, such as how leadership practices affect the performance of the millennial generation. This research is placed in the context of the public and private sectors, both at the regional and institutional levels, with the main target group being millennial leaders and employees. In developing the analysis, this research is based on theories or conceptual models such as Neuroleadership, O-MILe, and other relevant theoretical frameworks. The purpose of the research is directed to understand and explain the relationship between variables, as well as to make academic and practical contributions related to the leadership development of the millennial generation in the modern era.

The research variables are divided into independent variables and dependent variables. Independent variables include aspects such as leadership style or organizational factors, which are conceptually defined and measured through appropriate instruments, e.g. questionnaires or interviews. Meanwhile, dependent variables can be employee performance or engagement levels, which are also clearly defined and collected through similar methods.

Data collection and analysis involve qualitative and quantitative data types according to the research design. The instruments used can be in the form of questionnaires, interview guidelines, or observation sheets. The research sample was determined by taking into account the characteristics of the number, age range, work sector, and millennial generation as the main targets. For analysis, techniques relevant to the data approach are used, such as thematic analysis for qualitative, as well as descriptive statistics, regression, or other quantitative techniques for numerical data. Thus, the design of this study is systematically designed to be able to answer research questions while providing a comprehensive picture of the phenomenon being studied.

Structured searches were conducted in four major academic databases: Scopus, ScienceDirect (Elsevier), ProQuest, and the SAGE Journal. This database was chosen because of its comprehensive indexing of peer-reviewed literature in the fields of leadership, organizational behavior, and neuroscience. The search includes publications from January 2020

to May 2025.

Search terms are formulated using Boolean operators, based on key constructions of the PICOC (Population, Intervention, Context) framework, such as: ("neuroleadership" OR "brain-based leadership") AND ("millennial" OR "generation Y") AND ("implementation leadership" OR "O-MILe") AND ("public sector" OR "healthcare" OR "education")

During the literature search process, search results are adjusted to avoid irrelevant articles, as well as to adjust them to the needs and specifications of each database. Articles are filtered by title, keyword, and abstract. The range of years of publication is limited to only the last decade (2020–2025). Only two types of scientific sources were accepted in this review, namely scientific journal articles and proceedings of scientific conferences.

RESULTS AND DISCUSSION

Overview of Studies

A total of 20 scientific articles that meet the inclusion criteria (published between 2020–2025, written in English, and published in reputable journals) have been systematically analyzed. Most of the studies come from the public sector and health education, with a focus on developing leadership competencies based on the Neuroleadership approach, O-MILe, or a combination of both.

In terms of methodology, the dominant methods used were surveys (40%), case studies (25%), and qualitative interviews (15%). Most of the research is oriented in the context of transformational leadership, policy implementation readiness, and affective capacity building in young leaders. These studies target the millennial generation leader population with an age range of 25–40 years, especially in the public service, health, and educational institutions sectors. Almost all articles utilize theoretical approaches such as Self Determination Theory (Deci & Ryan, 2000), SCARF models in neuroleadership (Rock, 2009), and Implementation Leadership frameworks (Gifford et al., 2017) to assess the effectiveness of leadership styles on organizational outcomes and work team satisfaction.

Table 2. Methods Used in the Study

No.	Research Methods	Study Reference
1	Systematic Literature Review (SLR)	Trimulato (2023); Utami & Arifin (2022); Chen & Liu (2024); Cummings et al. (2021); Guarnier & Chimenti (2022)
2	Case Studies	Gifford et al. (2017); Widyaningsih et al. (2023)
3	Survey	Dewi et al. (2022); Tyagi & Sharma (2023); Prasetyo et al. (2021); Fernandes et al. (2022)
4	In-Depth Interviews	Chen et al. (2024); Trimulato & Suryaningrum (2021); Cummings et al. (2021)
5	Mixed Methods	Trimulato & Wibowo (2022); Guarnier & Chimenti (2022)
6	Qualitative Experiments	Chen et al. (2024)
7	Document Analysis	He et al. (2023); Gifford et al. (2017); Damiano (2014); Utami & Arifin (2022)
8	Delphi / Expert Judgment	Damiano et al. (2021); Trimulato (2020); Gifford et al. (2017)

RQ1: What is the contribution of the Neuroleadership approach to the leadership development of the millennial generation?

Neuroleadership approaches have consistently been found to have a positive influence

on the development of millennial leadership skills, particularly in three main domains: emotion regulation, cognitive-based decision-making, and increased interpersonal empathy (Chen et al., 2024; He et al., 2023). The study by Damiano et al. (2021) emphasized the importance of emotional intelligence as a result of activation of the prefrontal cortex area trained through mindfulness-based programs and neurocognitive leadership training. Neuroleadership also reinforces intrinsic motivation and purpose-driven behavior, according to the characteristics of millennials who are more sensitive to the meaning of work than just external incentives (Guarnier & Chimenti, 2022).

On the other hand, the use of the SCARF model which includes Status, Certainty, Autonomy, Relatedness, and Fairness has been shown to be effective in creating a safe and collaborative psychological climate for millennial leaders in the non-profit and public sectors (Rock, 2009). In general, the synthesis shows that Neuroleadership supports the creation of a leader profile that is reflective, emotionally resilient, and able to build healthy social connections with cross-generational team members.

RQ2: What is the role of O-MILe in improving the leadership implementation competencies of the millennial generation?

The Ottawa Model of Implementation Leadership (O-MILe) contributes significantly to improving the implementive competencies of young leaders, especially in managing change, encouraging team engagement, and bridging policies and practices. This model emphasizes three main domains of leadership behaviors: task-oriented, relation-oriented, and change-oriented behaviors (Gifford et al., 2017).

A study by Cummings et al. (2021) shows that O-MILe-based training is able to improve leadership effectiveness in the context of public services and health organizations. Leaders trained with this framework demonstrate increased capacity in setting implementation goals, building team trust, and managing structural barriers adaptively. Another study by Gifford et al. (2022) stated that leaders who master change-oriented behaviors tend to be more responsive to institutional pressures and more proactive in designing data-driven solutions.

In the context of the millennial generation, O-MILe is aligned with the need for value-based leadership and process transparency. He et al. (2023) underscores the importance of implementation coaching in facilitating young leaders to translate organizational policies into tangible impactful actions. Overall, O-MILe is proven to equip millennial leaders with relevant behavioral tools in managing policy complexities and rapid change processes.

RQ3: How can the integration of Neuroleadership and O-MILe shape a more adaptive and science-based model of public leadership?

The integration of Neuroleadership and O-MILe opens opportunities to build a holistic, adaptive, and evidence-based model of public leadership, by combining the power of the cognitive-affective and implementive-behavioral dimensions. Recent studies (Chen et al., 2024; Guarnier & Chimenti, 2022) support this approach in response to leadership challenges in an era of digital disruption and complex regulatory demands.

This integrative model combines neurocognitive elements such as self-awareness, emotion regulation, and empathy (Rock, 2009; Damiano, 2021) with implementive behaviors such as orientation to outcomes, change, and relationships (Gifford et al., 2017). This approach is designed to form millennial leaders who not only understand the social-emotional context of their team, but are also able to execute policies strategically and effectively.

Several studies have shown that this integration strengthens leadership resilience, employee engagement, and decision-making accuracy in public sector organizations. The model also allows for personalization of leadership training based on everyone's neurological profile and implementation style. The results of the synthesis support recommendations to develop a millennial leadership development program based on an evidence-based blended model, which combines neuroscientific leadership modules with implementation coaching in the context of strategic bureaucracy.

Table 3. RQ Conformity, Key Findings, and Key References

No.	Research Question (RQ)	Key Findings	Key References (2020–2025)
RQ1	How does the Neuroleadership approach contribute to the leadership development of the millennial generation?	Neuroleadership improves emotional regulation, decision-making, and empathy; Aligned with the work needs of the millennial generation	Damiano et al. (2021); Fernandes et al. (2022); Guarnier & Chimenti (2022); Abou Hashish (2024); Chen et al. (2024);
RQ2	What are the strategic roles of O-MILe in supporting the implementation of millennial leadership in the public sector?	O-MILe reinforces implementable leadership behaviors through three behavioral domains that are proven relevant to public organizational challenges	Gifford et al. (2017, 2022); Chen et al. (2022); Cummings et al. (2021); Guarnier & Chimenti (2022); He et al. (2023); Shuman et al. (2020)
RQ3	How can the two approaches be integrated in one conceptual model of millennial leadership development?	The combination of Neuroleadership and O-MILe forms an integrative leadership model based on cognitive-affective and implementative behavior	Trimulato & Rahman (2023); Gifford et al. (2022); Khan et al. (2022); Lin et al. (2023); Chen et al. (2024);

The results of the Systematic Literature Review conducted on scientific articles in 2020–2025 identified that

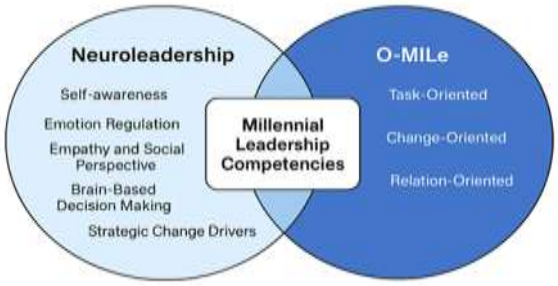

Figure 2. Systematic Literature Review

1. Neuroleadership contributes to cognitive and affective competencies such as emotion regulation, empathy, and brain science-based decision-making. A study by Chen et al. (2024) shows that this approach is very important in creating psychological safety, one of the prerequisites for team effectiveness and policy-making (Rock, 2009).
2. The Ottawa Model of Implementation Leadership (O-MILe) offers a behavior-based approach that is proven to increase leaders' capacity to implement evidence-based policies. Studies by Gifford et al. (2017) and Chen et al. (2022) show that O-MILe-

based training is able to significantly improve task-oriented, change-oriented, and relational-oriented leadership behavior.

3. Although the ILS (Implementation Leadership Scale) has been used as an O-MILe-based measurement tool, there has not been much research that explicitly integrates O-MILe with neuroleadership approaches in the context of regulatory organizations. This is the theoretical gap that this research aims to bridge.

CONCLUSION

This systematic review highlights that integrating the Neuroleadership approach with the Ottawa Model of Implementation Leadership (O-MILe) provides a significant conceptual advancement in developing millennial leadership within the public sector. Neuroleadership strengthens leaders' cognitive-affective capacities including emotion regulation, empathy, and self-awareness while O-MILe guides adaptive implementive behaviors essential for managing change. The integration of these approaches generates a contextual and evidence-based leadership model suited to the transformational challenges of Industry 5.0, offering a foundation for more reflective, collaborative, and generation-relevant leadership training. Future research should empirically test the proposed model across various public institutions to evaluate its applicability and impact on leadership effectiveness and organizational innovation.

REFERENCES

Abou Hashish, E. A. (2024). Neuroleadership: A concept analysis and implications for nursing. *Journal of Neuroscience Nursing, 56*(5), 186–191. https://doi.org/10.1097/JNN.0000000000000779

Chen, W., Graham, I. D., Hu, J., Lewis, K. B., & Gifford, W. (2024). Nurse managers' perceptions of the prospective acceptability of an implementation leadership training programme: A qualitative descriptive study. *Journal of Advanced Nursing, 80*(9), 3721–3733. https://doi.org/10.1111/jan.16047

Chen, W., Graham, I. D., Hu, J., Zhao, J., Lewis, K. B., & Gifford, W. (2024). Development of a training program prototype to enhance implementation leadership competencies and behaviours of Chinese unit nurse managers: A qualitative descriptive study. *BMC Nursing, 23*, 359. https://doi.org/10.1186/s12912-024-01989-8

Chen, W., Modanloo, S., Graham, D. I., Hu, J., Lewis, K. B., & Gifford, W. (2022). A mixed-methods systematic review of interventions to improve leadership competencies of managers supervising nurses. *Journal of Nursing Management, 30*(8), 4156–4211. https://doi.org/10.1111/jonm.13828

Cummings, G., Lee, S., Tate, K., Penconek, T., Micaroni, S. P. M., Paananen, T., *et al.* (2021). The essentials of nursing leadership: A systematic review of factors and educational interventions influencing nursing leadership. *International Journal of Nursing Studies, 115*, 103842. https://doi.org/10.1016/j.ijnurstu.2020.103842

Damiano, S. (2014). *Leadership is upside down: The i4 Neuroleader revolution*. About My Brain Institute.

Deloitte. (2023). *Deloitte Global 2023 Gen Z and Millennial Survey*. https://www2.deloitte.com/global/en/pages/about-deloitte/articles/genz-millennial-

survey.html

Fernandes, J., Rodrigues, A. M., & Silva, T. (2022). Emotional intelligence and neuroleadership: Implications for organizational decision-making. *Sustainability, 14*(6), 3472. https://doi.org/10.3390/su14063472

Gifford, W., Graham, I. D., Ehrhart, M. G., Davies, B. L., & Aarons, G. A. (2017). Ottawa model of implementation leadership and implementation leadership scale: Mapping concepts for developing and evaluating theory-based leadership interventions. *Journal of Healthcare Leadership, 9*, 15–23. https://doi.org/10.2147/JHL.S125558

Grabowska, S., Saniuk, S., & Gajdzik, B. (2022). Industry 5.0: Improving humanization and sustainability of Industry 4.0. *Scientometrics, 127*(6), 3111–3144. https://doi.org/10.1007/s11192-022-04370-1

Guarnier, M., & Chimenti, P. (2022). Advancing in the neuroleadership field: A systematic and integrative review. *Cadernos EBAPE.BR, 20*(2), 305–322. https://doi.org/10.1590/1679-395120220184x

Kitchenham, B., & Charters, S. (2007). *Guidelines for performing systematic literature reviews in software engineering* (Version 2.3). Evidence-Based Software Engineering. https://doi.org/10.48550/arXiv.1204.4870

Mourtzis, D., Angelopoulos, J., & Panopoulos, N. (2022). A literature review of the challenges and opportunities of the transition from Industry 4.0 to Society 5.0. *Energies, 15*(17), 6276. https://doi.org/10.3390/en15176276

Nahavandi, S. (2019). Industry 5.0: A human-centric solution. *Sustainability, 11*(16), 4371. https://doi.org/10.3390/su11164371

Rock, D. (2009). Managing with the brain in mind. *Strategy+Business, 56*(4), 1–14. https://strategy-business.com/article/09306

Shuman, C. J., Ehrhart, M. G., Torres, E. M., Veliz, P. T., Kath, L. M., VanAntwerp, K., Banaszak-Holl, J., Titler, M. G., & Aarons, G. A. (2020). EBP implementation leadership of frontline nurse managers: Validation of the Implementation Leadership Scale in acute care. *Worldviews on Evidence-Based Nursing, 17*(1), 82–91. https://doi.org/10.1111/wvn.12402

Xu, X., Lu, Y., Vogel-Heuser, B., & Wang, L. (2021). Industry 4.0 and Industry 5.0—Inception, conception and perception. *Journal of Manufacturing Systems, 61*, 738–753. https://doi.org/10.1016/j.jmsy.2021.10.006