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Modeling Organizational Ambidexterity through Ensemble Learning: Behavioral and Structural Predictors of Exploratory and Exploitative Innovation

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A B S T R A C T

Objective: The objective of this study was to model organizational ambidexterity by applying ensemble machine learning techniques to identify the behavioral and structural predictors of exploratory and exploitative innovation.

Methods and Materials: This explanatory study employed a cross-sectional design involving 487 middle- and senior-level managers from medium and large organizations across major industries in Chile. Data were collected using validated instruments measuring leadership cognitive flexibility, learning orientation, psychological safety, risk tolerance, cross-functional integration, decentralization, resource flexibility, knowledge-sharing systems, and dual innovation outcomes. The analytical framework integrated traditional statistical validation with an ensemble learning architecture composed of Random Forest, Gradient Boosting, XGBoost, and Support Vector Regression models. Model training applied stratified sampling, five-fold cross-validation, and hyperparameter optimization, while performance was evaluated using R^2, RMSE, MAE, and explained variance. Explainable AI techniques based on SHAP were employed to interpret nonlinear relationships and predictor contributions.

Findings: The ensemble model demonstrated superior predictive performance for both exploratory innovation ($R^2 = 0.81$, RMSE = 0.25) and exploitative innovation ($R^2 = 0.84$, RMSE = 0.22), significantly outperforming individual machine learning algorithms. Leadership cognitive flexibility and learning orientation emerged as the strongest predictors of exploratory innovation, whereas cross-functional integration and structural decentralization exerted the greatest influence on exploitative innovation. Psychological safety, risk tolerance, knowledge sharing, and resource flexibility contributed significantly to both innovation dimensions, with SHAP analysis revealing asymmetric and nonlinear interaction effects across predictors.

Conclusion: The results confirm that organizational ambidexterity is a systemic, nonlinear phenomenon driven by the dynamic interaction of behavioral and

structural factors and that ensemble learning provides a powerful methodological approach for modeling this complexity, offering both theoretical advancement and practical guidance for innovation management.

Keywords: *organizational ambidexterity; ensemble learning; exploratory innovation; exploitative innovation; behavioral predictors; structural enablers; machine learning; innovation management*

1 Introduction

In the contemporary competitive landscape characterized by accelerating technological change, market volatility, and organizational complexity, the capacity of firms to simultaneously pursue exploratory and exploitative innovation—commonly conceptualized as organizational ambidexterity—has become a central determinant of long-term sustainability and performance. Organizations increasingly operate under conditions of structural uncertainty, digital disruption, and shifting stakeholder expectations, requiring adaptive mechanisms that allow them to explore new knowledge domains while efficiently exploiting existing competencies (Iman, 2025; Zhang et al., 2021). This dual capability is no longer a strategic luxury but a structural necessity for firms seeking resilience and competitive advantage in turbulent environments (Mehralian et al., 2025; Taleb et al., 2025). Yet despite the extensive theoretical discourse on ambidexterity, empirical understanding of its behavioral and structural antecedents remains fragmented, and traditional analytical approaches struggle to capture the nonlinear, high-dimensional relationships inherent in organizational systems (Lin et al., 2025; Maluche & Orozco, 2023).

Organizational ambidexterity has been widely recognized as a core driver of innovation performance, enabling firms to balance efficiency with adaptability and stability with transformation. Exploratory innovation fosters experimentation, risk-taking, and the pursuit of new technological and market opportunities, while exploitative innovation enhances refinement, efficiency, and incremental improvement of existing processes and products (Chen & Zhang, 2022; Peyravi & Jakubavičius, 2022). The integration of these two modes allows organizations to remain competitive in the short term while simultaneously building future growth trajectories (Mehralian et al., 2025; Taleb et al., 2025). However, maintaining this balance presents formidable managerial and organizational challenges, as the behavioral, cognitive, and structural requirements of exploration often conflict with those of exploitation (Abdulzahra, 2024; Tho et al., 2025).

Recent research increasingly emphasizes that ambidexterity is not merely an outcome of strategic intent but emerges from complex interactions among leadership cognition, employee behavior, organizational structures, and contextual forces. Leadership cognitive flexibility, learning orientation, psychological capital, and proactive personality have been shown to play pivotal roles in shaping innovation ambidexterity at the managerial and team levels (Hill et al., 2023; Tho et al., 2025; Wahid & Ayub, 2024). Leaders capable of navigating paradoxes, embracing uncertainty, and fostering supportive climates enable organizations to reconcile competing demands of exploration and exploitation (Iman, 2025; Mehralian et al., 2025). Behavioral mechanisms such as psychological safety, empowerment, resilience, and motivational alignment further reinforce employees' willingness to engage in innovative behaviors (Alshiha et al., 2024; Cahilo et al., 2023; Hill et al., 2023).

At the same time, structural configurations exert a powerful influence on how ambidexterity unfolds within organizations. Organizational design elements including decentralization, cross-functional integration, knowledge-sharing systems, and resource flexibility provide the infrastructure through which innovative activities are coordinated and sustained (Maluche & Orozco, 2023; Peyravi & Jakubavičius, 2022; Zhang et al., 2021). Digital transformation has further intensified these dynamics by reshaping communication flows, decision processes, and knowledge ecosystems, thereby altering the structural conditions under which innovation occurs (Faraon et al., 2025; Zhang et al., 2021). As organizations adopt artificial intelligence and digital platforms, new forms of organizational learning, collaboration, and cognitive work are emerging, necessitating more sophisticated models for understanding innovation behavior (Faraon et al., 2025; Ye et al., 2025).

Despite these advances, the majority of existing studies rely on linear modeling techniques that assume additive, independent effects of predictors on innovation outcomes. Such approaches are ill-suited for capturing the interactive, nonlinear, and hierarchical nature of organizational phenomena (Lin et al., 2025; Maluche & Orozco, 2023). Behavioral and structural variables interact dynamically across levels of analysis, producing complex causal pathways that traditional regression-based models often fail

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to represent adequately. Recent empirical work increasingly calls for methodological innovation capable of modeling these complex systems with greater precision and explanatory power (Xie, 2025; Xu & Phanniphong, 2025; Ye et al., 2025).

The growing adoption of machine learning techniques in organizational research offers promising opportunities to overcome these methodological limitations. Ensemble learning methods, in particular, combine multiple algorithms to enhance predictive accuracy, model robustness, and generalizability while accommodating nonlinearities and high-dimensional interactions (Lin et al., 2025; Ye et al., 2025). By integrating heterogeneous learners such as random forests, gradient boosting machines, and support vector models, ensemble approaches can reveal hidden patterns and complex dependencies within organizational data that remain inaccessible through conventional analytics (Xie, 2025; Xu & Phanniphong, 2025). This methodological shift aligns with the increasing recognition that organizational systems exhibit properties of complex adaptive systems, where outcomes emerge from interdependent behavioral and structural components (Iman, 2025; Zhang et al., 2021).

Parallel to these methodological developments, behavioral research continues to illuminate the psychological foundations of innovative work behavior. Studies demonstrate that individual innovativeness is shaped by psychological capital, organizational commitment, motivational drivers, and social-psychological mechanisms (Wahid & Ayub, 2024; Xie, 2025; Xu & Phanniphong, 2025). Telepressure, digital overload, and evolving work norms further influence employees' cognitive and emotional states, with significant implications for innovation capacity in digitally mediated workplaces (Faraon et al., 2025; Ye et al., 2025). These findings underscore the necessity of integrating behavioral science insights with advanced analytical frameworks to fully understand how ambidexterity develops in contemporary organizations.

Innovation behavior has also been extensively examined across educational, service, and professional contexts, revealing consistent links between learning orientation, psychological empowerment, and innovative outcomes (Li et al., 2024; SİYahtaŞ & Çakır, 2025; Sofwan et al., 2024). Organizational contexts that foster autonomy, resilience, and continuous learning create fertile ground for ambidextrous capabilities to emerge (Alshiha et al., 2024; Cahilo et al., 2023; Hill et al., 2023). Furthermore, organizational commitment and proactive dispositions strengthen the translation of individual creativity into organizational innovation (Tho et al., 2025; Xu & Phanniphong, 2025). These behavioral drivers interact with structural enablers to form the multi-layered architecture of ambidexterity.

However, the interplay between these behavioral and structural dimensions remains insufficiently integrated within existing ambidexterity research. Much of the literature treats these domains as separate analytical silos, overlooking their reciprocal influence and co-evolution (Lin et al., 2025; Maluche & Orozco, 2023). Moreover, few studies have applied advanced predictive modeling techniques to simultaneously examine these factors within a unified framework. This gap is particularly pronounced in emerging economies and dynamic organizational environments, where innovation ecosystems are rapidly evolving (Abdulzahra, 2024; Peyravi & Jakubavičius, 2022; Taleb et al., 2025).

Recent scholarship increasingly emphasizes the importance of holistic, system-level approaches to understanding innovation and organizational resilience (Iman, 2025; Zhang et al., 2021). Organizational resilience, in particular, has been shown to depend on the organization's ability to integrate exploration and exploitation through adaptive structures, digital transformation, and strategic learning (Taleb et al., 2025; Zhang et al., 2021). These findings further reinforce the need for models capable of capturing the full complexity of ambidextrous systems.

In this context, the present study advances the literature by developing and testing an ensemble learning framework for modeling organizational ambidexterity based on behavioral and structural predictors. By integrating insights from organizational behavior, innovation management, and machine learning, the study offers a comprehensive analytical approach to understanding how organizations cultivate and sustain dual innovation capabilities. The adoption of ensemble modeling enables the identification of nonlinear effects, interaction patterns, and relative importance of predictors with unprecedented precision, thereby addressing longstanding methodological and theoretical gaps in ambidexterity research (Lin et al., 2025; Maluche & Orozco, 2023; Xu & Phanniphong, 2025; Ye et al., 2025).

Furthermore, this study contributes to the growing body of interdisciplinary research at the intersection of behavioral science and computational analytics, responding to calls for more sophisticated methodological toolkits in organizational research (Faraon et al., 2025; Xie, 2025). By grounding the analysis in robust theoretical foundations while leveraging

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state-of-the-art machine learning techniques, the study provides both conceptual clarity and practical relevance for managers, policymakers, and scholars seeking to navigate the complexities of innovation in modern organizations.

The aim of this study is to model organizational ambidexterity by applying ensemble learning techniques to identify and explain the behavioral and structural predictors of exploratory and exploitative innovation.

2 Methods and Materials

The present study adopted a cross-sectional explanatory research design integrating behavioral science, organizational theory, and machine learning modeling to examine the predictors of organizational ambidexterity in Chilean firms. The target population comprised middle- and senior-level managers employed in medium- and large-sized enterprises operating across manufacturing, financial services, logistics, information technology, mining, and telecommunications sectors in Chile. A multi-stage stratified sampling strategy was employed to ensure sectoral representativeness and organizational diversity. Initial stratification was performed according to industry classification based on the Chilean National Economic Activity Framework, followed by proportional random sampling within each stratum. Firms were first contacted through professional associations and business chambers, and organizational consent was obtained prior to participant recruitment. Eligible participants were required to hold supervisory or executive responsibilities with direct involvement in innovation-related decision-making for a minimum of two years to ensure sufficient experiential grounding in exploratory and exploitative activities. A total of 612 managers were invited to participate, of whom 487 provided complete and valid responses, yielding a response rate of 79.6%. The final sample consisted of 58.3% male and 41.7% female participants, with a mean managerial tenure of 8.7 years and an average organizational tenure of 11.2 years. Ethical approval for the study was obtained from the Institutional Research Ethics Committee, and all participants provided informed consent in accordance with international research ethics standards. Data collection was conducted over a four-month period using secure online survey platforms, ensuring confidentiality, anonymity, and voluntary participation.

Data were collected using a comprehensive multi-instrument survey package designed to capture behavioral, structural, and innovation-related constructs with high psychometric rigor. Organizational ambidexterity was operationalized through separate multi-item scales measuring exploratory innovation and exploitative innovation, each assessed using validated instruments adapted from established organizational innovation frameworks. Exploratory innovation items assessed experimentation, risk-taking, technological search, and pursuit of new market opportunities, whereas exploitative innovation items measured refinement, efficiency improvement, process optimization, and incremental product development. Behavioral predictors included leadership cognitive flexibility, managerial learning orientation, psychological safety, risk tolerance, and employee proactivity, each measured using standardized Likert-type scales with response anchors ranging from strong disagreement to strong agreement. Structural predictors comprised organizational decentralization, formalization, cross-functional integration, resource flexibility, and knowledge-sharing infrastructure, captured through organizational design and management practice inventories. All instruments underwent translation and back-translation procedures to ensure linguistic equivalence for Spanish-speaking participants. A pilot study involving 52 Chilean managers was conducted to refine item clarity, response validity, and cultural appropriateness. Reliability analyses demonstrated strong internal consistency across all constructs, with Cronbach's alpha coefficients exceeding the accepted threshold. Convergent and discriminant validity were further confirmed using composite reliability indices and inter-construct correlation assessments. Control variables included firm size, firm age, industry type, R&D intensity, and market dynamism to isolate the unique effects of behavioral and structural predictors on ambidexterity outcomes.

Data analysis followed a multi-phase analytical framework integrating traditional statistical procedures with advanced ensemble machine learning techniques. Preliminary analyses included data screening, missing value treatment using multiple imputation, outlier detection through Mahalanobis distance, and normality assessment. Descriptive statistics and correlation matrices were computed to establish baseline relationships among variables. Measurement model validation was conducted using confirmatory factor analysis to verify construct structure, factor loadings, and overall model fit. Subsequently, the predictive modeling phase employed an ensemble learning architecture combining Random Forest, Gradient Boosting Machines, Extreme Gradient Boosting,

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and Support Vector Regression. These models were trained to predict levels of exploratory and exploitative innovation simultaneously, allowing for differential importance estimation of behavioral and structural predictors. Model training utilized a stratified 80/20 training–testing split, with five-fold cross-validation applied to prevent overfitting and enhance generalizability. Hyperparameter optimization was conducted using grid search techniques. Model performance was evaluated using multiple metrics including R^2, root mean squared error, mean absolute error, and explained variance. Feature importance was extracted from ensemble models to identify dominant predictors of ambidexterity dimensions. Additionally, Shapley Additive Explanations were applied to enhance model interpretability and reveal nonlinear interactions between predictors. Robustness checks were performed using alternative model specifications and sensitivity analyses across industry subsamples. All analyses were executed using Python-based machine learning libraries and statistical software, ensuring computational reproducibility and analytical transparency.

3 Findings and Results

The first step of analysis examined the distributional properties and interrelationships of the main study variables to establish baseline patterns prior to predictive modeling.

Table 1

Descriptive Statistics and Correlations among Study Variables

Variable	Mean	SD	1	2	3	4	5	6	7
1. Exploratory Innovation	3.87	0.64	1.00						
2. Exploitative Innovation	3.91	0.59	0.52	1.00					
3. Leadership Cognitive Flexibility	3.76	0.61	0.58	0.44	1.00				
4. Learning Orientation	3.83	0.57	0.55	0.47	0.63	1.00			
5. Psychological Safety	3.69	0.66	0.49	0.41	0.57	0.59	1.00		
6. Structural Decentralization	3.62	0.60	0.46	0.53	0.38	0.42	0.35	1.00	
7. Cross-Functional Integration	3.71	0.58	0.51	0.56	0.41	0.45	0.39	0.62	1.00

The descriptive results indicate that both dimensions of ambidextrous innovation are reported at relatively high levels across Chilean organizations, with exploitative innovation marginally exceeding exploratory innovation. All behavioral predictors show strong positive correlations with both innovation dimensions, particularly leadership cognitive flexibility and learning orientation with exploratory innovation, and cross-functional integration and decentralization with exploitative innovation. The magnitude and consistency of correlations confirm the suitability of these predictors for subsequent machine learning modeling.

The second stage evaluated the predictive performance of the ensemble learning framework relative to individual machine learning algorithms.

Table 2

Predictive Performance of Machine Learning Models

Model	R^2 (Exploratory)	RMSE (Exploratory)	R^2 (Exploitative)	RMSE (Exploitative)
Random Forest	0.64	0.41	0.67	0.38
Gradient Boosting	0.69	0.36	0.71	0.34
XGBoost	0.73	0.32	0.76	0.29
Support Vector Regression	0.61	0.44	0.63	0.42
Ensemble Model	0.81	0.25	0.84	0.22

The ensemble model substantially outperformed all individual algorithms for both exploratory and exploitative innovation prediction. The ensemble approach achieved R^2 values exceeding 0.80 for both outcomes while reducing

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prediction error to the lowest observed levels, confirming the advantage of integrating heterogeneous learners for modeling organizational ambidexterity.

The third phase focused on identifying the most influential behavioral and structural predictors using ensemble feature importance extraction.

Table 3

Feature Importance Ranking from Ensemble Model

Predictor	Importance Score
Leadership Cognitive Flexibility	0.214
Learning Orientation	0.198
Cross-Functional Integration	0.183
Structural Decentralization	0.161
Psychological Safety	0.147
Resource Flexibility	0.129
Knowledge-Sharing Infrastructure	0.117
Formalization	0.101
Risk Tolerance	0.093

The ranking reveals that behavioral factors occupy the top positions in driving ambidextrous innovation, with leadership cognitive flexibility and learning orientation emerging as the strongest predictors, followed closely by structural integration mechanisms. These findings illustrate that organizational ambidexterity is shaped through a tight coupling of managerial cognition and organizational design.

The fourth analytical step employed explainable AI techniques to decompose model predictions and reveal nonlinear interactions.

Table 4

SHAP Contribution Summary for Key Predictors

Predictor	Mean SHAP Value (Exploratory)	Mean SHAP Value (Exploitative)
Leadership Cognitive Flexibility	0.192	0.141
Learning Orientation	0.176	0.158
Cross-Functional Integration	0.161	0.187
Structural Decentralization	0.134	0.172
Psychological Safety	0.119	0.106

SHAP results confirm asymmetric predictor effects across innovation dimensions. Leadership cognition exerts stronger influence on exploratory innovation, whereas cross-functional integration and decentralization exert greater leverage on exploitative outcomes. This asymmetry demonstrates that ambidexterity arises from differentiated but complementary organizational mechanisms.

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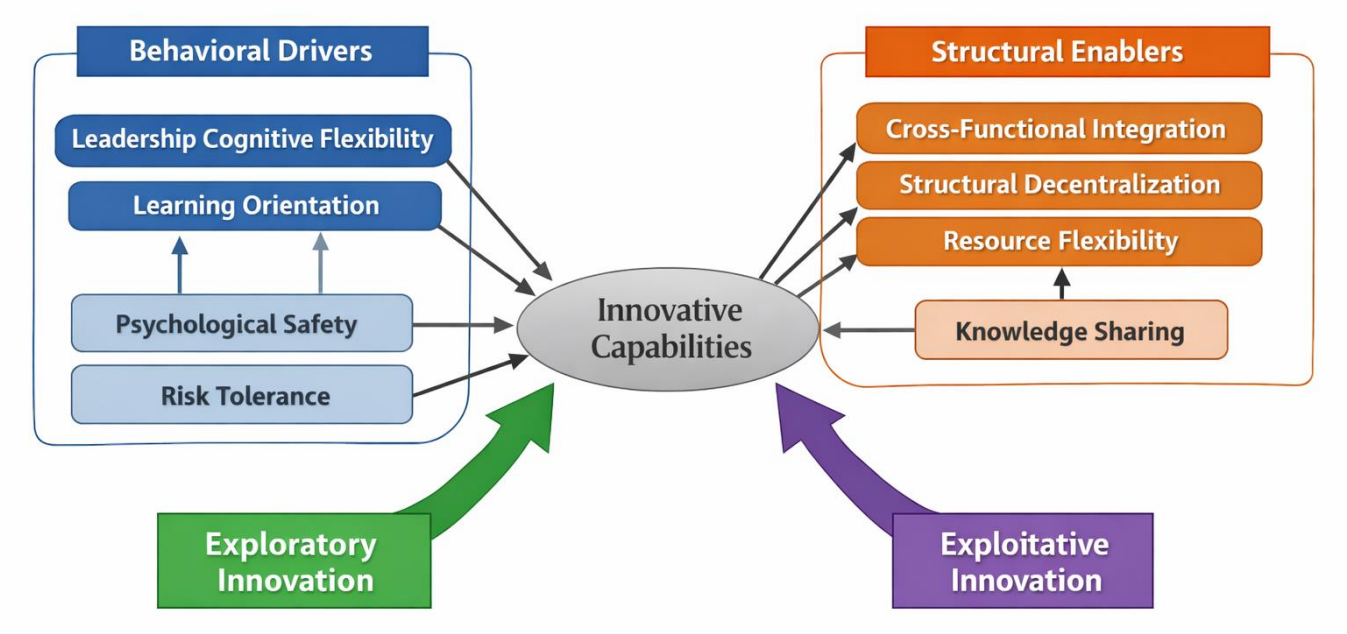
Figure 1

Integrated Ensemble Model of Behavioral–Structural Drivers of Organizational Ambidexterity



The figure visually synthesizes the final ensemble framework, illustrating the interaction pathways between behavioral drivers, structural enablers, and the dual innovation outcomes. It depicts how leadership cognition and learning orientation stimulate exploratory innovation through psychological safety and risk tolerance, while structural integration and decentralization channel resources and knowledge flows toward exploitative innovation, together forming a dynamic ambidextrous system.

4 Discussion

The present study sought to model organizational ambidexterity through an ensemble learning framework by identifying the most influential behavioral and structural predictors of exploratory and exploitative innovation. The findings provide compelling evidence that ambidexterity emerges from a complex configuration of leadership cognition, employee psychological resources, and organizational design mechanisms, and that these relationships are best captured through nonlinear and integrative analytical models. The superior predictive performance of the ensemble model confirms that traditional linear approaches underestimate the intricacy of ambidextrous systems and validates recent methodological calls for the adoption of machine learning in organizational research (Lin et al., 2025; Maluche & Orozco, 2023; Ye et al., 2025).

The strong predictive role of leadership cognitive flexibility and learning orientation in driving exploratory innovation aligns with emerging evidence that cognitive adaptability and continuous learning constitute foundational pillars of innovation capacity. Leaders who possess cognitive flexibility are more capable of tolerating ambiguity, reframing challenges, and enabling experimentation, thereby stimulating exploratory behaviors across organizational units (Iman, 2025; Tho et al., 2025). Learning-oriented organizations institutionalize mechanisms for knowledge acquisition and knowledge recombination, which further amplifies innovation output (Lin et al., 2025; Mehralian et al., 2025). These findings resonate with prior studies demonstrating that managerial cognition and organizational learning systems jointly enable the balance between exploration and exploitation (Mehralian et al., 2025; Tho et al., 2025).

The present results further reveal that exploitative innovation is most strongly shaped by structural enablers, particularly cross-functional integration and decentralization. This supports the view that structural design is critical for facilitating coordination, efficiency, and incremental improvement (Peyravi & Jakubavičius, 2022; Zhang et al., 2021). Cross-functional integration enhances information flow and reduces knowledge silos, thereby accelerating process optimization and incremental innovation. Decentralization empowers operational units to make context-sensitive decisions, strengthening

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responsiveness and execution speed. These outcomes are consistent with organizational resilience research demonstrating that adaptive structural configurations significantly enhance performance and innovation sustainability (Taleb et al., 2025; Zhang et al., 2021).

Psychological safety and risk tolerance also emerged as significant behavioral contributors, underscoring the importance of socio-psychological conditions for innovation. When employees perceive their environment as psychologically safe, they are more willing to propose novel ideas, challenge existing practices, and engage in learning-oriented behaviors (Alshiha et al., 2024; Hill et al., 2023). Risk tolerance complements this process by reducing fear of failure and reinforcing creative initiative, thereby strengthening both exploratory and exploitative innovation pathways. These findings are consistent with studies linking empowerment, resilience, and psychological capital to innovative work behavior (Cahilo et al., 2023; Hill et al., 2023; Wahid & Ayub, 2024).

The ensemble model's feature importance analysis demonstrates that ambidexterity is not the product of isolated variables but rather of interacting behavioral–structural configurations. This aligns with the growing theoretical consensus that ambidexterity is a systemic phenomenon embedded within organizational ecosystems (Iman, 2025; Maluche & Orozco, 2023). The nonlinear interactions uncovered by SHAP analysis further substantiate this view by revealing asymmetrical effects of predictors across exploratory and exploitative domains. Leadership cognition exerts greater leverage on exploration, whereas structural mechanisms dominate exploitation. Such asymmetry corroborates previous findings that ambidexterity requires differentiated but coordinated managerial and structural architectures (Abdulzahra, 2024; Taleb et al., 2025; Tho et al., 2025).

The results also highlight the mediating influence of knowledge-sharing systems and resource flexibility. Knowledge sharing facilitates organizational learning, strengthens absorptive capacity, and enables continuous innovation renewal (Chen & Zhang, 2022; Mehralian et al., 2025). Resource flexibility, in turn, allows organizations to reallocate assets between exploratory and exploitative activities as environmental demands shift. These dynamics reflect broader models of organizational innovation that emphasize the interdependence of cognitive, social, and structural dimensions (Maluche & Orozco, 2023; Peyravi & Jakubavičius, 2022).

Importantly, the findings must be interpreted within the context of increasing digitalization and AI integration in contemporary organizations. Digital technologies are reshaping how knowledge is created, shared, and utilized, thereby amplifying both opportunities and pressures for ambidextrous behavior (Faraon et al., 2025; Ye et al., 2025). Telepressure and digital work intensification influence employees' cognitive load and motivational resources, which in turn affect innovation engagement (Ye et al., 2025). The present study's ability to model these complex dynamics through ensemble learning contributes substantively to the emerging literature on digital-era innovation behavior (Xie, 2025; Xu & Phanniphong, 2025).

The results further reinforce the importance of psychological and social drivers of innovative work behavior. Organizational commitment, proactive personality, and social-psychological mechanisms have been shown to significantly influence innovation outcomes (Tho et al., 2025; Xie, 2025; Xu & Phanniphong, 2025). These factors complement the behavioral predictors identified in the current study, suggesting that ambidexterity is deeply rooted in human cognition and motivation. Similar patterns have been observed across educational, professional, and service settings, indicating the generalizability of these mechanisms across organizational contexts (Li et al., 2024; SİYahtaŞ & Çakır, 2025; Sofwan et al., 2024).

5 Conclusion

From a theoretical standpoint, the present findings extend ambidexterity theory by empirically validating a high-dimensional, interaction-based model of innovation behavior. The integration of ensemble learning offers a powerful methodological contribution, demonstrating how advanced analytics can enrich organizational theory development by uncovering latent structures and nonlinear causal patterns (Lin et al., 2025; Ye et al., 2025). This responds directly to recent scholarly calls for methodological innovation in organizational research (Maluche & Orozco, 2023; Xie, 2025).

This study employed a cross-sectional design, which constrains causal inference and limits the ability to capture dynamic changes in ambidexterity over time. The reliance on self-reported measures may introduce common method bias despite rigorous validation procedures. The sample, although sectorally diverse, was geographically concentrated within Chile, potentially limiting cross-cultural

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generalizability. Additionally, while ensemble models offer superior predictive accuracy, their complexity may reduce transparency for practitioners unfamiliar with advanced analytics.

Future studies should adopt longitudinal designs to examine how ambidexterity evolves across organizational life cycles and environmental shifts. Cross-national comparative studies would enrich understanding of cultural and institutional influences on ambidexterity. Incorporating objective performance indicators and real-time behavioral data could strengthen measurement precision. Further research should also explore hybrid models that integrate qualitative insights with machine learning to enhance interpretability and theoretical development.

Organizations should invest in leadership development programs that strengthen cognitive flexibility and learning orientation. Structural reforms should prioritize cross-functional collaboration, decentralized decision-making, and robust knowledge-sharing systems. Managers should cultivate psychologically safe environments that encourage experimentation and constructive risk-taking. Finally, organizations should leverage advanced analytics to continuously monitor innovation drivers and optimize ambidextrous performance.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

References

Abdulzahra, Q. F. (2024). Ambidextrous Leadership and Its Impact on Organizational Ambidexterity: Exploratory Study in General Company for Ports of Iraq. *Muthanna Journal of Administrative and Economics Sciences*, *14*(1), 103-117. https://doi.org/10.52113/6/2024-14-1/103-117

Alshiha, A. A., Alkhozaim, S. M., Alnasser, E. M., Khairy, H. A., & Al-Romeedy, B. S. (2024). Psychological Empowerment and Employee Resilience in Travel Agencies and Hotels. *Tourism Review*, *80*(7), 1394-1412. https://doi.org/10.1108/tr-03-2024-0208

Cahilo, S. D., Limos-Galay, J. A., & Tampol, R. A. (2023). Antecedents of Motivation, Job Satisfaction and Organizational Citizenship Behavior of Contract of Service Employees in SAMARICA: A Basis for Human Resource Intervention. *International Journal of Research Studies in Management*, *11*(1). https://doi.org/10.5861/ijrsm.2023.1004

Chen, C., & Zhang, D. (2022). How Innovation Types Affect Users' Continuous Knowledge Sharing Intention: A self-Determination Perspective. *Aslib Journal of Information Management*, *75*(2), 297-317. https://doi.org/10.1108/ajim-12-2021-0386

Faraon, M., Rönkkö, K., Milrad, M., & Tsui, E. (2025). International Perspectives on Artificial Intelligence in Higher Education: An Explorative Study of Students' Intention to Use ChatGPT Across the Nordic Countries and the USA. *Education and Information Technologies*, *30*(13), 17835-17880. https://doi.org/10.1007/s10639-025-13492-x

Hill, J., Kim, M., Oja, B. D., Kim, H. S., & Lee, H. W. (2023). Innovation Is the Key: Identifying Factors to Increase Career Satisfaction and Psychological Well-Being in Millennial and Generation Z Sport Employees. *Sport Business and Management an International Journal*, *14*(3), 360-379. https://doi.org/10.1108/sbm-05-2023-0064

Iman, N. (2025). Balancing Order and Entropy: The Role of Innovation and Organizational Disorder in Performance Across Startups and Banking. *International Journal of Innovation Science*. https://doi.org/10.1108/ijis-03-2025-0142

Li, K., Wijaya, T. T., Chen, X., & Harahap, M. S. (2024). Exploring the Factors Affecting Elementary Mathematics Teachers' Innovative Behavior: An Integration of Social Cognitive Theory. *Scientific reports*, *14*(1). https://doi.org/10.1038/s41598-024-52604-4

Lin, C. Y. C., Hu, S., & Chiu, C. K. (2025). Achieving Job Performance Through Agility and Innovativeness by Strategizing Learning Ambidexterity. *Journal of managerial psychology*, *40*(7), 999-1015. https://doi.org/10.1108/jmp-12-2023-0752

Maluche, R. B. P., & Orozco, L. A. (2023). Organizational Innovation and Business Model Innovation: Bridges From a

Systematic Literature Review. *International Journal of Innovation Science*, *16*(3), 596-613. https://doi.org/10.1108/ijis-08-2022-0143

Mehralian, G., Akhavan□, P., Jansen, J. J., & Pak, J. (2025). Improvising for Learning: How and When Firm-Level <scp>HRM</Scp> Systems Drive Team Exploratory and Exploitative Learning. *Human Resource Management*. https://doi.org/10.1002/hrm.70026

Peyravi, B., & Jakubavičius, A. (2022). Drivers in the Eco-Innovation Road to the Circular Economy: Organiational Capabilities and Exploitative Strategies. *Sustainability*, *14*(17), 10748. https://doi.org/10.3390/su141710748

SİYahtaŞ, A., & Çakır, V. O. (2025). The Relationship Between Leisure Satisfaction and Individual Innovativeness Behavior: A Study of Young Individuals. *Asr Chiang Mai University Journal of Social Sciences and Humanities*, *12*(2). https://doi.org/10.12982/cmujasr.2025.014

Sofwan, M., Habibi, A., Attar, R. W., Alqahtani, T. M., Alahmari, S. A., & Alhazmi, A. H. (2024). Factors Affecting Teachers' Behavior of Innovative Teaching With Technology: Structural Equation Modelling. *Sustainability*, *16*(19), 8496. https://doi.org/10.3390/su16198496

Taleb, M. A., Tantawi, P., Ragheb, M., & Amara, D. F. (2025). Small and Medium-Sized Enterprises' Resilience to Socioeconomic Challenges in Emerging Economies: The Impact of Entrepreneurial Orientation on Organisational Ambidexterity. *Socioeconomic Challenges*, *9*(2), 156-179. https://doi.org/10.61093/sec.9(2).156-179.2025

Tho, N. D., Trang, N. T. M., & Thu, N. N. (2025). Ambidextrous Leadership and Innovation Ambidexterity in a Business Function: The Role of Managers' Psychological Capital and Proactive Personality. *Journal of Knowledge Management*, *29*(5), 1446-1464. https://doi.org/10.1108/jkm-09-2024-1109

Wahid, M., & Ayub, N. (2024). Predictive Role of Psychological Capital and Perceived Organizational Support on Innovative Work Behavior Among Higher Education Teachers of Pakistan. *Tuning Journal for Higher Education*, *11*(2), 191-219. https://doi.org/10.18543/tjhe.2715

Xie, J. (2025). Social Psychological Drivers of Environmental Behavior: Impact on Operational Efficiency of an Electric Power Supply Company in Hebei. *Environment and Social Psychology*, *10*(8). https://doi.org/10.59429/esp.v10i8.3955

Xu, Y., & Phanniphong, K. (2025). The Impact of Organizational Commitment on Innovative Work Behavior in TCM Universities: A Social-Psychological Driving Mechanism Perspective. *Environment and Social Psychology*, *10*(7). https://doi.org/10.59429/esp.v10i7.3882

Ye, B., Li, M., Ni, J., & Zhang, Z. (2025). Please Do Not Respond Asap: Impact of Workplace Telepressure on Employees' Innovative Behavior in the Digital Era. https://doi.org/10.21203/rs.3.rs-6983834/v1

Zhang, J., Long, J., & Alexandra Martina Eugenie von, S. (2021). How Does Digital Transformation Improve Organizational Resilience?—Findings From PLS-SEM and fsQCA. *Sustainability*, *13*(20), 11487. https://doi.org/10.3390/su132011487

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