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Analysis of forgotten incidences on knowledge transfer and management skills in Tunja SME's

Análisis de incidencias olvidadas sobre transferencia de conocimiento y habilidades gerenciales en pymes de Tunja

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ABSTRACT

The main objective of this research is to examine the forgotten incidences in knowledge transfer and management skills within small and medium-sized enterprises (SMEs) in Tunja. The study employs the Experton method, distance measures, and forgotten effects theory to identify secondary-generation relationships between knowledge transfer (causes) and management skills (effects). The population consisted of 142 SMEs registered and active in the Chamber of Commerce of Tunja, operating in the secondary sector and with more than five years of existence. A convenience sample of 41 companies was selected. The findings show that forgotten effects are linked to the quality of knowledge transfer, highlighting the importance of formal mechanisms, communication clarity, and the ability to set priorities as factors that enhance productivity and mentoring. The originality of this study lies in uncovering hidden phenomena in knowledge transfer, particularly those arising from implicit and tacit knowledge exchanges, using fuzzy methodologies that allow for managing subjectivity. Limitations are related to the sample size and restricted access to confidential information. This research contributes to academic and business development by promoting SME strengthening, regional economic growth, and job creation in the capital of Boyacá.

Keywords: Knowledge transfer, Management skills, Forgotten effects, Incidences, SME's.

R E S U M E N

El objetivo principal de esta investigación es examinar las incidencias olvidadas en la transferencia de conocimiento y las habilidades de gestión en pequeñas y medianas empresas (PYMES) de Tunja. Para ello, se utilizó el método Experton, medidas de distancia y la teoría de los efectos olvidados, con el fin de identificar relaciones de segunda generación entre la transferencia de conocimiento (causas) y las habilidades de gestión (efectos). La población estuvo compuesta por 142 PYMES del sector secundario registradas y activas en la Cámara de Comercio de Tunja, con más de cinco años de funcionamiento. La muestra, seleccionada por conveniencia, incluyó 41 empresas. Los resultados muestran que los efectos olvidados están asociados a la calidad en la transferencia, destacándose el papel de los mecanismos formales, la claridad en la comunicación y la capacidad para establecer prioridades como factores que fortalecen la productividad y los procesos de mentoría. La originalidad del estudio radica en la identificación de fenómenos ocultos en la transferencia de conocimiento, especialmente en transacciones implícitas y tácitas, mediante el uso de metodologías difusas que permiten gestionar la subjetividad. Las principales limitaciones se relacionan con el tamaño muestral y las restricciones de acceso a información confidencial. Esta investigación aporta al fortalecimiento académico y empresarial, promoviendo el desarrollo de las PYMES, el crecimiento económico regional y la generación de empleo en la capital de Boyacá.

Palabras clave: Transferencia de conocimiento, Habilidades de gestión, Efectos olvidados, Incidencias, PYMES.

1. INTRODUCTION

Based on the uncertainty and complexity of contemporary markets, knowledge management (KM) is identified as a primary component for organizations to achieve favorable long-term performance (Anand *et al.*, 2021; Durst *et al.*, 2024). This theme has been the subject of extensive research, with studies focusing on various aspects including context, processes, and utilization (Sergeeva & Andreeva, 2016). Research has been predominantly conducted within large organizations (Serenko, 2013), which is noteworthy given the prevailing perspective that small and medium-sized enterprises (SMEs) are pivotal to economic growth. Indeed, in almost all countries, over 90% of companies fall into this category (Massaro *et al.*, 2016). Within the context of SMEs, it has been observed that their decision-making processes deviate from those employed by large corporations (Hauser *et al.*, 2020). Thus, SMEs are distinguished by their greater adaptability, flexibility, efficiency, and speed in decision-making processes (Branicki *et al.*, 2017).

Indeed, KM has been demonstrated to facilitate the enhancement of such processes (Durst *et al.*, 2024; Rao *et al.*, 2023). It provides a vital support system for companies of this nature, thereby engendering greater competitiveness in the face of mounting uncertainty on a global scale and enabling them to face these challenges. In this sense, companies that can manage their knowledge will demonstrate enhanced performance in their projects (Landaeta, 2008) and will establish greater resilience and superior competitive advantages, which must be incorporated into the organization's growth and expansion plans (Oranga, 2023; Suppiah & Singh Sandhu, 2011). Transferring accumulated knowledge is essential for sustaining competitiveness and fostering organizational learning.

Effective knowledge transfer (KT) depends on the dissemination, adaptation, and absorption of knowledge, requiring strategies that promote collaboration, mentoring, and coaching. The success of KT varies with organizational structures, processes, activities, and the capabilities of the actors involved (Modi & Mabert, 2007; R. Zhou *et al.*, 2025). Thus, organizations must articulate clear mechanisms and robust evaluation systems to consolidate knowledge assets and transform KT into a sustained source of competitive advantage (Boudreau, 2003).

Among the multiple challenges faced by KT processes is the development of managerial skills, which, according to Katz (1974) encompass technical, human, and conceptual dimensions, with leadership emerging as a critical component. A persistent difficulty in KT lies in accurately measuring its effectiveness, given its complexity and the broad array of interconnected elements that must be articulated, evaluated, and reinforced to align with the organization's competitive advantage (Boudreau, 2003). This complexity often leads to the omission of key factors in KT initiatives, undermining their impact. Consequently, conducting specific local or regional studies becomes essential to gain a deeper understanding of how KT processes unfold within diverse organizational contexts.

In this sense, the primary objective is to examine the instances of knowledge transfer and management skills in Tunja's SMEs that have been overlooked. The experton method is utilized for this purpose, employing distance measures and forgotten effects theory. This enables the generation of matrices of secondary relationships between the various elements, thereby facilitating the identification of second-order effects with the potential to generate a more substantial impact on the relationships between the variables (Kaufmann & Gil-Aluja, 1988). In a similar manner, two dimensions have been identified: knowledge transfer and management skills. These are the results of a literature review, the purpose of which was to identify forgotten incidents. The findings indicate that instances of transfer of knowledge and managerial skills being overlooked are associated with the quality of transfer. The utilization of formal transfer mechanisms, effective communication, and the capacity to establish priorities can enhance productivity and mentoring outcomes. It is imperative to emphasize that the dissemination of knowledge is predominantly facilitated by practice, the caliber of information, and mentorship. These elements constitute the primary conduit for the internalization of knowledge, thereby fostering the development of competencies and skills that are instrumental in enhancing productivity and ensuring the sustained viability of the organization.

Finally, the article is organized as follows: Section 2 presents the theoretical framework related to knowledge transfer and management skills and explains fuzzy methods and forgotten effects theory. Section 3 discusses the methodology and method used in the research. Section 4 presents the main results, while Section 6 discusses the second-order relationships obtained. Finally, Section 7 summarizes the main conclusions of the article.

2. THEORETICAL FRAMEWORK

2.1. Knowledge management

Knowledge Management (KM) is a strategic process focused on capturing, organizing, and leveraging organizational knowledge to sustain competitive advantage (Ferreira *et al.*, 2022). It involves managing two types of knowledge: tacit, embedded in individuals' experiences, and explicit, codified in systems and documents (Ferreira *et al.*, 2022; Parente *et al.*, 2022). Effective KM requires integrated processes of knowledge creation, storage, sharing, and application (de Castro *et al.*, 2022).

The SECI model (Socialization, Externalization, Combination, and Internalization) is a foundational framework for understanding the dynamic interplay between tacit and explicit knowledge (Nonaka *et al.*, 2000). It offers a comprehensive perspective on the reciprocal relationship between these two forms of knowledge (Guo *et al.*, 2020). It provides a valuable reference point for understanding how they transform and interact within complex knowledge systems (Nakash & Bouhnik, 2023). Socialization involves sharing experiences between individuals, allowing tacit knowledge to be acquired in a social context (Abubakar *et al.*, 2019). Externalization transforms this tacit knowledge into explicit knowledge using diagrams and documentation (Guo *et al.*, 2020). Combining these factors enables the organization of this explicit knowledge into coherent systems, while internalization ensures that individuals absorb it and integrate it into their routines (Nakash & Bouhnik, 2023).

Utilizing information and communication technologies (ICT), including artificial intelligence and big data systems, has

led to substantial advancements in knowledge processing and application capabilities (Di Vaio *et al.*, 2020). The utilization of these tools has been demonstrated to facilitate rapid access to information and contribute to the automation of processes, thereby enabling more efficient distribution (Ramadan *et al.*, 2017). However, organizations must confront challenges such as the fragmentation of knowledge into silos, employee resistance to change, and the rapid obsolescence of information (Wu *et al.*, 2023).

A strategic approach to addressing these challenges involves fostering an organizational culture that values continuous learning and interdisciplinary collaboration (Azeem *et al.*, 2021). Training programs, internal knowledge networks, and reward systems can be key tools that encourage the use and creation of knowledge in organizations (Upadhyay & Kumar, 2020). Furthermore, it is imperative to assess the efficacy of knowledge management by evaluating indicators such as the agility with which problems are resolved, the extent to which innovations are implemented, and the level of employee satisfaction with the available tools (Azeem *et al.*, 2021).

2.1.1. Knowledge Transfer

Knowledge transfer is a critical process for ensuring the dissemination and adaptation of knowledge to different organizational contexts. This exchange involves not only the transmission of information but also the assurance of comprehension and application of that knowledge in the recipient's context (Q. Zhou *et al.*, 2022). The knowledge transfer process can be structured in various ways. Linear models, in which the flow of information is unidirectional, and interactive models, in which bidirectional and collaborative communication are promoted, are two examples of such structures (Liu *et al.*, 2022).

The absorptive capacity of the recipient is a pivotal factor in the transfer of knowledge. This capacity depends on the recipient's prior training, experience, and motivation (Silva *et al.*, 2024). The organizational context exerts a substantial influence, for example, a culture that fosters trust, open communication, and teamwork can markedly facilitate the exchange (Ortiz *et al.*, 2023).

The advent of technological tools such as collaborative platforms, learning management systems (LMS), and instant communication applications has precipitated a paradigm shift in how organizations disseminate knowledge (Rabiman *et al.*, 2020). These platforms facilitate the expeditious transmission of knowledge across diverse departments and geographical locations, thereby attenuating temporal and spatial constraints(Hsu *et al.*, 2021). Nevertheless, the efficacy of these technologies is contingent upon implementing effective strategies to optimize their impact.

According to Cox and Overbey (2023), strategies such as the structured documentation of processes, the implementation of mentoring and coaching programs, and the creation of communities of practice can strengthen knowledge transfer. These communities, which consist of individuals who share common interests and goals, function as forums for collaborative learning and problem-solving (Napathorn, 2022). Constant feedback and adaptation to the organization's changing needs are essential for the success of these strategies (Martínez *et al.*, 2019)

In knowledge transfer, leaders assume a pivotal role by fostering an environment prioritizing transparency and trust, and exchanging ideas (Civera *et al.*, 2020). Effective leadership has been demonstrated to supersede cultural and organizational impediments that impede knowledge transfer (Q. Zhou *et al.*, 2023). In addition, the regular evaluation of the effectiveness of transfer mechanisms is imperative. Such evaluations should utilize metrics such as the level of application of the knowledge received, the time required for its integration, and the results obtained (Rashid *et al.*, 2021).

2.1.2. Management Skills

Management skills are essential enablers of effective KM and KT within organizations. Katz (1974) identifies three primary categories of skills: technical, referring to task-specific knowledge; human, emphasizing interpersonal effectiveness; and conceptual, relating to strategic thinking and systemic understanding. Mastery of these skills allows managers to coordinate teams, promote learning environments, and align individual actions with broader organizational goals (Boudreau, 2003).

Leadership plays a pivotal role in strengthening KM processes (Gürlek & Çemberci, 2020). Transformational leadership, in particular, fosters an atmosphere of trust, collaboration, and shared vision, crucial for promoting knowledge sharing and innovation (Rahimi *et al.*, 2022). Transformational leaders empower employees to engage actively with knowledge processes, thereby enhancing organizational agility and resilience (Kaur Bagga *et al.*, 2023).

The technological evolution of organizations has made digital literacy a fundamental competency for managers (Bitkowska *et al.*, 2023). Efficient use of knowledge management systems, collaborative platforms, and artificial intelligence tools optimize knowledge flows and accelerate decision-making processes (Boccoli *et al.*, 2024). Managers must not only adopt these technologies but also drive their integration into everyday organizational practices (Gu *et al.*, 2024).

Another essential skill for managers is the ability to solve complex problems (Myszkowski *et al.*, 2015). Managers must be able to analyze data, identify patterns, and propose practical solutions that integrate available knowledge (Yeadon-Lee & Hall, 2013). Effective communication skills must complement this analytical approach, allowing managers to convey ideas clearly and persuasively to different audiences within the organization (Afsar & Umrani, 2019).

Future-oriented analyses emphasize that competencies such as analytical thinking, creativity, technological design, critical evaluation, complex problem solving, and emotional intelligence will define the managerial profiles needed to sustain competitiveness (Konopik *et al.*, 2022; Mele *et al.*, 2024). Managers will be required not only to master these skills but also to foster dynamic learning ecosystems that continuously promote innovation and strategic adaptability (Rabelo Neto *et al.*, 2024)

2.2. *Fuzzy methods*

Fuzzy methodology is a mathematical approach based on the theory of fuzzy sets developed by Zadeh, (1965) that allows

modeling problems in which uncertainty and subjectivity play a determining role (Blanco-Mesa & León-Castro, 2024). Using fuzzy logic in such contexts enables the management of information characterized by ambiguity, imprecision, or incompleteness, thereby facilitating enhanced decision-making processes in scenarios where traditional models prove to be inadequate (García-Orozco *et al.*, 2022; Yager, 2003).

One of the primary advantages of fuzzy logic is its capacity to furnish analytical frameworks for evaluating problems characterized by non-deterministic relationships between variables (Türk *et al.*, 2021). This approach has been extensively applied in multicriteria decision making (MCDM), in which various alternatives are considered without clear delineation of exact values (Amoozad Mahdiraji *et al.*, 2024; Jahangiri *et al.*, 2020). This classification encompasses multi-attribute decision making (MADM), multiple objectives (MODM), and uncertain multi-attribute decision making (UMADM) (Hendukolaie *et al.*, 2011; Keshavarz Ghorabaee *et al.*, 2017), which enables the incorporation of subjectivity in the evaluation of variables (Nazari *et al.*, 2012).

Another salient feature of fuzzy methodology is its capacity to curtail errors in data modeling and enhance the precision of information evaluation (Piltan & Kim, 2023). This is particularly salient as it enables the incorporation of subjective data into decision-making processes and cultivates the formulation of adaptive organizational strategies (Banaeian *et al.*, 2018).

Additionally, fuzzy logic has emerged as a foundational instrument in discerning the interrelationships among disparate organizational factors (Azadnia *et al.*, 2015). Its capacity to interpret information with enhanced flexibility mitigates modeling errors and optimizes the efficacy of the criteria employed to evaluate critical data (Dorokhova *et al.*, 2024).

Furthermore, fuzzy logic facilitates the resolution of decision-making challenges in highly dynamic systems characterized by multiple interdependent variables (Shahmohammad *et al.*, 2024). At the organizational level, this capacity enables the modeling of uncertainty, thereby providing mathematical tools to optimize information transfer and enhance operational efficiency (Misnik & Shalukhova, 2024), while its aptitude for multicriteria analysis enables the mitigation of biases in decision-making processes, thereby ensuring that business strategies are more robust and better grounded in complex and uncertain data (Wang *et al.*, 2015).

Different levels of truth are proposed from this perspective, and the interpretation of reality is from different perspectives with varying degrees of acceptance (Kaufmann & Gil-Aluja, 1988). This suggests that information may be fragmentary or incomplete, requiring analytical tools that facilitate the evaluation of the interdependence between factors (Alfaro-Calderón *et al.*, 2019). In this context, the concept of incidence is pivotal, as it enables the identification of direct and indirect relationships between phenomena, providing an analytical framework that is largely free of significant errors (Kaufmann & Gil-Aluja, 1988). Incidence, understood as the interaction between entities within a system, facilitates the visualization of how variables influence each other (González-Morcillo *et al.*, 2023).

Despite the complexity of measurement due to its subjective nature, analysis of this phenomenon contributes to improved informed decision making (Martorell-Cunill *et al.*, 2013). It also recognizes the existence of effects that, although not immediately evident, can generate relevant impacts over time (Olazabal-Lugo *et al.*, 2019). Consequently, reality comprises interconnected systems wherein each activity is subject to a cause-and-effect relationship (Gil-Lafuente *et al.*, 2012). The intensity and gradualness of these incidences are influenced by human subjectivity, which is affected by risk perception, experience, intuition, and attitude (Kaufmann & Gil-Aluja, 1988). Fuzzy methodology, founded on heuristics and experiential learning, facilitates enhanced comprehension of phenomena and the development of more precise strategies, thereby reducing uncertainty in organizational decision making (Blanco-Mesa & León-Castro, 2024).

2.2.1. Forgotten effects theory

The forgotten effects method, developed by Kaufmann and Gil-Aluja (1988) is a theoretical framework that identifies non-obvious causal relationships within an organizational system. This approach utilizes incidence matrices to detect the indirect influence of certain variables on the dynamics of knowledge management and strategic decision-making (García-Orozco *et al.*, 2021; Ruiz *et al.*, 2022). The forgotten effects analysis is predicated on constructing matrices representing direct and indirect relationships between causes and effects (Alfaro-Calderón *et al.*, 2019). By employing maximum-minimum convolutions, hidden patterns in the interaction of variables can be uncovered, allowing for improved formulation of business strategies (Kaufmann & Gil-Aluja, 1988). Detecting neglected effects facilitates improved planning by ensuring that all influential factors are considered in decision-making (Velazquez-Cazares *et al.*, 2021). This is especially relevant within MSMEs, where the lack of recognition of certain effects can generate inefficiencies in learning and training processes (Blanco-Mesa *et al.*, 2021). Furthermore, it fosters a more comprehensive understanding of the organizational impact, thereby enabling the development of precise interventions that enhance the efficiency and sustainability of the company (Maqueda-Lafuente *et al.*, 2013).

The forgotten effects method has been a staple in business management, particularly in strategic decision-making and uncertainty reduction (Cisneros Quintanilla *et al.*, 2023). Its integration into financial analysis has enabled the identification of factors influencing the economic stability of organizations, offering a more nuanced perspective on how certain decisions can generate indirect effects that are not immediately apparent (Flores-Romero & González-Santoyo, 2020). This approach has been particularly impactful in studies examining business competitiveness, where the intricate interplay between financial planning, cost structure, and competitive position has been thoroughly investigated by identifying these latent variables (Patel *et al.*, 2023). Moreover, recent research has employed the theory of forgotten effects in the tourism sector to assess how various variables, such as infrastructure, complementary services, and accessibility, influence competitiveness and tourism gross domestic product (GDP) growth in emerging destinations (González-Morcillo *et al.*, 2023). It has been demonstrated that there are multiple incidence factors that, although not immediately considered, have a significant impact on the economic

performance of a region (Velazquez-Cazares *et al.*, 2021). The application of this method has been expanded to various fields, including economics, sociology, and management, to identify latent relationships between variables in complex systems (Mulet-Forteza *et al.*, 2024). The method's capacity to analyze interdependencies across diverse domains enables the anticipation of secondary effects that would otherwise remain unperceived (Patel *et al.*, 2023). This approach provides analytical tools in a dynamic environment to improve decision-making and increase efficiency in formulating business policies and strategies (Linares-Mustarós *et al.*, 2020).

3. METHODOLOGY

This study on knowledge transfer and managerial skills in Tunja SMEs is developed using a methodology that combines subjective data collection with advanced methods of analysis, such as the application of the Experton Method (Kaufmann & Gil-Aluja, 1993), Hamming's distance (1950) and the method of the Theory of Forgotten Effects (Kaufmann & Gil-Aluja, 1988).

3.1. Model to find the forgotten effects

The development of the model was informed by the theoretical foundations represented by the dimensions, variables, and methods to be applied (Figure 1). A logical sequence was established for the treatment process, to identify neglected effects. In this process, data collection (opinions and subjective criteria) related to the dimensions defined for the study was considered. The treatment process was then presented based on cause-and-effect conditions that allowed for establishing intermediate relationships until the forgotten effects were found. This process culminates in identifying novel relationships between knowledge transfer and managerial skills. The methods employed facilitate the calculation of semantic scales, which are transformed into representative numerical values. These numerical values establish approximate relationships and relative explanations, yielding vast possibilities (Blanco-Mesa *et al.*, 2021).

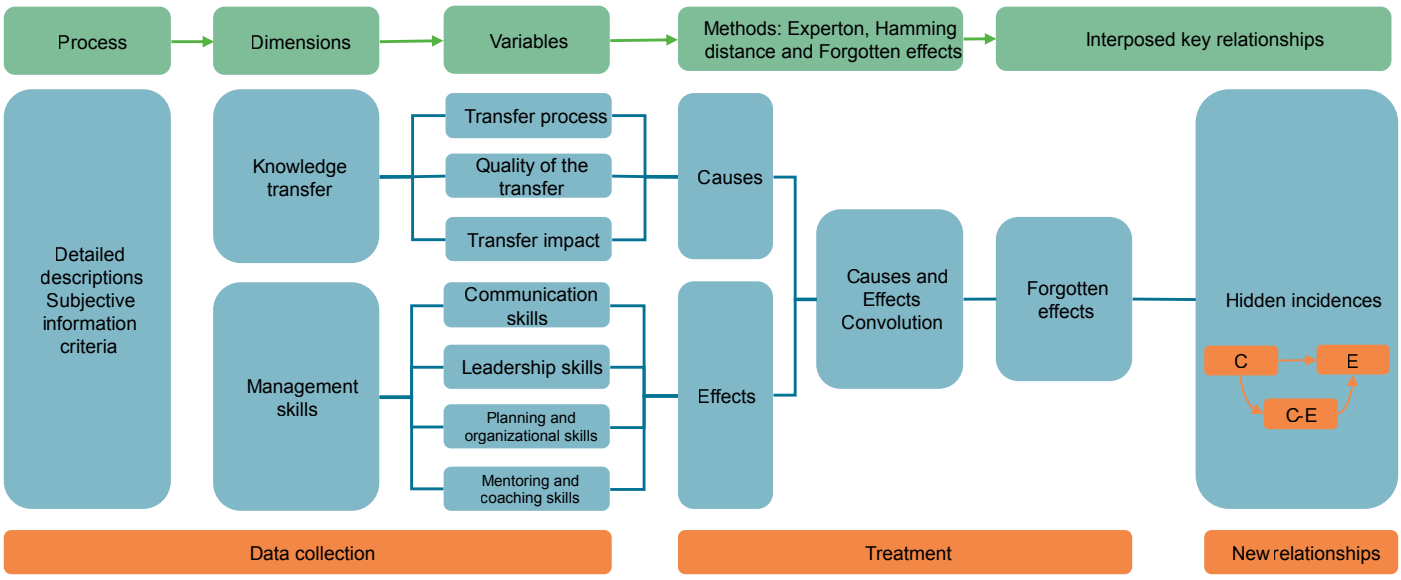

Figure 1
Model to find the forgotten effects between knowledge transfer and managerial skills in SMEs
Source: Own elaboration based on the studies of Blanco-Mesa *et al.*, (2021).

These relationships indicate the significance of the information by their incidence (Blanco-Mesa *et al.*, 2021). The intensity and linkage of relationships are pivotal in determining their occurrence. According to (Blanco-Mesa *et al.*, 2018) intensity pertains to the presence of a connecting agent within the relationship. This enables analysis of convergence, boundary, periodicity, and non-standard situations represented in potential connections. Linkage, conversely, demonstrates the direct and indirect connections of relationships. This facilitates the examination of variations in the intensity and strength of relationships and the observation of behavior.

3.2. Case study

The population consisted of 142 small and medium-sized enterprises (SMEs) registered and active in the Chamber of Commerce of Tunja, operating within the secondary sector and founded more than five years ago, according to official records. The sample is selected through a purposive sampling approach (Sharp, 2003) and convenience criteria (Mackiewicz, 2018) resulting in 41 participating companies, where managers were asked to answer the questionnaire. This selection aimed to ensure that the organizations had sufficient operational maturity and stability to provide

reliable insights into knowledge transfer processes. Although the study sample is small, the data obtained are sufficient to carry out the treatments using the proposed techniques, such as the expert method, which allows the opinions and degree of belief of small samples to be aggregated to obtain a single representative value.

3.3. Data collection

For data collection, a survey was developed that focused on the transfer of knowledge and managerial skills. This survey was based on a theoretical review, which facilitated the identification of the key dimensions and variables for the study. The following dimensions and variables are shown below: Table 1 delineates the pivotal variables in evaluating knowledge transfer. These variables are derived from the SECI model (Hoe, 2006; Nonaka, 2007; Nonaka *et al.*, 1996, 2000; Nonaka & Konno, 1998; Nonaka & von Krogh, 2009) and from Knowledge Creation Theory (Nonaka & Toyama, 2005), as well as the phases of knowledge transfer (Szulanski, 1996, 2000) and the theory of the Nature of Knowledge and Organizational Context (Argote & Ingram, 2000). Table 2 delineates the fundamental variables of managerial skills. These variables were identified using the following models: the managerial competencies model (Boyatzis, 2002), the managerial competencies model (Rahimi *et al.*, 2022), the 360-degree feedback managerial skills model (Atkins & Wood, 2002) and the model of managerial skills in organizations (Katz, 1974).

Table 1
Knowledge Transfer Dimension

Dimension 1	Variables	Indicators	Identifier
Knowledge transfer (Argote & Ingram, 2000; Hoe, 2006; Nonaka, 1994, 2007; Nonaka *et al.*, 1996, 2000; Nonaka & Konno, 1998; Ruth *et al.*, 2017; Szulanski, 1996, 2000)	Transfer process	Existence of formal transfer mechanisms.	TP1
		Frequency of knowledge transfer.	TP2
	Quality of the transfer	Clarity of transferred knowledge.	QT1
		Relevance of transferred knowledge.	QT2
	Transfer impact	Applicability of acquired knowledge.	TI1
		Improvement in efficiency or productivity.	TI2

Source: Own elaboration.

Table2
Management Skills Dimension

Dimension 2	Variables	Indicators	Identifier
Management skills (Atkins & Wood, 2002; Boyatzis, 2002; Katz, 1974; Rahimi *et al.*, 2022)	Communication skills	Clarity of communication.	CS1
		Frequency and quality of feedback	CS2
	Leadership skills	Ability to inspire and motivate.	LS1
		Ability to make decisions.	LS2
	Planning and organizational skills	Ability to set goals and priorities.	POS1
		Time and resource management.	POS2
	Mentoring and coaching skills	Availability and effectiveness of the mentor.	MCS1
		Development of competencies and skills	MCS2

Source: Own elaboration.

A consideration of the variables reveals that the inquiries within Dimension 1 pertain to knowledge transfer within the organizational context, encompassing formal mechanisms and the relevance of the transferred knowledge. Dimension 2 encompasses inquiries about the managerial competencies deemed indispensable for knowledge transfer, including leadership, planning, mentoring, and coaching skills. The data collection instrument employs a semantic scale to assess the cause-and-effect relationship between knowledge transfer and managerial skills in businesses (see Table 3).

Table 3
Semantic scale

SS	TD	SD	I	SA	TA
NC	0.00	0.25	0.50	0.75	1

Source: Own elaboration. SS: semantic scale, NC: numerical criteria, SD: Total disagree, SD: strongly disagree, I: indifferent, SA: strongly agree, TA: Total agree.

A reliability test is also performed (Hernández *et al.*, 2014) using Cronbach's coefficient, the results of which yielded 0.87, located in the range of strong reliability. This indicates that the instrument presents good internal consistency. Finally, the FuzzyLog© (Gil-Lafuente, 2012) was used to process the collected data. This software utilizes mathematical models to demonstrate second-order incidence relationships and the degree of oblivion in initial estimates. Additionally, it provides the results of the incidence matrix calculation in both graphic and numerical formats (Barragán & Marquez, 2012).

3.4. Methods

The present research employed a variety of methodologies for data analysis, including the entropy method, Hamming's distance, and the theory of forgotten effects. These approaches facilitate the prioritization of understanding and interpretation of information based on its meaning (Blanco-Mesa *et al.*, 2023).

3.4.1. Experton method

Kaufmann's method is a mathematical approach grounded in fuzzy set theory and the aggregation of expert opinions (Kaufmann & Gil-Aluja, 1993). The presentation of expert opinions is in the form of a probability interval, representing their degree of belief about an event, the α-corte, is defined as follows:

$$\forall a \in E : \left[a_j^*(a)\right], \left[a_j^*(a)\right] \subset [0,1], \tag{1}$$

where ⊂ means the inclusion set and j means the expert.

According to Blanco-Mesa *et al.* (2023) experton is characterized by 1) non-strict horizontal increasing monotonicity property[1] and 2) non-strict vertical increasing monotonicity property, except at level 0 which always takes the value 1. Then:

$$\forall \alpha \in [0,1] : \alpha_1(a) \leq \alpha_2(a) en\ \alpha_1\left[\alpha_1(a), \alpha_2(a)\right], \tag{2}$$

$$\forall \alpha\alpha' \in [0,1] : a' > a \Rightarrow \left(\alpha_1(a)\right) \leq \alpha_1 a', \alpha_2(a) < a_2(a'), \tag{3}$$

$$(a = 0) \Rightarrow \left(a_1(a) = 1, a_2(a) = 1\right). \tag{4}$$

The variables are evaluated using a number $\alpha \in [0, 1]$ or confidence intervals.

3.4.2. Hamming's Distance

The Hamming (1950) distance allows us to estimate the comparison between two arguments x_i and y_i. It can be defined as follows.

Definition 1. A Hamming distance of dimension n is a mapping d_H: $R^n x R^n \rightarrow R$, such as:

$$d_H\left(\langle x_1, y_1\rangle, \ldots, \langle x_n, y_n\rangle\right) = \sum_{j=1}^{n} \left|x_i - y_i\right|, \tag{5}$$

where x_i and y_i are the ith arguments of the sets X and Y.

3.4.3. Forgotten effects method

The use of the forgotten effects method allows the identification of hidden causal relationships between factors through incidence matrices (García-Huerta & Kido-Cruz, 2022; Gil-Lafuente *et al.*, 2020; Ruiz *et al.*, 2022).

The incidence matrices are represented in the relationships between causes (A) and effects (B), where there is an incidence a_i sobre b_j. The values of the characteristic function of the pair (a_i, b_j) are evaluated between [0,1]:

$$\forall\left(a_i, b_j\right)\right) \Rightarrow \mathcal{M}\left(a_i, b_j\right)\right) \in [0,1]. \tag{6}$$

Then the direct incidence matrix is defined by the set of valued pairs of elements:

$$\tilde{M} = \begin{array}{c|cccc} & b_1 & b_2 & \cdots & b_j \\ a_1 & u_{a_1b_1} & u_{a_1b_2} & \cdots & u_{a_1b_j} \\ a_2 & u_{a_2b_1} & u_{a_1b_2} & \cdots & u_{a_2b_j} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ a_i & u_{a_ib_1} & u_{a_ib_2} & \cdots & u_{a_ib_j} \end{array} \tag{7}$$

Therefore, the direct relationship matrices are given by:

$$[\tilde{M}] = \left\{Ma_ib_j \in [0,1] / i = 1,2,\ldots,n; j = 1,2,\ldots,m\right\} \tag{8}$$

According to M_{aibj}, the characteristic function of the permanence of the elements of the matrix $[\tilde{M}]$, where $\tilde{M}$ is formed by the effects that the elements of set A have on set B. Indirect relations are given by:

$$[\tilde{A}] = \left\{Ma_ib_j \in [0,1] i, j = 1,2,\ldots,n\right\} \tag{9}$$

$$[\tilde{B}] = \left\{Ma_ib_j \in [0,1] i, j = 1,2,\ldots,m\right\} \tag{10}$$

where $[\tilde{A}]$ collects the occurrence relations between the causes and $[\tilde{B}]$ does so for the effects. Both matrices are reflexive, and it is satisfied that $M_{aibj} = 1 \forall i = 1, 2..., n$ y que $M_{bibj} = 1 \forall i = 1, 2..., m$., and both matrices will be symmetrical. The incidences of the second generation are given by:

$$[\tilde{A}] \circ [\tilde{M}] \circ [\tilde{B}] = [\tilde{M}^*] \tag{11}$$

Thus, with the three matrices defined, causal relationships are established through maximum-minimum composition:

[1] This means that the membership characteristic function of the positively sloping function is less than or equal to the characteristic function of the negative slope function (Blanco-Mesa *et al.*, 2023).

$$\begin{array}{ccccccc}
\rightarrow & a_1 & a_2 & \cdots & a_n \\
a_1 & 1 & u_{a_1a_2} & \cdots & u_{a_1a_n} \\
a_2 & u_{a_2a_1} & 1 & \cdots & u_{a_2a_n} \\
\vdots & \vdots & \vdots & \vdots & \vdots \\
a_n & u_{a_na_1} & u_{a_na_2} & \cdots & a_n
\end{array}
\underset{[\tilde{A}]}{}
\circ
\begin{array}{ccccccc}
\rightarrow & b_1 & b_2 & \cdots & b_m \\
a_1 & 1 & u_{a_1b_2} & \cdots & u_{a_1b_m} \\
a_2 & u_{a_2b_1} & 1 & \cdots & u_{a_2b_m} \\
\vdots & \vdots & \vdots & \vdots & \vdots \\
a_n & u_{a_nb_1} & u_{a_nb_2} & \cdots & 1
\end{array}
\underset{[\tilde{M}]}{}
\circ
\begin{array}{ccccccc}
\rightarrow & b_1 & b_2 & \cdots & b_n \\
b_1 & 1 & u_{b_1b_2} & \cdots & u_{b_1b_m} \\
b_2 & u_{b_2b_1} & 1 & \cdots & u_{b_2b_m} \\
\vdots & \vdots & \vdots & \vdots & \vdots \\
b_m & u_{b_mb_1} & u_{b_mb_2} & \cdots & 1
\end{array}
\underset{[\tilde{B}]}{}$$

$$= \begin{array}{ccccccc}
\rightarrow & b_1 & b_2 & \cdots & b_m \\
a_1 & u_{a_1b_1} & u_{a_1b_2} & \cdots & u_{a_1b_m} \\
a_2 & u_{a_2b_1} & u_{a_2b_2} & \cdots & u_{a_2b_m} \\
\vdots & \vdots & \vdots & \vdots & \vdots \\
a_n & u_{a_nb_1} & u_{a_nb_2} & \cdots & u_{a_nb_m}
\end{array}
\underset{[\tilde{M}^*]}{} \qquad (12)$$

To find the degree of oblivion of some causal relationships is given by:

$$[\tilde{O}]=[\tilde{M}^*]-[\tilde{M}] \qquad (13)$$

Therefore, if the value of the characteristic function of the matrix elements $[\tilde{O}]$ is high, the degree of forgetting in the initial incidence ratio is the highest.

$$[\tilde{O}]= \begin{array}{ccccc}
\rightarrow & b_1 & b_2 & \cdots & b_m \\
a_1 & u^*_{a_1b_1}-u_{a_1b_1} & u^*_{a_1b_2}-u_{a_1b_2} & \cdots & u^*_{a_1b_m}-u_{a_1b_m} \\
a_2 & u^*_{a_2b_1}-u_{a_2b_1} & u^*_{a_2b_2}-u_{a_2b_2} & \cdots & u^*_{a_2b_m}-u_{a_2b_m} \\
\vdots & \vdots & \vdots & \vdots & \vdots \\
a_m & u^*_{a_nb_1}-u_{a_nb_1} & u^*_{a_nb_2}-u_{a_nb_2} & \cdots & u^*_{a_nb_m}-u_{a_nb_m}
\end{array}
\underset{[\tilde{A}]}{} \qquad (14)$$

4. RESULTS

The results of the proposed methods are presented below. First, the results of the experton method are presented, and then those of the neglected effects are presented, using Hamming's distance to construct the cause-and-effect matrices.

4.1. Experton method results

This method uses a cumulative distribution function to facilitate the grouping of the data from the 41 managers that answered the questionnaire, which gives the following results in the following tables, organized according to the dimensions presented in the methodology. It is worth noting that the opinions of the experts are aggregated using a probability interval to obtain a single value that is representative of the opinions. Table 4 shows the results of the experton method per item of knowledge transfer, where 4 causes are represented by the letter C and 2 effects are represented by the letter E, of which the lowest is C_1 (existence of formal transfer mechanisms). This result is the compilation of the 41 subjective opinions leading to a general opinion calculated by the experton method.

Table 4
Knowledge Transfer Dimension experton results

Item	Type	Identifier	Experton
TP1	Cause	C_1	0.52
TP2	Cause	C_2	0.84
QT1	Cause	C_3	0.86
QT2	Cause	C_4	0.85
TI1	Effect	E_1	0.88
TI2	Effect	E_2	0.85

Source: Own elaboration.

Table 5 shows the items related to the Management Skills dimension, where all 10 items are identified as effects, with the effect with the lowest overall opinion being E_{10} (development of competencies).

Table 5
Management Skills Dimension experton results

Item	Type	Identifier	Experton
CS1	Effect	E_3	0.94
CS2	Effect	E_4	0.93
LS1	Effect	E_5	0.93
LS2	Effect	E_6	0.91
POS1	Effect	E_7	0.94
POS2	Effect	E_8	0.95
MCS1	Effect	E_9	0.89
MCS2	Effect	E_{10}	0.77

Source: Own elaboration.

4.2. Forgotten effects method results

To analyze the incidence of the forgotten factors of knowledge transfer on the managerial skills of Tunja SMEs, the variables of dimension 1 knowledge transfer and the variables of dimension 2 managerial skills are taken from the results of the experton method. Using Hamming's distance, the direct chance matrix $[\tilde{A}]$ and $[\tilde{B}]$ is presented (see tables 6 and 7). Additionally, the matrices $[\tilde{M}]$, $[\tilde{M}^*]$ and $[\tilde{O}]$ are presented in Tables 8, 9, and 10, respectively.

Table 6
Direct Cause-Cause Matrix $[\tilde{A}]$

↱	C_1	C_2	C_3	C_4
C_1	0.00	0.32	0.34	0.33
C_2	0.32	0.00	0.02	0.01
C_3	0.34	0.02	0.00	0.01
C_4	0.33	0.01	0.01	0.00

Source: Own elaboration using FuzzyLog.

Table 7
Direct Effect-Effect Matrix $[\tilde{B}]$

↱	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8	E_9	E_{10}
E_1	0.00	0.03	0.06	0.05	0.05	0.02	0.06	0.06	0.01	0.11
E_2	0.03	0.00	0.09	0.08	0.08	0.05	0.09	0.09	0.04	0.08
E_3	0.06	0.09	0.00	0.01	0.01	0.03	0.00	0.01	0.05	0.17
E_4	0.05	0.08	0.01	0.00	0.00	0.02	0.01	0.02	0.04	0.16
E_5	0.05	0.08	0.01	0.00	0.00	0.02	0.01	0.02	0.04	0.16
E_6	0.02	0.05	0.03	0.02	0.02	0.00	0.03	0.04	0.02	0.13
E_7	0.06	0.09	0.00	0.01	0.01	0.03	0.00	0.01	0.05	0.17
E_8	0.06	0.09	0.01	0.02	0.02	0.04	0.01	0.00	0.06	0.17
E_9	0.01	0.04	0.05	0.04	0.04	0.02	0.05	0.06	0.00	0.12
E_{10}	0.11	0.08	0.17	0.16	0.16	0.13	0.17	0.17	0.12	0.00

Source: Own elaboration using FuzzyLog.

Table 8
Direct Cause-Effect Matrix $[\tilde{M}]$

↱	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8	E_9	E_{10}
C_1	0.36	0.33	0.42	0.41	0.41	0.39	0.42	0.43	0.37	0.25
C_2	0.04	0.02	0.10	0.09	0.09	0.07	0.1	0.11	0.05	0.07
C_3	0.02	0.00	0.08	0.07	0.07	0.05	0.08	0.09	0.03	0.09
C_4	0.03	0.00	0.09	0.08	0.08	0.06	0.09	0.10	0.04	0.08

Source: Own elaboration using FuzzyLog.

Table 9
Convolution matrix $[\tilde{A}] \circ [\tilde{M}] \circ [\tilde{B}] = [\tilde{M}^*]$

↱	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8	E_9	E_{10}
C_1	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.11
C_2	0.11	0.09	0.17	0.16	0.16	0.13	0.17	0.17	0.12	0.17
C_3	0.11	0.09	0.17	0.16	0.16	0.13	0.17	0.17	0.12	0.17
C_4	0.11	0.09	0.17	0.16	0.16	0.13	0.17	0.17	0.12	0.17

Source: Own elaboration using FuzzyLog.

Table 10
Forgotten effects matrix [$\tilde{O}$]

↱	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8	E_9	E_{10}
C_1	–0.27	–0.24	–0.33	–0.32	–0.32	–0.3	–0.33	–0.34	–0.28	–0.14
C_2	0.07	0.07	0.07	0.07	0.07	0.06	0.07	0.06	0.07	0.10
C_3	0.09	0.09	0.09	0.09	0.09	0.08	0.09	0.08	0.09	0.08
C_4	0.08	0.09	0.08	0.08	0.08	0.07	0.08	0.07	0.08	0.09

Source: Own elaboration using FuzzyLog.

The matrix of forgotten effects demonstrates varying degrees of forgetting among causes C_2, C_3, and C_4 encompassing all effects from E_1 to E_{10}. Additionally, it is noted that C_1 exhibits negative values across all effects, indicating an absence of forgetting. All negative values are represented as zero to prevent ambiguity in interpreting the results. The matrix of neglected effects [$\tilde{O}$] is presented in Table 11.

Table 11
Forgotten effects matrix [$\tilde{O}$]

↱	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8	E_9	E_{10}
C_1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C_2	0.07	0.07	0.07	0.07	0.07	0.06	0.07	0.06	0.07	0.10
C_3	0.09	0.09	0.09	0.09	0.09	0.08	0.09	0.08	0.09	0.08
C_4	0.08	0.09	0.08	0.08	0.08	0.07	0.08	0.07	0.08	0.09

Source: Own elaboration.

The program identified potential solutions to the previously unaddressed effects (see Table 12). An alternative approach exists to enhance the cause-effect relationship for causes C2, C3, and C4, associated with effects E1, E2–E9. However, it is noteworthy that these same causes, which are associated with effects E_2 and E_{10}, augment the number of potential solutions by a factor of three. Considering these observations, it is imperative to accord these two effects a heightened level of significance, given their capacity to engender many avenues for enhancing knowledge transfer and management skills.

Table 12
List of incidents of the Forgotten Effects

	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8	E_9	E_{10}
C_1	0	0	0	0	0	0	0	0	0	0
C_2	1	3	1	1	1	1	1	1	1	3
C_3	1	3	1	1	1	1	1	1	1	3
C_4	1	3	1	1	1	1	1	1	1	3

Source: Own elaboration. Transfer process: C_2: Frequency of knowledge transfer. Quality of the transfer: C_3: Clarity of the knowledge transferred. C_4: Relevance of the knowledge transferred. Impact of the transfer: E_2 Improvement in efficiency or productivity. Mentoring and coaching skills: E_{10} Development of competencies and skills.

When inquiring into the key relationships interposed between causes C_2, C_3 and C_4 and effects E_2 and E_{10}, it is found that they all coincide with the intermediate paths to be taken such as sequences $C_1 \rightarrow E_3$, $C_1 \rightarrow E_7$, $C_1 \rightarrow E_8$ (see Table 13).

Table 13
Interpose relevant key relationships

	E_2: E_2: Improved efficiency or productivity	**E_{10}: E_{10}: Development of competencies and skills**
C_2: Frequency of knowledge transfer	$C_1 \rightarrow E_3$ $C_1 \rightarrow E_7$ $C_1 \rightarrow E_8$	$C_1 \rightarrow E_3$ $C_1 \rightarrow E_7$ $C_1 \rightarrow E_8$
C_3: Clarity of transferred knowledge	$C_1 \rightarrow E_3$ $C_1 \rightarrow E_7$ $C_1 \rightarrow E_8$	$C_1 \rightarrow E_3$ $C_1 \rightarrow E_7$ $C_1 \rightarrow E_8$
C_4: Relevance of transferred knowledge	$C_1 \rightarrow E_3$ $C_1 \rightarrow E_7$ $C_1 \rightarrow E_8$	$C_1 \rightarrow E_3$ $C_1 \rightarrow E_7$ $C_1 \rightarrow E_8$

Source: Own elaboration. C_1: Existence of formal transfer mechanisms; E_3: Clarity in communication; E_7: Ability to establish goals and priorities; E_8: Time and resource management.

This suggests that to improve efficiency or productivity (E_2) and to develop competencies and skills (E_{10}), these sequences must be worked with continuity, highlighting the existence of formal transfer mechanisms (C_1) by being present as the main intervening key. Likewise, the aspects Clarity in communication (E_3), Ability to establish goals and priority (E_7), and Time and resource management (E_8), become relevant for improvement according to their effect. Their analysis is expanded in the discussion to better understand the results.

5. DISCUSSION

Knowledge transfer in companies is important, particularly in SMEs, where stability and longevity are at stake. This research aimed to analyze the incidence of the forgotten factors of knowledge transfer in the managerial skills of SMEs in Tunja. Utilizing mathematical tools grounded in fuzzy models, the present study identified and evaluated the intensity of the incidence relationships between knowledge transfer and managerial skills in Tunja's SMEs. Additionally, it examined the forgotten effect present in these relationships (see Figure 2).

In the initial stage of the investigation, a close relationship was identified between the causes and effects evaluated. This finding suggests that Tunja's SMEs can transfer knowledge to a considerable extent. The investigation further revealed a direct relationship between the frequency of knowledge transfer and the development of competencies and skills. The planned knowledge transfer should be frequent in tasks and mentoring processes, as well as being clear and relevant (quality of knowledge). This is essential for the application of knowledge, the improvement of processes, and the making of decisions. As Katz (1974) noted, clarity is paramount to avoid misunderstandings and ensure all team members are aligned with organizational objectives.

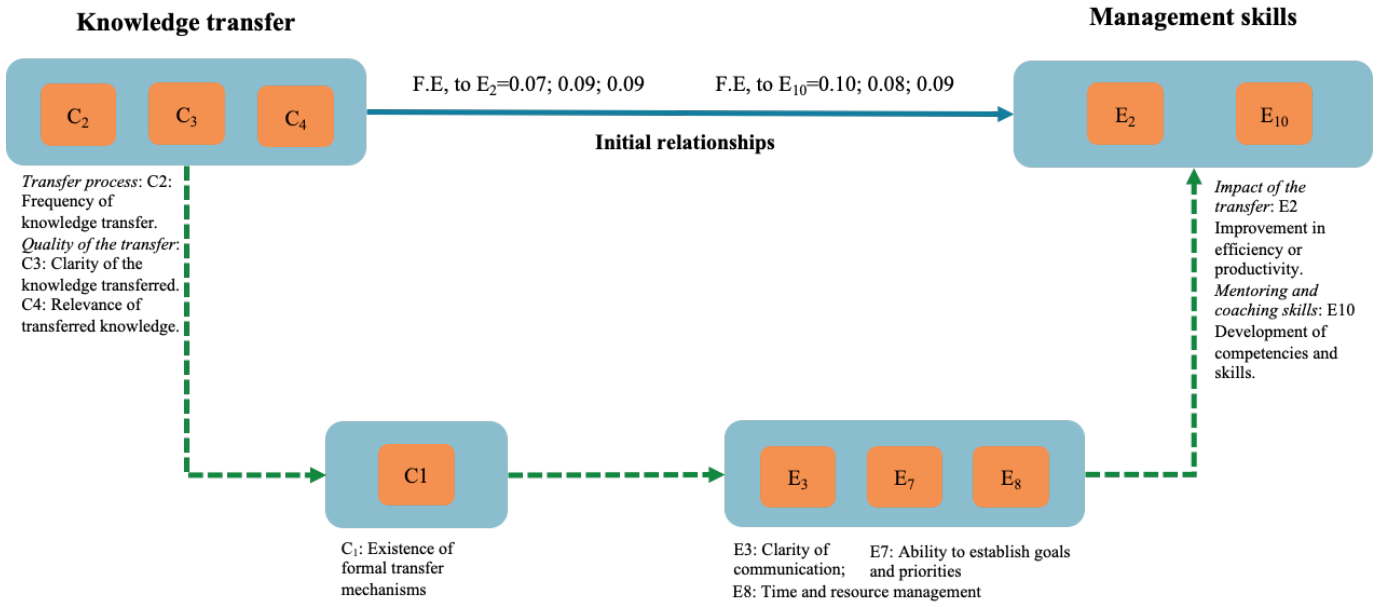

Figure 2
Forgotten effects between knowledge transfer and managerial skills in SMEs
Source: Own elaboration.

Additionally, clarity is crucial when applying knowledge, as internalization is contingent on it to develop competencies and skills aligned with the company's needs. In this regard, tacit knowledge is pivotal, predominantly transmitted from predecessors to successors. Cultivating positive relationships is paramount, as it facilitates the frequent and effective transfer of knowledge (Lozano-Posso, 2008). Indeed, in cultivating competencies through mentorship and coaching, a direct emphasis on transforming tacit knowledge into explicit knowledge is imperative for efficacious transfer (Szulanski, 1996). This approach facilitates the identification of strengths, cultivating essential skills in the learner, and assimilating knowledge (clarity and relevance of knowledge) from 360-degree feedback (Atkins & Wood, 2002). Finally, the applicability of transferred knowledge is contingent upon its frequency and clarity. It is futile to transfer knowledge that is not frequently utilized in the company and that does not generate value, as is misapplying knowledge because it was not transferred with clarity (Atkins & Wood, 2002).

A relevant result can be observed in Table 3, where we see that C2, C3, and C4 have high forgotten effects with E2 and E10, which means a high relationship between the frequency, clarity, and content of knowledge transfer has a significant impact on the increase in efficiency and/or productivity and the development of competencies and skills. The above becomes relevant to an analysis by entrepreneurs since this shows that knowledge transfer has an indirect effect on the daily processes of the organization, which can initially make it difficult for companies to see clearly how this benefits their results. However, as can be seen, if having an adequate transfer of knowledge increases efficiency, productivity, competencies, and skills then it becomes a vital resource to develop internally. In this sense, the organization must generate spaces where formal mechanisms for knowledge transfer can be created that are appropriate to the needs and realities of the company, thus generating a constant system of collaboration between actors and constantly improving workers' skills and knowledge.

6. CONCLUSIONS

Knowledge management in companies is essential in a world that changes in seconds, where knowledge retention is a challenge for companies' productivity, sustainability and longevity. In addition, the challenge of knowledge transfer is more complex when most of the knowledge is in tacit form, a main characteristic of MSMEs (Ferreira *et al.*, 2022). When employees leave their role, they take with them all their knowledge acquired through experience and practice, which implies costs for the company (Manzano-Santana & Mul-Encalada, 2021), even carrying risks of leakage of their "know-how" since the competitive advantage of MSMEs is found in their resources (knowledge as intellectual capital) and in their capabilities (acquired skills) to survive (Ferreira *et al.*, 2022). A comprehensive view of an individual's competencies (Atkins & Wood, 2002), the "Ba" is a dynamic and continuous process in which individuals actively participate and where the transfer of knowledge is facilitated. Strategic and operational knowledge (Nonaka *et al.*, 2000), a solid ramp-up (Szulanski, 1996) for learning through ongoing training and mentoring, ensures successful integration where knowledge becomes an integral part of the organizational culture, a company identity, and also transforms into skills and competencies conducive to business management and administration (Azeem *et al.*, 2021; Suppiah & Singh Sandhu, 2011)

Information collected from MSMEs in Tunja and analyzed using the FuzzyLog© program found that the forgotten factor is the development of competencies and skills (mentoring and coaching variable), which impacts the process and quality variables in knowledge transfer. The implicit nature of tacit knowledge, with its challenges in formalization, expression, and communication, introduces barriers that are not present in explicit knowledge, hence the fundamental nature of the transfer process, since knowledge must be clear, precise, and relevant to develop competencies and skills that provide value and stability to companies (Abubakar *et al.*, 2019). For this reason, MSMEs in Tunja must take practice and mentoring as the main source of knowledge transfer since these experiences allow them to internalize knowledge and develop competencies and skills focused on the productivity and longevity of the company. This research is of great value to Tunja's business community, as it demonstrates the importance of experience, practice, and mentoring to transfer knowledge and develop unique competencies and skills for Tunja's MSMEs. This research also contributes greatly to academia and the scientific community, as little academic research focused on this city has been found when searching for related research. It is important to be able to conduct this type of research in the capital of Boyacá, as sharing it with the business community can boost the growth of MSMEs, strengthen the region's GDP, and mitigate the personal drain due to a lack of job opportunities. Finally, it is important to emphasize the strengthening that must be generated between academia and the city's business community, as one of the limitations of the research was access to information from several companies due to confidentiality and information security issues.

It is evident from the research that there are limitations associated with the sample size, given that the characteristics of the population under study result in a limited number of observations. Likewise, access to information from several companies is difficult for confidentiality and information security issues. Nevertheless, the results obtained are mathematically valid insofar as they enable the assessment and relationship of the subjective experiences of the subjects under study. Also, it is important to note that the results cannot be replicated or can change drastically based on the experts that are used in the study. This limitation is also one of the benefits of the fuzzy methodologies used in the study, because the results are specifically for Tunja and based on the reality that the companies of that city are experiencing and, because of that, when the sample changes, it will present specific results based on the cultural and specific characteristics of the companies surveyed.

For future lines of research, it is proposed to collect a more significant amount of information through the same instrument to be able to generate a broader analysis of the Boyacá Region and later to be able to create comparative studies between the cities and the regions, initially in Colombia and then continue with other countries. At the same time, the design of a new instrument that can use analysis of linguistic variables is proposed, which would allow better capture of the responses of the most

subjective cohort (Torrens-Urrutia *et al.*, 2022), as well as multicriteria methodologies for decision making that allow knowledge transfer (Martínez *et al.*, 2019; Sangaiah *et al.*, 2017) or managerial skills (Kaufmann & Gil-Aluja, 1993; Mumcu & Gök, 2021) to be adequately measured. In professional contexts, knowledge must be formalized for effective knowledge transfer, ensuring its preservation, replication, and enhancement. In a similar vein, formal communication must be clear and precise. This, in turn, contributes to improved time and resource management, as well as the achievement of organizational objectives. Finally, with the data of more regions and cities of Colombia different hypotheses and objectives can be validated with complementary techniques, for example, the use of Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM) that is a useful technique to empirically test hypothesized relationships between variables, that will help to understand the relations obtained by the Forgotten Effects method (Fauzi, 2022; Hair *et al.*, 2021).

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