



Understanding Entrepreneurial Behaviour of Makhana Growers in Bihar Using SEM-PLS Approach

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HIGHLIGHTS

- Considerable difference in entrepreneurial behaviour levels was observed among makhana growers across different districts.
- Achievement, Production, and Risk-taking were the most significant contributors towards entrepreneurial behavior. Innovativeness and Marketing were the weak influencers.
- Economic factors (Land, Annual Income, Income from Makhana) strongly influenced entrepreneurial traits, with loading factors exceeding 0.89.

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ABSTRACT

The study aimed to identify the factors that influence the entrepreneurial behaviour of Makhana growers. During 2022–24, data were collected from 120 Makhana growers across four leading districts (Purnea, Darbhanga, Katihar, and Madhubani) in Bihar using a structured schedule. Various socio-economic and entrepreneurial characteristics of the farmers were analyzed using Structural Equation Modeling (SEM) with Partial Least Squares (PLS). The findings revealed that more than three-fifths (67.50%) of makhana growers possessed medium entrepreneurial behavior followed by 19.16 per cent of them with low level of entrepreneurial behaviour and only 13.33 per cent of them exhibited high level of entrepreneurial behaviour. The findings indicated that variables Achievement, Production, and Risk were strong indicators of entrepreneurial behaviour. Makhana farmers always dare to take risks and persistent and disciplined to undertake cultivation activities. Additionally, knowledge and skills need to be constantly updated to enhance the ability to innovate and be creative in carrying makhana cultivation activities successfully.

INTRODUCTION

The management of agricultural practices has become a significant concern, particularly in developing countries like India, where farmers face numerous challenges in achieving sustainable agricultural productivity. This issue is particularly acute in Bihar, where Makhana (fox nut) cultivation plays a vital role in the local economy. Despite its importance, the farming community still faces several challenges in adopting innovative and entrepreneurial practices, which can impact both productivity and economic outcomes. Bihar is the main producer of Makhana in the country producing more than 80 per cent of the country's total production

(Kumar et al., 2020). According to the ICAR National Research Centre for Makhana Research in Darbhanga, the total area under Makhana cultivation in India is around 15,000 hectares, with an average production of 1.5 t ha⁻¹. The total output of Makhana seeds is around 1,20,000 MT, which becomes 40,000 MT of Makhana pop after processing. Makhana production is projected to be worth Rs. 250 crores at the farmer level, however, it earns Rs. 550 crores at the trader's level (Sonu & Jha, 2025). In Bihar, the area under Makhana cultivation is about 13,000 hectares, contributing to 85% of India's total production. Darbhanga and Madhubani districts alone account for approximately 80 per cent of the processed Makhana production (Ahmad, 2020).

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A substantial amount of agricultural production in Bihar is lost due to inadequate management practices, pests, and market limitations which has a detrimental effect on farmer livelihoods. The reliance on conventional methods is not sufficient to meet the growing demands for Makhana in both local and international markets. In light of these challenges, it is crucial to identify innovative methods that could help farmers increase production while ensuring environmental sustainability. Integrated approaches to farming, including entrepreneurial strategies and market-driven innovations, are crucial for improving agricultural outcomes. Thus a comprehensive understanding of the socio-economic, demographic, and psychological factors influencing entrepreneurial behaviour of Makhana growers is essential. Entrepreneurial behaviour can be described as the process of recognizing potential opportunities and effectively implementing innovative ideas (Wang et al., 2022). Promoting entrepreneurship can improve socio-economic development (Vukovic et al., 2017).

The objective of this study was to determine the key factors influencing the entrepreneurial behaviour of Makhana growers in Bihar using SEM-PLS approach. The study aimed to identify how socio-economic factors such as age, annual income, makhana income, land, and knowledge of Makhana cultivation influence the entrepreneurial decisions of Makhana growers. Given the complex nature of agricultural entrepreneurship, various factors—ranging from access to information and resources to cultural and environmental factors—play an essential role in shaping entrepreneurial intentions and behaviour.

By applying SEM-PLS approach, this study made an endeavour to identify the factors significantly affecting the likelihood of Makhana growers exhibiting entrepreneurial behaviour that can enhance productivity and sustainability. The results will provide insights into how policymakers, agricultural extension services, and development agencies can promote entrepreneurial practices among Makhana growers, ultimately contributing to more sustainable agricultural practices and improved economic outcomes in Bihar.

METHODOLOGY

This research was conducted in Bihar, focusing on makhana farmers from the districts of Purnea, Katihar, Darbhanga, and Madhubani during 2022–24. Primary data were collected through observations, interviews, and discussions using structured interview schedule to gather insights into farmers' characteristics, including independent variables and entrepreneurial traits. The research employed a survey method, with a simple random sampling approach involving 120 farmers. Collected data were processed and analyzed using R-Studio. SEM was chosen for its ability to represent relationships between constructs within a direct model (Wijanto, 2008). Data analysis in R Studio examined two variables: endogenous latent variables (entrepreneurial characteristics) and exogenous latent variables observed through variable indicators.

The data analysis included two key stages: Outer Model Analysis and Inner Model Analysis. The Outer Model evaluates the relationships between indicator (manifest) and latent variables by assessing the Loading Factor (λ), where a value above 0.5 indicates validity. The Inner Model assesses relationships between latent variables.

The data analysis included two key stages: Outer Model Analysis and Inner Model Analysis. The Outer Model evaluates the relationships between indicator (manifest) and latent variables by assessing the Loading Factor (λ), where a value above 0.5 indicates validity. The Inner Model assesses relationships between latent variables. Mathematically, the structural equations for this study are represented as follows:

1. Structural Equation Modeling

$$\eta_1 = \lambda_1 X_1 + \gamma_2 X_2 + \gamma_3 X_3 + \gamma_4 X_4 + \gamma_5 X_5 + \gamma_6 X_6 + \zeta_1$$

2. The Measurement Model of Endogenous Latent Variables

$$Y_1 = \lambda_1 \eta_1 + \varepsilon_1$$

$$Y_2 = \lambda_2 \eta_1 + \varepsilon_2$$

$$Y_3 = \lambda_3 \eta_1 + \varepsilon_3$$

$$Y_4 = \lambda_4 \eta_1 + \varepsilon_4$$

$$Y_5 = \lambda_5 \eta_1 + \varepsilon_5$$

$$Y_6 = \lambda_6 \eta_1 + \varepsilon_6$$

3. The Measurement Model of Exogenous Latent Variables is as follows:

$$X_1 = \lambda_7 \zeta_1 + \delta_1$$

$$X_2 = \lambda_8 \zeta_2 + \delta_2$$

$$X_3 = \lambda_9 \zeta_3 + \delta_3$$

$$X_4 = \lambda_{10} \zeta_4 + \delta_4$$

$$X_5 = \lambda_{11} \zeta_5 + \delta_5$$

η_1 = endogenous latent variable of entrepreneurial Characteristics, γ = regression coefficient of the structural equation model, ζ = error component model, Y_1 - Y_6 = endogenous latent variable of entrepreneurial behaviour, X_1 - X_5 = exogenous latent variable of independent variables, λ = loading factor of indicator variable in exogenous and endogenous latent, δ , ε = error in the regression model of the indicator variable

RESULTS

It could be inferred from Table 1 that approximately two-thirds (65.83%) of the makhana growers had exhibited a medium level of innovativeness, while a similar proportion (60.00%) had demonstrated a medium level of risk-taking ability. In the study area, most makhana growers had been middle-aged, had completed education up to high school, had been small-scale farmers, and had had moderate exposure to mass media but limited contact with extension services. These factors might have constrained their ability to adopt new practices on their land, ultimately contributing to their moderate level of innovativeness. More than half (56.66%) of the makhana growers had possessed a medium level of production, while the majority (70.83%) had exhibited a medium level of achievement. Many makhana growers had likely excelled in attracting customers to their farming through various strategies. Over time, they might have utilized their experiences and effective communication skills to engage customers effectively. In contrast, makhana growers with low management might have adopted a more mechanical approach to their farm operations. When a makhana grower had been driven by enthusiasm and determination, it had boosted their self-confidence, ultimately contributing to the success of their farming and improving their economic stability. It was evident that over three-fifths (67.50%) of the makhana growers had exhibited a medium level of entrepreneurial behaviour. This distribution

Table 1. Distribution of makhana growers according to different components of entrepreneurial behaviour

Component of Entrepreneurial Behaviour	Category			Mean Score	S.D.
	Low (%)	Medium (%)	High (%)		
Innovativeness	17.50	65.83	16.67	21.19	2.45
Achievement	09.17	70.83	20.00	17.80	1.85
Risk-taking	20 .00	60.00	20.00	17.84	1.84
Management	19.17	68.33	12.50	22.19	2.01
Production	21.67	56.66	21.6 0	18.86	1.90
Marketing	19.17	68.33	12.50	22.17	2.01
Overall entrepreneurial behaviour	19.17	67.50	13.33	120.07	7.83

indicated that the majority of makhana growers displayed moderate entrepreneurial traits, with smaller proportions having shown either high or low levels of such behaviour.

Measurement model evaluation

The first step in assessing the measurement model using SEM-PLS was to evaluate the loading factor. This value served as a key indicator to determine the model's accuracy. If an indicator variable had possessed a loading factor (λ) below 0.4, it had been considered unsuitable for analysis and had to be excluded, necessitating a model verification illustrated in Figure 1.

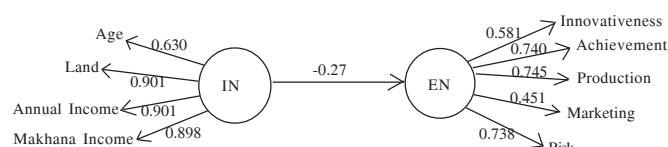
**Figure 1.** Cross Diagram Model on Factors (IN) Influencing the Entrepreneurial Behaviour (EN)

Table 2 revealed that the Independent Variable (IN) latent construct had been defined by its manifest variables: Age, Land, Annual Income, and Makhana Income. The loading factors and t-values for these indicators demonstrated their strength and statistical significance in contributing to the measurement of the latent construct. Specifically, Land, Annual Income, and Makhana Income exhibited very strong loading factors of 0.901, 0.901, and 0.898, respectively, indicating that these variables had been critical in defining the Independent Variable (IN) construct. The corresponding t-values for these indicators had been 6.88, 6.98, and 6.91, respectively, all of which had been highly statistically significant ($p < 0.001$). In addition to these strong indicators, age also contributed to the Independent Variable (IN) construct, albeit with a slightly lower loading factor of 0.630. Despite this moderate strength, the t-value of 4.85 ($p < 0.001$) had indicated that the relationship between Age and the latent construct had been statistically significant. This suggested that Age had been a meaningful indicator, though its contribution had been

Table 2. Contribution of Independent Variable based on Loading Factor and T-Value

Latent Variable	Manifest Variable	Loading Factor	T-Value
Independent Variable	Age	0.630	4.85
	Land	0.901	6.88
	Annual Income	0.901	6.98
	Makhana Income	0.898	6.91

less pronounced compared to Land, Annual Income, and Makhana Income. The high loading factors and significant t-values for Land, Annual Income, and Makhana Income highlighted the economic and resource-based dimensions of the Independent Variable (IN) construct.

Table 3 presented the loading factors and t-values for the manifest variables associated with the Entrepreneurship Characteristics latent construct. These results were derived from a Partial Least Squares Path Modeling (PLS-PM) analysis, which evaluated the strength and significance of the relationships between the latent construct and its indicators. The Innovativeness variable had a loading factor of 0.581, indicating a moderate contribution to the Entrepreneurship Characteristics construct. However, its t-value of 1.23 suggested that the relationship was not significant ($p > 0.05$). Similarly, Marketing had a loading factor of 0.451, which was relatively low, and its t-value of 1.04 was also non-significant. In contrast, Achievement, Production, and Risk variables exhibited stronger loading factors of 0.740, 0.745, and 0.738, respectively. These values suggest that these variables are meaningful indicators of Entrepreneurship Characteristics. Their t-values of 2.82, 2.88, and 2.87, respectively, were all statistically significant ($p < 0.05$). Table 4 showed that the path coefficient for IN $\rightarrow$ EN is -0.27, indicating a negative relationship between the two constructs. That means that as the Independent Variable (IN) values increases, the Entrepreneurship Characteristics (EN) values tend to decrease. The t-value for this relationship was -3.04, which was found significant ($p < 0.05$).

DISCUSSION

A significant proportion of makhana growers exhibited a medium level of innovativeness and risk-taking ability. Singh and Kumar (2019) found that farmers with moderate exposure to

Table 3. Contribution of Entrepreneurial Characteristics based on Loading Factor and T-Value

Latent Variable	Manifest Variable	Loading Factor	T-Value
Entrepreneurship Characteristics	Innovativeness	0.581	1.23
	Achievement	0.740	2.82
	Production	0.745	2.88
	Marketing	0.451	1.04
	Risk	0.738	2.87

Table 4. Path Coefficient Value

Relationship	Original Sample Value	T-value	Significance
IN $\rightarrow$ EN	-0.27	-3.04	Significant

education and mass media tended to exhibit medium levels of innovativeness due to limited access to advanced resources and extension services. Similarly, Meena et al., (2020) highlighted that middle-aged farmer with moderate educational backgrounds often demonstrated a balanced approach to adopting new practices. Moderate level of production and achievement motivation of makhana growers may be attributed to their small-scale farming operations and limited access to extension services. These findings resonated with the work of Patel & Desai (2018), who emphasized that small-scale farmers in India often faced constraints such as limited financial resources, lack of technical knowledge, and inadequate institutional support, which hindered their ability to achieve higher levels of productivity and motivation. However, the ability of makhana growers to attract customers through effective communication and experiential strategies reflected their entrepreneurial characteristics, as noted by Sharma & Gupta (2021) in their study. The role of enthusiasm and determination in boosting self-confidence and economic stability among makhana growers was consistent with the findings of Reddy & Rao (2017). They argued that intrinsic motivation and a positive attitude toward farming significantly contributed to the success of agricultural enterprises. This was particularly relevant in the context of makhana cultivation, where growers relied on their passion and resilience to overcome challenges and improve their livelihoods. The mechanical approach adopted by growers with low management skills underscored the importance of capacity-building interventions. As suggested by Joshi & Tiwari (2016), training programs and access to extension services could empower farmers to adopt more efficient and innovative farming practices, thereby enhancing their productivity and economic outcomes.

The majority of makhana growers possessed moderate level of entrepreneurial behaviour, might have been influenced by various socio-economic and institutional factors. These findings aligned with the work of Kumar and Singh (2020), who found that a majority of small-scale agri-entrepreneurs in India exhibited moderate entrepreneurial behaviour due to limited access to resources, training, and market linkages. Similarly, Mehta & Choudhary (2019) observed that moderate levels of entrepreneurial behaviour were common among farmers and nursery owners operating in resource-constrained environments including factors like limited access to formal education and training in entrepreneurship, which restricted their ability to develop advanced business skills. Sharma & Gupta (2021) highlighted that many small-scale entrepreneurs in rural India lacked exposure to modern business practices, limiting their capacity to innovate and take risks. Findings also align with Kobba et al., (2021) & Gupta et al., (2023). The absence of robust institutional support, such as access to credit, technical guidance, and market information, may have hindered their ability to scale up their operations and adopt entrepreneurial strategies, as emphasized by Patel & Desai (2018) & Kademini et al., (2024).

The findings of strong loading factors for Land, Annual Income, and Makhana Income, along with their high statistical significance, indicated that these variables were crucial determinants in the entrepreneurial behaviour of makhana growers. This aligned with several studies conducted on climate-smart agriculture technologies (CSAT) adoption in India, which found that annual income was significantly correlated with farmers' awareness and adoption of

CSAT (Mallappa & Pathak, 2023). Similarly, research on organic farming adoption in Haryana, India, identified economic factors as one of the six critical determinants driving 71.0 per cent variations in organic farming adoption (Kumar et al., 2023). The moderate but statistically significant loading factor for Age suggested that while it played a role in entrepreneurial decisions, its influence may have been less pronounced compared to land ownership and income. This was consistent with findings from a study in Northern Bangladesh, where age was not identified as a significant factor in the adoption of improved farm practices (Farid et al., 2016).

The PLS-PM analysis revealed varying contributions of different factors to the Entrepreneur construct. Achievement, Production, and Risk demonstrated strong and statistically significant relationships with the Entrepreneur construct, as evidenced by their high loading factors (0.740, 0.745, and 0.738 respectively) and t-values exceeding 2.5 (Alshebami & Seraj, 2022). These findings aligned with previous research highlighting the importance of need for achievement, production capabilities, and risk-taking propensity in entrepreneurial behaviour (Alshebami & Seraj, 2022; Mahmood et al., 2019). Interestingly, Innovativeness and Marketing showed weaker associations with the Entrepreneur construct. The moderate loading factor (0.581) and non-significant t-value (1.23) for Innovativeness contradicted some earlier studies that emphasized its crucial role in entrepreneurship (Jaziri & Miralam, 2023; Valaei et al., 2017). Similarly, Marketing's low loading factor (0.451) and non-significant t-value (1.04) suggested a less prominent role in this context. These findings diverged from expectations, as innovation and marketing were often considered vital for entrepreneurial success (Mukhtar et al., 2023; Valaei et al., 2017).

The observed negative path coefficient ($\hat{\alpha} = -0.27$, $p < 0.05$) between the independent variable (IN) and entrepreneurial characteristics (EN) suggested an inverse relationship, where higher values of IN (e.g., socio-economic factors such as age, landholding size, or traditional income reliance) correlated with lower entrepreneurial traits. This finding aligned with studies in Indian agricultural contexts, where structural and socio-economic constraints often dampened entrepreneurial behaviour. For instance, Singh & Agarwal (2018) noted that farmers with larger landholdings in Bihar exhibited risk-averse tendencies, preferring conventional practices over innovative ventures due to perceived stability. The statistical significance ($t = -3.04$) reinforced the robustness of this relationship, suggesting that entrenched socioeconomic factors like age, lack of formal education, or limited exposure to extension services may have hindered entrepreneurial mindsets. Sharma et al., (2019) corroborated this, where older farmers with low education levels demonstrated reluctance to adopt new technologies or marketing strategies, resulting in stagnant business growth. This reflected the "resource curse" paradox, where existing assets (land, stable income) reduced the urgency to innovate, as noted by Patel and Desai (2021) in their analysis of Gujarat's agricultural communities. To mitigate this, targeted interventions such as entrepreneurial training, access to microfinance, and exposure to modern agri-business models were critical. As Joshi & Roy (2022) emphasized, bridging knowledge gaps through farmer-producer organizations (FPOs) could empower smallholders to transcend traditional practices and embrace entrepreneurial opportunities.

CONCLUSION

The study highlights that makhana growers predominantly exhibit moderate innovativeness and entrepreneurial behaviour, influenced by socio-economic constraints such as limited access to resources and education. SEM-PLS had shown that production and risk-taking ability were the most impacting components on the entrepreneurial behaviour of makhana growers, yet most of the makhana growers had medium innovativeness and marketing. Hence, there is a need to conduct intensive training programmes to expose the makhana to entrepreneurial opportunities, decision-making, innovations, time and financial management skills.

REFERENCES

- Ahmad, A. (2020). A study on constraints of Makhana cultivation and suitable measures for its better development. *Journal of Pharmacognosy and Phytochemistry*, 9(1), 984–987. doi:10.22271/phyto.2020.v9.i1q.10580
- Alshebami, A. S., & Seraj, A. H. A. (2022). Exploring the influence of potential entrepreneurs' personality traits on small venture creation: The case of Saudi Arabia. *Frontiers in Psychology*, 13(19). https://doi.org/10.3389/fpsyg.2022.885980
- Farid, K., Tanny, N., & Sarma, P. (2016). Factors affecting adoption of improved farm practices by the farmers of Northern Bangladesh. *Journal of the Bangladesh Agricultural University*, 13(2), 291–298. https://doi.org/10.3329/jbau.v13i2.28801
- Gupta, S. K. Nain, M. S., Singh, R., Mishra, J. R., & Lata, A. (2023). Exploring the entrepreneurial climate and attributes of agripreneurs and its determinants. *Indian Journal of Extension Education*, 59(2), 93–97. http://doi.org/10.48165/IJEE.2023. 59220
- Hebsale Mallappa, V. K., & Pathak, T. B. (2023). Climate smart agriculture technologies adoption among small-scale farmers: a case study from Gujarat, India. *Frontiers in Sustainable Food Systems*, 7. https://doi.org/10.3389/fsufs.2023.1202485
- Jaziri, R., & Miralam, M. S. (2023). Do psycho-entrepreneurial traits and social networks matter for innovativeness among Saudi female entrepreneurs? *Arab Gulf Journal of Scientific Research*, 42(3), 566–584. https://doi.org/10.1108/agjsr-02-2023-0067
- Joshi, P. K., & Tiwari, S. (2016). Agricultural innovation and sustainable development in India: Challenges and Opportunities. *Springer*.
- Joshi, V., & Roy, A. (2022). Farmer producer organizations and entrepreneurial empowerment. *Indian Journal of Extension Education*, 58(1), 12–25.
- Kademani, S., Nain, M. S., Singh, R., Kumar, S., Parsad, R., Sharma, D. K., Roy, S. K., Krishna, D. K., Prabhakar, I., Mahapatra, A., & Patil, M. (2024). Unveiling challenges and strategizing solutions for sustainable agri-entrepreneurship development. *Frontiers in Sustainable Food Systems*, 8, 1447371. https://doi.org/10.3389/fsufs.2024.1447371
- Kobba, F., Nain, M. S., Singh Rashmi, & Mishra, J. R. (2021). Determinants of entrepreneurial success in farm and non-farm sectors: A comparative analysis. *Indian Journal of Agricultural Sciences*, 91(2), 269–273.
- Kumar, A., Singh, A. K., Kumar, A., & Kumari, S. (2020). Constraints faced by makhana grower of Mahbubani districts and suggestions to eliminate them. *Indian Journal of Extension Education*, 56(3), 177–180.
- Kumar, J., Rana, S., Rani, V., & Ahuja, A. (2023). What affects organic farming adoption in emerging economies? A missing link in the Indian agriculture sector. *International Journal of Emerging Markets*. https://doi.org/10.1108/ijem-03-2023-0390
- Kumar, R., & Singh, S. (2020). Entrepreneurial behavior among small-scale agri-entrepreneurs in India: a study of determinants and constraints. *Indian Journal of Agricultural Economics*, 75(2), 210–225.
- Mahmood, T. M. A. T., Ahmad, G. B., Al Mamun, A., & Ibrahim, M. D. (2019). Predicting entrepreneurial intentions and pre-start-up behaviour among Asnaf Millennials. *Sustainability*, 11(18), 4939. https://doi.org/10.3390/su11184939
- Meena, M. S., Singh, K. M., & Singh, R. K. P. (2020). Adoption of agricultural innovations among smallholder farmers in eastern India: Determinants and constraints. *Indian Journal of Agricultural Economics*, 75(3), 345–358.
- Mehta, R., & Choudhary, V. (2019). Factors influencing entrepreneurial behavior among farmers in India. *Journal of Rural Development*, 38(3), 456–470.
- Mukhtar, B., Shad, M. K., Hamad, S., & Woon, L. F. (2023). Risk management implementation and its efficacy towards green innovation: a conceptual framework for Malaysian solar photovoltaic industry. *Journal of Economic and Administrative Sciences*. https://doi.org/10.1108/jeas-12-2022-0260
- Patel, M., & Desai, K. (2021). The resource curse in Indian agriculture: Landholding and innovation. *Economic and Political Weekly*, 56(22), 33–40.
- Patel, R., & Desai, T. (2018). Challenges and Opportunities for Small-Scale Farmers in India. *Journal of Rural Development*, 37(2), 123–135.
- Reddy, A. A., & Rao, P. P. (2017). Motivation and success in agricultural entrepreneurship: evidence from India. *Agricultural Economics Research Review*, 30(1), 89–101.
- Sharma, N., Verma, S., & Tiwari, R. (2019). Socioeconomic barriers to agri-entrepreneurship in Bihar. *Agricultural Extension Review*, 31(3), 45–59.
- Sharma, V., & Gupta, R. (2021). Farmer entrepreneurship in India: A case study of makhana cultivation. *Journal of Agribusiness in Developing and Emerging Economies*, 11(2), 234–249.
- Singh, R., & Agarwal, S. (2018). Risk aversion and agricultural entrepreneurship: evidence from Bihar. *Indian Journal of Agricultural Economics*, 73(2), 145–160.
- Singh, R., & Kumar, S. (2019). Factors influencing the adoption of agricultural innovations among farmers in India. *Indian Journal of Extension Education*, 55(1), 45–52.
- Sonu, K., & Jha, K. K. (2025). Knowledge gap and path analysis of adoption of Makhana (Euryale Ferox Salisb) growers in Bihar. *Indian Journal of Extension Education*, 61(1), 83–88.
- Valaei, N., Rezaei, S., & Emami, M. (2017). Explorative learning strategy and its impact on creativity and innovation. *Business Process Management Journal*, 23(5), 957–983. https://doi.org/10.1108/bpmj-12-2015-0179
- Vukovic, K., Kedmenec, I., Postolov, K., Jovanovski, K., & Korent, D. (2017). The role of bonding and bridging cognitive social capital in shaping entrepreneurial intention in transition economies. *Management: Journal of Contemporary Management Issues*, 1(22), 1–33.
- Wang, Y., Zhou, H., Zhang, Y., & Sun, X. R. (2022). Role of entrepreneurial behavior in achieving sustainable digital economy. *Frontiers in Public Health*, 1–13. https://doi.org/10.3389/fpubh.2022.829289
- Wijanto, S. H. (2008). Structural equation modelling dengan Lisrel 8.8: Konsep dan Tutorial. Yogyakarta: GrahaIlmu.