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Pro-Metrics

ORIGINAL ARTICLE

SECI model of knowledge management: A thematic analysis with emphasis on agricultural organizations

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ABSTRACT

Objective. This research aimed to identify the thematic trends in knowledge management through Nonaka and Tekeuchi's socialization, externalization, combination, and internalization (SECI) model. First, an analysis of the application of the model in general and then in the field of agriculture was conducted.

Design/Methodology/Approach. A bibliometric analysis was performed, and 2201 indexed papers from the Scopus database between the years 1994 and 2024 were considered. The study used the authors' keywords to identify thematic trends through word co-occurrences.

Results/Discussion. Thematic cores related to innovation and open innovation were identified. This model has experienced a notable boom in recent years. In the agricultural sector, knowledge creation and transfer represent a part of the model that has experienced increasing use. The importance of understanding and effectively using the model to drive innovation and sustainable development in agriculture was stressed. Therefore, it was proposed that knowledge be transformed into a source of knowledge.

Conclusions. Despite the criticisms received, this paper highlights the lack of research on using the SECI model in agriculture and its relevance in advancing knowledge management research. Furthermore, the results point out that, for the agricultural sector, future research on knowledge management should focus on organizational learning mechanisms, social innovation, critical success factors, business processes, and job satisfaction.

Keywords: agriculture; knowledge management; SECI model; bibliometrics; agricultural organizations; co-word analysis.

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INTRODUCTION

Within the fundamental principles and theories related to knowledge management (KM), the SECI (Socialization, Externalization, Combination, and Internalization) model of Nonaka and Takeuchi (1995) is of particular interest, as it stands out for its relevance and contribution to the field of KM (Khadir-Poggi, 2018; Gaviria-Marín *et al.,* 2019). For Nonaka and Takeuchi, knowledge is active and subjective in nature and is rooted in the value system of each individual (Nonaka and Takeuchi, 1995; Nonaka *et al.,* 2000). Based on this thinking, the authors created a model of a dynamic nature that incorporates three dimensions: "epistemological, ontological and temporal" (Nonaka and Takeuchi, 1995, p. 49). The central idea of their theory is the differentiation between tacit knowledge and explicit knowledge, as well as their conversion (Nonaka and Takeuchi, 1995; Nonaka *et al.,* 2000).

The SECI model describes the knowledge management process in organizations through four stages involving the interaction between explicit and tacit knowledge. This process can occur at the individual, group, or organizational level. This model emerged from studies on successful innovation in Japanese companies during the 1980s and 1990s (Nonaka and Takeuchi, 1995). Tacit knowledge is acquired with little or no direct instruction, while explicit knowledge is expressed in terms of written words or formulas and can, therefore, be easily communicated (Nonaka and Takeuchi, 1995; Nonaka *et al.,* 2000).

The importance of this work lies in the fact that, in recent years, in the area of business and management, the study of KM has relied heavily on the contributions of Nonaka (Gaviria-Marín *et al.,* 2019). The SECI model is one of the most relevant frameworks in research on organizational knowledge transfer (Ahmadani *et al.,* 2023). In agriculture, a significant contrast is apparent in the study of KM. While some experts focus on developing organizational practices in established agribusinesses, other researchers, mainly agricultural experts, engage in field studies involving local producers and communities, emphasizing indigenous knowledge (Tumwebaze *et al.,* 2022). This duality presents a valuable opportunity to identify emerging themes from the SECI model, which has been iconic in KM analysis, and explore how they can be integrated to strengthen both agricultural research and practice.

In the field of agriculture, KM has not been effectively addressed due to the particularities of this sector, where knowledge is built from the historical needs of the agents involved (García-Bode, 2013). In this study, we focus on analyzing the thematic trends of the SECI model in the agricultural field, considering that it could be a practical tool to understand how organizations, especially rural ones, manage their knowledge. Therefore, we propose to approach the SECI model from the perspective of the source of knowledge, highlighting experiential, ancestral, and indigenous knowledge. We start from the idea that Nonaka and Takeuchi developed an original, comprehensive, and practical theory of knowledge (Khadir-Poggi, 2018).

We asked the following questions: What are the thematic trends in using the SECI model? What are the thematic trends in using the SECI model in the agricultural sector? Trends in the academic literature were identified through co-word analysis in the Socpus database to locate and compile the papers. Hereafter, the paper is organized into four sections. The first section provides a review of the literature. The second section presents the methodology. The third section presents the results obtained, and the discussion and conclusions are presented.

LITERATURE REVIEW

The distinction between explicit and tacit knowledge, which Polanyi originally proposed in the 1950s, laid the foundation for the theory of the knowledge-creating firm that Nonaka and Takeuchi developed in the 1990s (Li and Gao, 2003). This model, focused mainly on organizational knowledge in Japanese companies, has become a fundamental reference in the field of KM (Gaviria-Marín *et al.,* 2019). Its relevance lies in conceptualizing the different types of knowledge and the dynamic processes between them.

The model developed by Nonaka and Takeuchi focuses mainly on the distinction between explicit and tacit knowledge as crucial elements in creating knowledge within organizations. These authors questioned the traditional Western view that separates the subject that knows

from the object, arguing that this perspective has limited the development of knowledge creation. Instead, they propose that knowledge is generated through the interaction of four modes of creation: socialization, externalization, combination, and internalization (Nonaka and Takeuchi, 1995).

It is essential to differentiate between explicit and tacit knowledge. The former can be expressed in words or figures and codified in a formal and systematic language. In contrast, tacit knowledge is intrinsic to the individual, rooted in his or her mind and body, without the possibility of being written down (Polanyi, 1966, in Nonaka *et al.,* 1994). At the same time, SECI is an interactive rather than sequential process that creates new knowledge (Tee & Lee, 2012) (Table 1).

Acronym	Type	Description	Source	Dynamic process
S	Socialization	Process of knowledge creation through experience specific to the context in which the subject develops.	Observation and conversation through the exchange of experiences in meetings.	Tacit in tacit
E	Externalization	Process of articulation of new knowledge	Language, objects or practice	Tacit to explicit
C	Combination	The process of decomposing and organizing elements of externalized knowledge into a more systematic whole so that it can be disseminated to others in different contexts.	It is collected inside or outside the organization and then combined, edited or processed to form new knowledge	Explicit to explicit
I	Internalization	Process of incorporating knowledge "learning	Through practice, action and reflection	Explicit to tacit

Table 1. Knowledge conversion processes. **Source:** Prepared by the authors based on Nonaka *et al.* (1994), Nonaka *et al.* (2000), Nonaka & Takeuchi (1995), and Tee & Lee (2012).

Socialization refers to converting tacit knowledge into practical learning, while externalization involves transforming that knowledge into explicit knowledge to be shared with others. Combination consists of organizing explicit knowledge in a systematic way, and internalization involves incorporating this knowledge into individuals' tacit knowledge (Nonaka *et al.,* 2000).

The four modes of knowledge conversion operate independently. However, to create organizational knowledge, these nodes must revolve around a conversion dynamic between tacit and explicit. Knowledge creation occurs through internalization and externalization, basically the appropriation and mastery of acquired knowledge. To reach the creation of organizational knowledge, a continuous cycle, also called a spiral, takes place (Nonaka *et al.,* 1994).

The knowledge spiral is characterized by the interaction of different triggers at each stage. The process begins with socialization, where teams are built to foster the exchange of experiences. Then, in the externalization stage, dialogue and metaphors are promoted so that team members can articulate their perspectives and uncover hidden knowledge. The new concepts generated are combined with existing data and external knowledge, facilitating knowledge coordination and documentation. Through internalization and "learning by doing," explicit and tacit knowledge is consolidated, and knowledge creation is expanded at the individual, group, and organizational levels upward in a dynamic spiral (Nonaka *et al.,* 1994).

Some literature review papers on the evolution of KM highlight that Nonaka is the most relevant author (Gaviria-Marina, *et al.,* 2019), that the SECI knowledge conversion model has evolved mainly from tacit knowledge conversion (Hong, 2012; Seghroucheni, 2023), that it has acted as a moderator in knowledge sharing among knowledge workers in industries (Yusoff *et al.,* 2020) and that, to date, it is the only complete theory of knowledge creation (Khadir-Poggi, 2018).

The main criticisms of the SECI model are its deterministic nature, its applicability in different cultural environments (Khadir-Poggi, 2018; Li and Gao, 2003), territorial (Hong,

2012), industrial contexts and organizational sizes (Ahmadani *et al.,* 2023), its linearity and the need for it to be tangible in a new era of holistic knowledge (Bratianu and Bejinaru, 2020). A literature review to identify the main models for knowledge management in private companies highlights that seven of the 21 models found in the research were derived from the SECI model. This makes it the most frequently reproduced model. The authors point out that although each industry is different, models for studying knowledge should be adaptable to each one (Susanto *et al.,* 2021).

METHODOLOGY

Bibliometric analyses have gained popularity in the scientific community (Donthu *et al.,* 2021; Debmalya *et al.,* 2022). The usefulness of this type of study lies in the possibility of obtaining a global view of a topic, identifying new areas of knowledge, and discovering novel ideas for research (Donthu *et al.,* 2021). Nevertheless, there is a theoretical tension regarding the overuse of bibliometric analyses, given that their descriptive tendency has been exposed (Breslin & Bailey, 2020; Debmalya *et al.,* 2022). However, they represent an opportunity to contribute to theory and practice (Donthu *et al.,* 2021), and unlike other techniques, bibliometrics provides a more objective and reliable analysis (Aria & Cuccurullo, 2017).

The data source for this study was the Scopus database. Two search strategies were implemented. The first focused on the general analysis of the SECI model, while the second covered the agricultural sector specifically. Data processing was performed through a co-word analysis of the literature related to the model. The tools Bibliometrix and VOSviewer were used to visualize the results, which facilitated a detailed analysis of the co-words.

Search strategies:

A. (seci-model OR seci-process OR nonaka-model OR takeuchi-model OR takeuchi-model OR nonaka-theory OR knowledge-spiral) OR (socialization AND externalization AND combination AND internalization)
B. (seci-model OR seci-process OR nonaka-model OR takeuchi-model OR nonaka-theory OR knowledge-spiral) OR (socialization AND externalization AND combination AND internalization) AND agro* OR agri* OR farmer.

Search A yielded 2,201 documents from 1994 to 2024. Search B yielded 168 documents from 2003 to 2024.

RESULTS

Trends in the use of the SECI model

Knowledge creation is a continuous process by which the limits of previous knowledge are transcended to arrive at a new one (Nonaka *et al.,* 2000, p. 9). The SECI model or spiral has gained prominence recently (Figure 1). This trend adds to the growing research in knowledge management (Gaviria-Marín *et al.,* 2019). In addition, new knowledge dynamics have gained relevance in the applicability of new technologies, such as artificial intelligence, which includes emotional knowledge (Bratianu & Bejinaru, 2020).

The main words derived from the analysis relate to the model, such as socialization, tacit knowledge, explicit knowledge, internalization, combination, etc. (Table 2). However, knowledge workers, technology, and e-learning are words that recur frequently. *Knowledge workers* are all members of organizations who contribute to creating knowledge (Martinez-Martinez *et al.,* 2018). For example, entrepreneurs (Nonaka and Takeuchi, 1995, p. 97) could even be considered the center of knowledge acquisition (Magnier-Watanabe and Benton, 2013, p. 220) because they create knowledge products, which can be aligned with the business process (Karagiannis, Woitsch and Hrgovcic, 2024).

Culture is a recurring theme in the work on the SECI spiral. Early on, Nonaka opened the debate on the fact that learning is primarily a social process and that Japanese companies are more competitive due to their collaborative culture (Chatti *et al.,* 2007). Moreover, KM is considered to be a benchmark for building a knowledge culture and vice versa, culture supports knowledge creation (Ahmadani *et al.,* 2023).

The co-word analysis (Table 2) denotes that the driving themes of the model continue to be the parts of the model, which was to be expected, given that, as explained, Nonaka has been

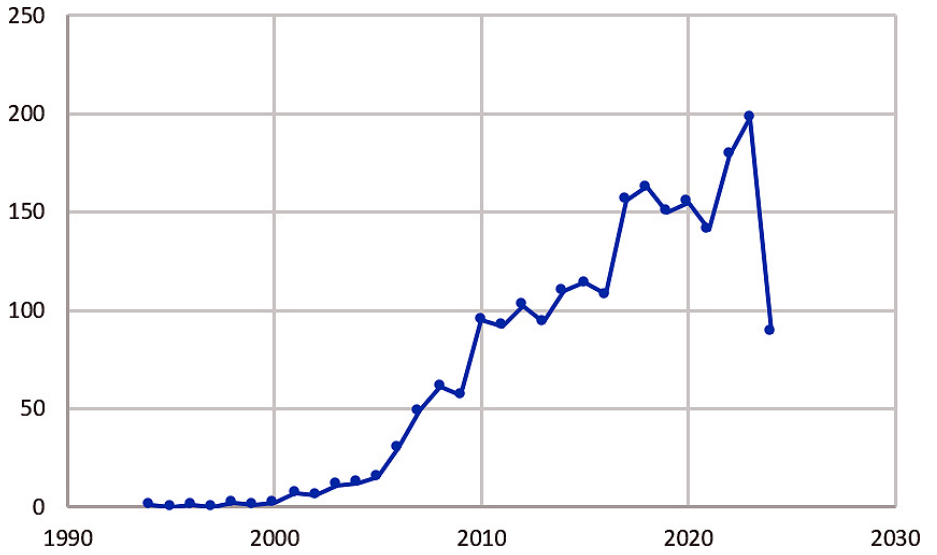

Figure 1. Annual scientific production on the SECI model.

Occurrence	Keywords	% of occurrence	Occurrence	Keywords	% of occurrence
176	knowledge management	14.9%	7	knowledge management (km)	0.6%
169	seci model	14.3%	7	knowledge spiral	0.6%
92	knowledge creation	7.8%	7	knowledge creation process	0.6%
46	tacit knowledge	3.9%	7	internalization	0.6%
41	Seci	3.5%	6	case study	0.5%
27	knowledge sharing	2.3%	6	communities of practice	0.5%
24	explicit knowledge	2.0%	6	learning	0.5%
23	knowledge transfer	1.9%	6	organizational knowledge creation	0.5%
16	Innovation	1.4%	6	culture	0.5%
15	Knowledge	1.3%	6	combination	0.5%
12	organizational learning	1.0%	6	externalization	0.5%
11	Ba	0.9%	6	socialization	0.5%
10	knowledge conversion	0.8%	5	knowledge acquisition	0.4%
10	seci process	0.8%	5	information technology	0.4%
9	online learning	0.8%	5	knowledge management systems	0.4%
9	e-learning	0.8%	5	nonaka	0.4%
8	knowledge transformation	0.7%	5	organizational knowledge	0.4%
8	seci-model	0.7%	5	knowledge worker	0.4%

Table 2. Occurrence of keywords.

one of the main authors recognized in the subject (Gaviria-Marín *et al.,* 2019). For their part, innovation and open innovation have been placed as topics close in density to the SECI model (Figure 2).

Each cluster found (colors) represents a theme (Figure 3). The orange cluster shows that the main themes are internationalization, outsourcing, socialization, and combination, which frame the KM process. The turquoise blue cluster highlights knowledge conversion, representation, and processes, as well as product development, indicating a focus on the application of KM in organizations. The purple cluster highlights the SECI process and knowledge dissemination. The purple cluster

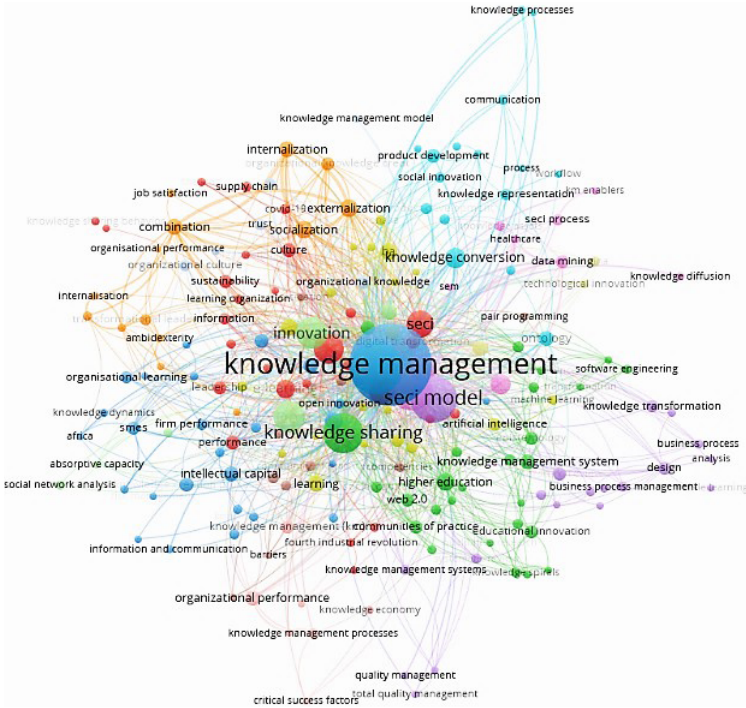

Figure 2. Map of co-words on the SECI model.

highlights issues related to KM in business. The red cluster focuses on organizational performance and process. The blue cluster groups intellectual capital, small and medium enterprises, absorptive capacity, dynamic knowledge, information, and communication. In the green cluster, themes related to knowledge sharing are observed, such as innovation in education, practices in communities, and knowledge management systems. In addition, the topics of recent interest, represented in the periphery of Figure 3, are social innovation (turquoise blue), job satisfaction (orange), health care (violet), business processes (purple), critical success factors (red), social network analysis (green) and organizational learning (blue).

Trends in the use of the SECI Model in the agricultural sector

As for the search results for using the model in the agricultural sector, 168 documents were obtained from 2003 to 2024. The authors' co-keyword analysis shows that knowledge creation and transfer are the main phases applied to this sector (Figure 3). Therefore, it is proposed that the sources of knowledge for knowledge creation be the starting point of the analysis.

A review of the literature confirms that a recurring theme has been knowledge transfer for innovation (Thang *et al.,* 2013; Jayanti *et al.,* 2021) and technology (Gyamfi, 2019; Jayanti *et al.,* 2021), as well as for succession (Souma & Kminami, 2011) and lessons learned from failures (Isoe & Nakatani, 2011). In particular, in Mexico, the high value of tacit knowledge is recognized (Fernandez *et al.,* 2018; Flores Torres *et al.,* 2021). Moreover, in the case of family businesses, knowledge transfer enables the correct management of knowledge (León-Torres & Alvarado-Borrego, 2020).

The original model of knowledge acquisition is linear, starting with socialization and concluding with internalization (Bratianu & Bejinaru, 2020). However, Susanto *et al.* (2021) emphasize that this process is dynamic and adapts to its context. Therefore, it is suggested that, for the agricultural sector, the identification of knowledge sources should be prioritized, as tacit knowledge is very relevant in this sector (Fernandez *et al.,* 2018; Flores Torres *et al.,* 2021). In this new framework, diverse sources of knowledge can be incorporated, such as personal experience, family heritage, indigenous knowledge, and ancestral knowledge, which are not limited and enrich the learning spiral.

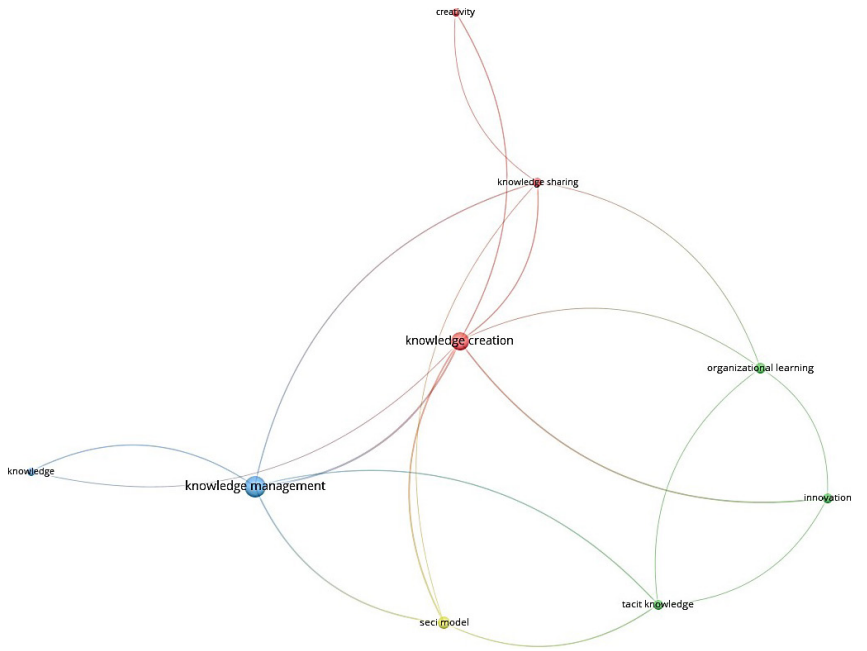

Figure 3. Authors' keywords on the SECI model and agriculture.

We could draw on the research of Jalotjot and Tokuda (2024), who examine the application of the SECI model in vegetable producers in the Philippines. The authors highlight that these producers manage to convert the tacit knowledge they acquire through their experience, facilitating their access to and participation in open innovation. On the other hand, the study by Hamid *et al.* (2023) analyzes the conceptualization of the four knowledge-creation tools of the SECI model in palm oil plantations in Malaysia. Their findings highlight that the most effective knowledge flow is the one based on converting tacit to tacit knowledge. Therefore, this paper proposes that once knowledge is recognized, it is predominantly formalized in a tacit form, either written or verbal. Moreover, historically, the exchange of agricultural knowledge was transmitted from generation to generation or interpersonally over time (Isoe & Nakatani, 2011). In particular, in Mexico, the use of the SECI model supports the empirical description of the dynamic interaction of knowledge among producers, as has been the case of agave production in Oaxaca (Flores Torres *et al.,* 2021), who found opportunities for technological innovation through the incorporation of the SECI model.

The limited amount of KM work in the agricultural sector can be attributed to the tendency of academics to focus on studies of agricultural organizations or structured agribusinesses. In contrast, other researchers, more linked to agricultural fields, conduct direct studies with community producers, exploring indigenous knowledge. This reveals a notable disconnect between the two groups. This phenomenon was exposed at the 23rd European Conference on Knowledge Management in 2022 by Tumwebaze *et al.* (2022). However, Flores Torres *et al.* (2021) highlight that in Mexico, there is still a scarcity of research in this area because practical and mechanistic approaches predominate, relegating rooted knowledge to the background.

DISCUSSION AND CONCLUSIONS

Nonaka and Takeuchi's model has been subject to criticism due to its Japanese origin, which has raised the need to consider other cultures, territories, types of organizations, and contexts (Li & Gao, 2003; Hong, 2012; Khadir-Poggi, 2018; Ahmadani *et al.,* 2023). The SECI model has been the most recognized and applicable in KM (Susanto *et al.,* 2021). Although it is considered somewhat idealistic (Bratianu & Bejinaru, 2020), it is nonetheless a guide for observing knowledge dynamics in organizations. Especially in agricultural organizations in rural territories, since it has been

shown that tacit knowledge and its transfer facilitate the transformation of knowledge into innovations (Flores Torres *et al.,* 2021; Hamid *et al.,* 2023).

This study explored the approach of the SECI model in the agricultural sector in rural territories, revealing a potential area of opportunity for its implementation. In this sector, tacit knowledge acquires significant relevance, especially in its transfer, reinforcing the importance of intergenerational transmission of knowledge. This issue is essential, as the agricultural sector faces challenges due to reduced workers in recent years (Isoe & Nakatani, 2011). In Mexico, this problem emphasizes the phenomenon of "deagrarianization", which mainly affects small-scale agriculture, driven by institutional and economic pressures that have led to a diversification of agricultural and non-agricultural activities (Dobler-Morales *et al.,* 2023).

This paper highlights the need for more research on using the SECI model in the agricultural setting and its relevance in advancing KM research despite the criticisms received. Furthermore, the results of this research point out that, for the agricultural sector, future research on QA can focus on organizational learning mechanisms, social innovation, critical success factors, business processes, and job satisfaction. It is also noted that the available literature focuses on knowledge creation through learning and innovation.

The SECI model for the agricultural sector should begin with the identification of the source of knowledge, prioritizing experiential, family, Indigenous, and ancestral knowledge. Based on this, it is also proposed to make the transmission of tacit knowledge more flexible, without the need to transform it into explicit knowledge, so that it can be transferred verbally, unwritten, or even non-verbally and through observation.

Conflict of interest

The authors declare that there is no conflict of interest.

Data consent statement

The data generated during the development of this study have been included in the article.

Contribution statement

Evelia López-Meza was responsible for conceptualization, research, analysis, data curation, writing the original draft, and editing.

Antonia Terán-Bustamante participated in the conceptualization, research, analysis, validation, writing of the original draft, revision, editing, and manuscript supervision.

Sandra Nelly Leyva-Hernández participated in the manuscript's research, validation, review, and editing. ●

REFERENCES

Ahmadani, A. A. K., Putra, S. A., & Lubis, M. (2023). Comparative Study of Knowledge Management Framework. Proceedings - 2023 3rd International Conference on Electronic and Electrical Engineering and Intelligent System: Responsible Technology for Sustainable Humanity, ICE3IS 2023, 276-281. https://doi.org/10.1109/ICE3IS59323.2023.10335211

Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics, 11*(4), 959-975. https://doi.org/10.1016/j.joi.2017.08.007

Bratianu, C., & Bejinaru, R. (2020). Knowledge dynamics: a thermodynamics approach. *Kybernetes, 49*(1), 6-21. https://doi.org/10.1108/K-02-2019-0122

Breslin, D., & Bailey, K. (2020). Expanding the Conversation through 'Debate Essays' and 'Review Methodology' Papers. *International Journal of Management Reviews 22* (3), 219-221. https://doi.org/10.1111/ijmr.12234

Chatti, M. A., Klamma, R., Jarke, M., & Naeve, A. (2007). The web 2.0 driven SECI model-based learning process. Proceedings - The 7th IEEE International Conference on Advanced Learning Technologies, ICALT 2007, 780-782. https://doi.org/10.1109/ICALT.2007.256

Debmalya, M., Weng Marc, L., Satish, K., & Naveen, D. (2022). Debmalya Guidelines for advancing theory and practice through bibliometric research. *Journal of Business Research, 148,* 101-115. https://doi.org/https://doi.org/10.1016/j.jbusres.2022.04.042

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research, 133,* 285-296. https://doi.org/10.1016/j.jbusres.2021.04.070

Flores Torres, C. L., Olvera-Vargas, L. A., Sánchez Gómez, J., & Contreras-Medina, D. I. (2021). Discovering innovation opportunities based on SECI model: reconfiguring knowledge dynamics of the agricultural artisan production of agave-mezcal, using emerging technologies. *Journal of Knowledge Management, 25*(2), 336-359. https://doi.org/10.1108/JKM-01-2020-0078

Gaviria-Marín, M., Merigó, J. M., & Baier-Fuentes, H. (2019). Knowledge management: A global examination based on bibliometric analysis. *Technological Forecasting and Social Change, 140,* 194-220. https://doi.org/10.1016/j.techfore.2018.07.006

Hamid, Z. A., Chandiram, S. G., Ancelot, R., & Fontaine, H. (2023). Knowledge Creation Among Managers and Supervisors in Palm oil Estates in Malaysia. Proceedings - the 24th European Conference on Knowledge Management, ECKM 2023.

Hong, J. F. L. (2012). Glocalizing Nonaka's knowledge creation model: Issues and challenges. *Management Learning, 43*(2), 199-215. https://doi.org/10.1177/1350507611428853

Isoe, Y., & Nakatani, Y. (2011). Agricultural knowledge transfer based on experience from failures. Proceedings of the IADIS International Conference e-Democracy, Equity and Social Justice 2011, Part of the IADIS, MCCSIS 2011, 263-266.

Jayanti, D. S., Arif, S. S., Susanto, S., & Sutiarso, L. (2021). Implementation of land and water controlling: Case study in Sriharjo Village, Bantul District, Yogyakarta. IOP Conference Series: Earth and Environmental Science, 922(1). https://doi.org/10.1088/1755-1315/922/1/012030

Khadir-Poggi, Y. (2018, September). A Critical Perspective on the Nonakian Paradigm. In *European Conference on Knowledge Management* (pp. 384-XXI). Academic Conferences International Limited.

Li, M., & Gao, F. (2003). Why Nonaka highlights tacit knowledge: A critical review. *Journal of Knowledge Management, 7*(4), 6-14. https://doi.org/10.1108/13673270310492903

León-Torres, D. A., & Alvarado-Borrego, A. (2020). Prácticas en gestión del conocimiento de la empresa familiar agropecuaria. *Ra Ximhai, 16* (5), 99-124

Magnier-Watanabe, R., & Benton, C. (2013). Enablers of knowledge management across borders: A structural approach. *International Journal of Innovation and Technology Management, 10*(4). https://doi.org/10.1142/S0219877013500120

Martínez-Martínez, A., Cazzaniga, F., Cegarra-Navarro, J. G., Bolisani, E., & Wensley, A. (2018). Overcoming environmental barriers through KM practices. In S. E., B. E., & D. M. E. (Eds.), Proceedings of the European Conference on Knowledge Management, ECKM. Vol. 1, 521-529.

Nonaka, I., Byosiere, P., Borucki, C. C., & Konno, N. (1994). Organizational Knowledge Creation Theory: a First Comprehesive Test. *International Business, 3*(4), 337-351.

Nonaka, I., Toyama, R., & Konno, N. (2000). SECI, Ba and Leadership: A Unified Model of Dynamic Knowledge Creation. *Long Range Planning, 33*(1), 5-34. https://doi.org/10.1016/S0024-6301(99)00115-6

Nonaka, & Takeuchi. (1995). The Knowledge-creating company: How Japanese companies create the dynamics of innovation: I. Nonaka & H. Takeuchi (p. 284).

Seghroucheni, O. Z., Al Achhab, M., & Lazaar, M. (2023). Systematic Review on the Conversion of Tacit Knowledge. In *2023 7th IEEE Congress on Information Science and Technology (CiSt)* (pp. 123-128). IEEE.

Souma, T., & Kminami, L. (2011). Knowledge management in agricultural succession. *Studies in Regional Science, 41*(4), 943-955. https://doi.org/10.2457/srs.41.943

Susanto, J., Permata, J., Sensuse, D. I., & Elisabeth, D. (2021). Systematic Literature Review: Knowledge Management Model in Private Organizations. Proceedings - 2nd International Conference on Computer Science and Engineering: The Effects of the Digital World After Pandemic (EDWAP), IC2SE 2021. https://doi.org/10.1109/IC2SE52832.2021.9791468

Tee, M. Y., & Lee, S. S. (2012). Advancing understanding using Nonaka's model of knowledge creation and problem-based learning. 10th International Conference of the

Learning Sciences: The Future of Learning, ICLS 2012 - Proceedings, 2, 467-468.

Tumwebaze, R. P., Walsh, J., & Lannon, J. (2022). A Systematic Literature Review of Agriculture Knowledge Management in KM and non-KM Journals. *European Conference on Knowledge Management, Vol. 23* (2), 1195-1201. https://doi.org/10.34190/eckm.23.2.313

Yusoff, M. Z., Saadon, M. S. I., Salleh, N. H., Kamaron, T., & Ahmad, H. (2018). Literature Review on Determinants Affecting Knowledge Sharing. *The Journal of Social Sciences Research,* 860-866.