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A Strategic Knowledge Management Approach to Circular Agribusiness

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Abstract: In this study, we construct a theoretical model for strategic knowledge management in the circular agribusiness industry. Previous studies lack an analysis of strategic knowledge management and sets of measures. Hence, this study applies the fuzzy Technique for Order of Preference by Similarity to Ideal Solution (known as fuzzy TOPSIS), and utilizes the interrelationship weights as a parameter to justify the weights and address important attributes. The results demonstrate that strategic knowledge management improves a firm's competitive advantages through high-level management support. The theoretical and managerial implications are that high-level management support, firm performance, and knowledge management process cycles are the most important strategic knowledge management aspects for improving a firm's performance in circular agribusiness.

Keywords: knowledge management; strategic knowledge management; circular agribusiness; fuzzy TOPSIS

1. Introduction

Agribusiness plays an indispensable role in the world's economy and has become the most important source of food supplies [1]. However, the issue of sustainability has come to the forefront in recent decades. In particular, Vietnam's traditional agribusiness needs to enhance its competitive advantage and work toward sustainability. The essential factor in enhancing competitive advantage in agribusiness is the professionalization of management in production [2]. To achieve this purpose and retain competitive advantages, strategic management is considered a potent means to analyze the environment in order to identify and develop specialized strategies [3,4]. Al-Hakim and Shahizan [5] emphasized that knowledge is one of the crucial resources for strategic management by helping administrators understand a firm's core characteristics and uphold its competitive position. In addition, a firm creates current knowledge and then employs it effectively to create competitive advantages [6]. However, Del Junco, et al. [7] found that one of the main difficulties for firms regarding sustainable development is failure in knowledge management (KM) due to poor strategic integration in practice. Hence, as the ability of firms to identify, codify, leverage, and use their knowledge sources as a firm strategy to increase overall performance and competitive advantages, strategic KM (SKM) has become an important determinant to help firms improve their competitive advantages [8].

Prior studies have examined strategic management or general KM, but there have been few empirical investigations of SKM [6,9]. Despite the extensive literature, Venkitachalam and Willmott [10] argued that a conceptual understanding of the vital role of SKM in firms appears to be lacking, and there is a considerable gap that must be closed in terms of both theory and practice. Conversely, Garavelli, et al. [11] indicated that SKM is often adopted and implemented, and then proposed a model to assess the firm's current status and support the identification of suitable actions to better implement its SKM and improve the firm's practices. Notably, Lwoga, et al. [12] argued that while SKM is based on procuring, organizing and retaining explicit knowledge, the primary approach for continuation still depends on the transfer of technology, creating an obstacle to academics and practitioners seeking to combine knowledge and information systems. In addition, Tseng, et al. [13] presented a closed-loop framework to improve a firm's performance in terms of service supply chain management to achieve greater sustainability. Green practices require the application of the closed-loop framework, particularly for supply chain networks. Li et al. [14] noted the barriers and strategies in ecological industrial parks utilizing closed-loop supply chain networks (known as a circular system). These industrial practices require strong performance in the use of SKM, as prior studies imply that closed-loop sustainable supply chain management (SSCM) needs to utilize SKM in order to improve performance.

However, to address SKM in closed-loop supply chain management (which is called circular), the assessment attributes need to be collected into a framework. Such attributes are always described in terms of qualitative information. Fuzzy set theory can be used to translate qualitative information to a quantifiable scale. Nevertheless, many analytical methods have been utilized to evaluate the attributes of SKM and develop SKM assessments. López-Nicolás and Meroño-Cerdán [6] provided a conceptual model and structured questionnaire and conducted confirmatory factor analysis. This study applies the advantages of fuzzy numbers to describe the values of attributes under circumstances in which information is vague, imprecise, or uncertain, and it is very difficult to precisely meet the attributes proposed by López-Nicolás and Meroño-Cerdán using real numbers and values [15]. In particular, the fuzzy Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) weights each attribute, normalizes the scores for each criterion, and measures the geometric distance between each solution and its ideal solution. There are even a few studies that have involved using interrelationship weight to justify the final importance, and the performance weights due to attributes are similar to those of interrelationships [14]. Thus, this study fills gaps from previous studies while maintaining the advantages of reducing decision-making weakness and increasing the accuracy of the results.

Hence, this study applies this hybrid method to determine the important attributes under linguistic preferences. This study contributes to the literature by distinguishing the critical SKM attributes under linguistic preferences and emphasizes the attributes that must be enhanced in the agribusiness industry. The following questions are raised:

- What are the decisive attributes of SKM under linguistic preferences?
- What attributes must be enhanced in the circular agribusiness industry?

The agribusiness industry in Vietnam has exhibited challenging characteristics that are highly volatile in terms of both production and market conditions, especially waste. In addition, SKM has been relatively underexplored in agribusiness, in which SKM has only been examined from perspectives such as innovation, supply chains or risk management [1,16]. Fabbe-Costes et al. [17] emphasized that firms must work together in closed-loop SSCM, which has also been noted not only from a social perspective but also from environmental and economic perspectives (circular system). The present study consists of five parts. The next section provides a review and discussion of the related literature on KM and SKM. Then, the paper describes the industry background and the proposed methods. The fourth section presents the industry background and analytical results. After the results are discussed, theoretical and managerial implications are described. Concluding remarks and suggestions for potential future studies are included in the final section.

2. Literature Review

This section introduces the theoretical debates about KM, SKM, and closed-loop SSCM and discusses proposed methods and measures.

2.1. Knowledge Management

KM relates to even the most basic work processes of firms. Typically, Hernaus and Mikulić [18] found that even with regard to the existence and importance of the interaction between work characteristics and work outcomes, only the knowledge characteristics of work design had a significant effect on both dimensions of work behavior. From the opposite side of the spectrum, Aziz and Rizkallah [19] measured the relationship between idea generation by employees and the effects of certain attributes on innovation performance. The authors found that while many of the attributes were significantly correlated with employees' innovative idea generation, functional and motivational attributes appeared to be the most important. Tseng [4] proposed KM capabilities as important activities that help firms continuously improve their environments because of the great emphasis on green product development in competitive and sustainable markets. Bloodgood [20] referred to KM as the creation, storage and utilization of routines. Therefore, these KM approaches raise concerns about the creation, storage, dissemination, and application of firm knowledge within supply chain networks.

López-Nicolás and Meroño-Cerdán [6] argued that despite considerable advances in certain aspects, heterogeneous and confounding results had been presented related to the variables affecting KM programs. Duhon [21] defined KM as an integrated approach to identify, capture, evaluate, retrieve, and share all information, and this information can take the form of databases, documents, policies, procedures, or formerly uncaptured expertise and experience among individual workers. KM was also observed as a process of creating, acquiring and transferring knowledge reflected in the behavior of the firm [22]. A KM framework should incorporate a basic understanding of knowledge operations and infrastructures to support operations. According to Lee and Choi, KM enablers are mechanisms that are employed by firms to foster consistent knowledge usage [23]. KM refers to identifying and leveraging the collective knowledge in a firm [24], but there is still a problem regarding the integration of such knowledge into a firm's strategic levels. The main difficulties for firms regarding sustainable development include the failure of KM due to the difficulty of integrating the knowledge at the strategic level [7]; hence, the ability of firms to identify, codify and leverage/use their knowledge sources as a firm strategy to increase overall performance and competitive advantages is limited. Hence, SKM needs to be formulated as a set of measures at a firm's strategic level.

2.2. Strategic Knowledge Management

SKM can be thought of as the strategically codifying and personalizing aspects of knowledge (explicit and tacit) about an organization that increase overall performance [8]. Venkitachalam and Willmott [10] showed the importance of executives' responsibility to emphasize the codification of knowledge instead of fixating on strategic knowledge. Hansen et al. [25] debated distinguishing between personalization and codification. In codification, knowledge is extracted from the person who developed it before being made independent of that person and reused for various purposes, whereas personalization focuses on dialogue between individuals [6]. In the relevant literature, arguments related to the personalization and codification of knowledge are easily understood by academics and practitioners [6]. Furthermore, Venkitachalam and Willmott [10] indicated the importance of emphasizing the equivalence (or congruence) between aspects of codification and personalization to maintain work productivity and innovation capacity.

Firms must utilize a global and consistent vision when managing knowledge and selecting the tools to be implemented [6]. A firm's innovation process depends greatly on SKM [26], especially tacitly. Darroch [27] provided empirical evidence to support the view that a firm with SKM ability is also likely to be more innovative. Massey et al. [28] reported evidence from a real firm that implemented and achieved improvements in the innovation process and performance. Generally, innovations in firms emerge from knowledge creation and sharing using the strong social networks that a personalization strategy seeks to foster [6]. A networking strategy thus supports most consulting firms' approaches to SKM in a sophisticated way, resulting in an overwhelming amount of codified knowledge. Venkitachalam and Willmott [8] argued that overemphasized codification efforts can result in structuration, and through this process, dilute the purpose, meaning and contextual relevance of knowledge work. This study seeks to identify the decisive attributes that can increase performance in the circular agribusiness industry to overcome the gap between academics and practitioners.

2.3. Closed-Loop SSCM

Kirchherr et al. [29] described the closed loop as an economic system based on business models that replace the "end of life" by reducing, reusing, recycling and recovering materials in the manufacturing/distribution process. Closed-loop systems operate at the micro level (firms, consumers, and products), the meso level (eco-industrial parks) and the macro level (city, region, country and world) to achieve sustainable development, including the creation of environmental quality, economic prosperity and social equity for the benefit of present and future generations. Shankar et al. [30] referred to the closed-loop strategic supply chain as one of the most prudent approaches to sustainability, as it supports continuity and long-term firm survival. Tsao [31] argued that closed-loop SSCM considers both the transition and reverse supply chain concurrently. SSCM considers new product streams to minimize distribution costs, whereas reverse logistics involves returning product streams to minimize product recovery costs.

Hosoda and Disney [32] argued that understanding the functions of closed-loop SSCM can help improve firm efficiency and economic viability. Closed-loop SSCM has also proven to be a fruitful and important issue for improving sustainability [33]. However, the complexity of closed-loop SSCM has not been adequately addressed due to difficulties in implementation and strategic integration [34]. Recently, SSCM has been widely studied by both academics and industrial practitioners [14,35,36]. Many studies have also discussed important SSCM attributes [37,38], but little is known regarding how SKM can bridge closed-loop SSCM. In addition, prior studies have not included SKM as a critical attribute in closed-loop SSCM in the circular agribusiness industry. Therefore, it is necessary to identify the attributes of closed-loop SSCM in the industry.

2.4. Proposed Methods

López-Nicolás and Meroño-Cerdán [6] used a survey method to elucidate the consequences of SKM with regard to the improvement and effectiveness of firms. Venkitachalam and Willmott [10] adopted a qualitative multiple case-study method to identify the attributes that shape the development context of KM. Tseng [39] proposed an analytic network process, and a second survey was developed to apply decision-making trials and evaluation laboratories as the most appropriate tools to understand hierarchical relationships and cause and effect in firm environmental KM under conditions of uncertainty. Aliewi et al. [40] used the multi-criteria decision analysis methodology to clarify the issue of strategic management. Tseng et al. [13] demonstrated how sustainable service supply chain management under uncertainty could contribute to the sustainability debate using the fuzzy Delphi method to screen alternative attributes in the industry. However, there has been a lack of studies using multiple decision-making methods to clarify SKM through sets of measures.

Patil and Kant [41] proposed TOPSIS to identify and rank solutions utilizing KM in supply chains. KM is very important for the management of firm knowledge. To support the evaluation and selection of KM from a user perspective, a multi-criteria decision-making standard incorporates the implementation of quality functions with preference techniques. Ordered by analogy to an ideal solution, TOPSIS in an intuitive blurring environment was proposed [42]. Decision-making issues are subject to difficulties, such as unclear goals and consequences. The TOPSIS method is a practical and useful technique for ranking and selecting external alternatives through distance measures, which are used to compare alternatives [42]. This proposed method provides a decision support tool that is accurate, effective and systematic for the implementation of an SKM application. Hence, this study uses the TOPSIS method to clarify SKM and the contribution of closed-loop SSCM.

2.5. Proposed Measures

The existing literature has proposed several attributes. These attributes include four aspects and twenty-two criteria, as listed in Table 1. The four aspects include top management support, the KM process cycle, KM performance, and firm performance.

Table 1. Aspects and criteria. KM: knowledge management, SKM: strategic knowledge management.

Aspects (AS)			Criteria	References
AS1	Top management support	C1	Systematic knowledge	López-Nicolás and Meroño-Cerdán [6], Ng et al. [43]
		C2	Advanced knowledge acquisition	
		C3	Archived knowledge from projects and meetings	
		C4	Codified knowledge sharing	
		C5	Knowledge sharing from informal dialogue and meetings	
		C6	SKM	
AS2	KM process cycle	C7	Knowledge creation/capture	Huang et al. [44]
		C8	Knowledge storage	
		C9	Knowledge transfer/sharing	
		C10	Knowledge application/use	
AS3	KM performance	C11	Organizational problem solving	Kim et al. [45]
		C12	Communication improvement	
		C13	Employee abilities development	
		C14	Value enhancement	
		C15	Customer satisfaction	
AS4	Firm performance	C16	Firm learning and growth	López-Nicolás and Meroño-Cerdán [6]
		C17	Firm profit	
		C18	High-quality products/services	
		C19	Efficient resource use	
		C20	Quality-oriented internal processes	
		C21	Qualified employees	
		C22	Creative and innovative employees	

Top management support is considered one of the critical attributes that influences organizational knowledge [46]. Systematic knowledge (C1) is related to know-how, technical skill, and problem-solving methods that allow knowledge to be shared quickly and with wider access [6]. Advanced knowledge acquisition (C2) is another knowledge resource through which firms acquire information through formal documents and manuals as well as from experts or coworkers. In addition, archived knowledge from projects and meetings (C3) involves the use of documents, including the results of the projects and firm meetings [6], thus contributing to the synthesis of knowledge to support decisions in firms. Codified knowledge sharing (C4) through codified forms, such as manuals or documents, supports the development of innovation. Knowledge sharing through informal dialogue and meetings (C5) is an important aspect of top management support and can help management understand the effects of embedded knowledge and facilitate the transfer of such knowledge [6]. Ng et al. [43] discussed SKM (C6) and categorized it into codification, personalization and integrated strategies.

Many prior studies have argued that any organization implementing KM will enter the KM process cycle [47]. The initiation of the KM process cycle involves either the creation or acquisition of knowledge by an organization. Knowledge creation/capture (C7) creates a virtual space with both explicit and tacit knowledge [44]. Knowledge storage is considered one of the phases of a typical KM process cycle [44,48]. Knowledge storage (C8) includes workflow tools, databases and search engines for arranging system knowledge in a firm. The rapid changes in technology and international business have encouraged knowledge sharing. Knowledge transfer/sharing (C9) is related to cross-functional collaboration and teamwork [44]. Furthermore, knowledge sharing to enhance or develop information or create new knowledge facilitates the development of innovation [6].

Darroch [27] stated that during the knowledge application/use phase, SKM taps into the firm's power, combining humans with a technological nexus. Knowledge application/use (C10) includes interpreting and combining knowledge in human networks. In addition, the performance of knowledge management relies on organizational problem solving (C11) to seek innovation opportunities. Additional criteria include communication improvement (C12) employee ability development (C13) and value enhancement (C14), which includes enhancing the values of products and services and customer satisfaction (C15).

The present study suggests that the impact of a KM strategy on firm performance can be better understood by analyzing different dimensions of firm performance [6]. Firm learning and growth (C16) is a key criterion for the rapid growth of firms. Additional key criteria include firm profit (C17), high-quality products/services (C18), efficient resource use (C19), quality-oriented internal processes (C20), qualified employees (C21), and creative and innovative employees (C22).

3. Methods

Fuzzy TOPSIS was proposed by Hwang and Yoon [49] and is the best-known technique for solving decision-making problems. This approach is based on the notion that the optimal path should be the shortest distance to the ideal positive solution (the solution that minimizes cost norms and maximizes welfare criteria), while the path with the greatest distance is the least optimal solution.

Fuzzy sets can be used to formally define the fuzzy intersection, union and fuzzy subset. Based on these concepts, fuzzy theory was subsequently developed [14,15]. Fuzzy set theory is the only means to quantify fuzzy sets and enable a precise mathematical method for analyzing and processing uncertainties or linguistic preferences. The triangular fuzzy number (TFN) was employed to fuzzify the meaning of expert cognition value. a represents the lower limit of the original cognition value, b is the median of the original cognition value, and c is the upper limit of the original cognition value. Linguistic scales that depict the various levels of importance and performance are presented. The TFNs are as indicated [15].

Proposed Analytical Procedures for Fuzzy TOPSIS

1. Create an evaluation matrix consisting of m alternatives and n criteria, with the intersection of each alternative and criterion given as x_{ij}; we therefore have a matrix $(x_{ij})_{mxn}$.
2. Based on the evaluation matrix, develop an assessment questionnaire. Once the responses are returned, the responses are transformed into fuzzy numbers in the following sub-steps. If the k experts in the decision group need to consider the fuzzy weight $\overline{F}_{ij}^{k} = \left(a_{ij}^{k}, b_{ij}^{k}, c_{ij}^{k}\right)$ of the ith criterion, the jth criterion appreciated by the kth evaluators is affected. This study also uses expert weights as parameters for each respondent. The equations are set forth below. Normalization:

$$
\begin{aligned}
F_{a_{ij}}^{\ k} &= \left(\frac{l_{1ij}^{k} - min\ l_{ij}^{k})}{\Delta_{min}^{max}}\right) \\
F_{b_{ij}}^{\ k} &= \left(\frac{m_{ij}^{k} - min\ m_{ij}^{k}}{\Delta_{min}^{max}}\right) \\
F_{c_{ij}}^{\ k} &= \left(\frac{u_{ij}^{k} - min\ u_{ij}^{k}}{\Delta_{min}^{max}}\right)
\end{aligned}
\quad (1)
$$

where $\Delta_{min}^{max} = max\ c_{ij}^{k} - min\ a_{ij}^{k}$

Calculate left (L) and right (R) normalized values:

$$N_{Ls} = \frac{f_{b_{ij}}^{k}}{\left(1+f_{b_{ij}}^{k}-f_{a_{ij}}^{k}\right)} \qquad N_{Rs} = \frac{f_{c_{ij}}^{k}}{\left(1+f_{c_{ij}}^{k}-f_{b_{ij}}^{k}\right)} \tag{2}$$

Compute total normalized crisp value:

$$ncv_{ij}^{k} = \frac{\left[f_{Ls}(1-f_{Ls}) + (f_{Rs})^{2}\right]}{[1-f_{Ls}+f_{Rs}]} \tag{3}$$

Aggregation of crisp values. The aggregate value of the subjective judgments from the composite opinions of k evaluators:

$$\overline{A}_{ij}^{k} = \frac{\left(\overline{ncv}_{ij}^{1} + \overline{ncv}_{ij}^{2} + \overline{ncv}_{ij}^{3} + \cdots \overline{ncv}_{ij}^{k}\right)}{k} \tag{4}$$

3. Calculate the weighted normalized decision matrix

$$V = (v_{ij})_{mxn} = (w_j v_{ij})_{mxn},\ i = 1,2,\cdots m$$

where $w_{ij} = \mathrm{W}_D \times \frac{w_i}{\sum_{j=1}^{n} w_i}$, $j = 1,2,\cdots n$, such that $\sum_{j=1}^{n} w_i = 1$, and w_i is the original weight given to the indicator w_j, $j = 1,2,\cdots n$. W_D represents the interrelationships among the attributes.

4. Determine the worst alternative AS_w and the best alternative AS_b:

$$AS_b = \left\{v_1^{+}, v_2^{+}, \ldots v_n^{+}\right\} = \left\{\left(max_j v_{ij} \middle| i \in I\right), \left(min_j v_{ij} \middle| i \in j\right)\right\}$$

$$AS_w = \left\{\left(v_1^{-} = v_2^{-}, \ldots v_n^{-}\right\} = \left\{\left(min_j v_{ij} \middle| i \in I\right), \left(max_j v_{ij} \middle| i \in j\right)\right\},$$

where I is associated with the benefit criteria, and j is associated with the cost criteria.

5. Calculate the separation measure between the target alternative and the best alternative:

$$d_{ib} = \sqrt{\sum_{j=1}^{n} \left(v_{ij} - v_j^{+}\right)^2},\ i = 1,2,\cdots m \tag{5}$$

and the distance between the target alternative and the worst alternative:

$$d_{iw} = = \sqrt{\sum_{j=1}^{n} \left(v_{ij} - v_j^{-}\right)^2},\ i = 1,2,\cdots m \tag{6}$$

6. Calculate the similarity to the worst condition:

$$S_{iw} = \frac{d_{iw}}{(d_{iw} + d_{ib})}, 0 \le S_{iw} \le 1,\ i = 1,2,\cdots m \tag{7}$$

$S_{iw} = 1$ if and only if the alternative solution has the best condition, and $S_{iw} = 0$ if and only if the alternative solution has the worst condition.

7. Rank the alternatives according to S_{iw} $(i = 1,2,\cdots m)$.

4. Results

This section includes the industry background and the analytical results of the proposed hybrid approaches.

4.1. Industry Background

Vietnam provides an appropriate context for conducting a study of the positional advantages in agribusiness [50]. Competition exists between state-owned companies and private firms, and between local products and imported products. Vietnam provides new opportunities for agriculture exporters and challenges for commitments that previously only flourished in the domestic market. The industry is operating at a steady pace, and production is planned. Vietnam has shifted from a centrally planned economy to a market economy, with open market trade policies and increased competitive pressures. There is great opportunity for agribusiness. However, there is also a need to understand the closed-loop SSCM due to the environmental requirements, as well as improve the industry's competitive advantages to work toward sustainability.

The agribusiness industry exhibits challenging characteristics, particularly high volatility, in terms of both production and market conditions. In addition, Vietnam's agribusiness industry generally neglects the importance of closed-loop SSCM. The literature indicates that SKM needs to be studied in closed-loop SSCM. In addition, prior studies have revealed the relationships among source, location advantage and business efficiency in agricultural production, but there has been a lack of SKM integrated into a framework at firms' strategic levels in the industry. The agribusiness industry suffers from high costs and resource waste. Thus, this study utilizes an expert decision-making method to understand the main performance attributes in order to reduce costs and enhance the industry's performance. The respondents are four individuals from industrial sectors and three individuals from academic institutes with at least 10 years of work and research experience in the industry, all of who understand how agribusiness can work toward sustainability. The four individuals from the industry were selected from focal Vietnamese agribusinesses and were top managers, which enabled them to provide appropriate assessments.

4.2. Analytical Results

Step 1: Transforming correspondence into fuzzy scales

Based on the steps in fuzzy TOPSIS, correspondence can be acquired after experts' assessments. However, this correspondence possesses qualitative features that must be transformed into quantitative values for further computation. Table 2 presents the transformation results from the experts. For example, if an assessment is stated to be U, it means that the criterion is unimportant, and the transformation result is stated as [0.0 0.1 0.3], as shown in Table 3.

Table 2. The Fuzzy Triangular Numbers for Transformation.

Linguistic Preference	Fuzzy Triangular Numbers		
	a	b	c
Unimportant (U)	0.0	0.1	0.3
Less Important (LI)	0.1	0.3	0.5
Important (I)	0.3	0.5	0.7
Moderately Important (MI)	0.5	0.7	0.9
Very Important (VI)	0.7	0.9	1.0

Table 3. Transformation results from the experts.

	From Academic Institutions									From Industrial Experts											
	Expert 1			Expert 2			Expert 3			Expert 4			Expert 5			Expert 6			Expert 7		
C1	0.7	0.9	1.0	0.5	0.7	0.9	0.7	0.9	1.0	0.7	0.9	1.0	0.7	0.9	1.0	0.5	0.7	0.9	0.7	0.9	1.0
C2	0.5	0.7	0.9	0.7	0.9	1.0	0.7	0.9	1.0	0.5	0.7	0.9	0.7	0.9	1.0	0.7	0.9	1.0	0.5	0.7	0.9
C3	0.5	0.7	0.9	0.7	0.9	1.0	0.5	0.7	0.9	0.7	0.9	1.0	0.5	0.7	0.9	0.7	0.9	1.0	0.5	0.7	0.9
C4	0.7	0.9	1.0	0.3	0.5	0.7	0.5	0.7	0.9	0.3	0.5	0.7	0.3	0.5	0.7	0.5	0.7	0.9	0.5	0.7	0.9
C5	0.5	0.7	0.9	0.5	0.7	0.9	0.5	0.7	0.9	0.7	0.9	1.0	0.3	0.5	0.7	0.5	0.7	0.9	0.5	0.7	0.9
C6	0.7	0.9	1.0	0.5	0.7	0.9	0.7	0.9	1.0	0.7	0.9	1.0	0.3	0.5	0.7	0.3	0.5	0.7	0.5	0.7	0.9
C7	0.5	0.7	0.9	0.7	0.9	1.0	0.5	0.7	0.9	0.3	0.5	0.7	0.3	0.5	0.7	0.5	0.7	0.9	0.5	0.7	0.9
C8	0.5	0.7	0.9	0.5	0.7	0.9	0.7	0.9	1.0	0.3	0.5	0.7	0.5	0.7	0.9	0.5	0.7	0.9	0.5	0.7	0.9
C9	0.3	0.5	0.7	0.5	0.7	0.9	0.3	0.5	0.7	0.3	0.5	0.7	0.5	0.7	0.9	0.5	0.7	0.9	0.5	0.7	0.9
C10	0.3	0.5	0.7	0.3	0.5	0.7	0.5	0.7	0.9	0.5	0.7	0.9	0.3	0.5	0.7	0.5	0.7	0.9	0.5	0.7	0.9
C11	0.5	0.7	0.9	0.7	0.9	1.0	0.3	0.5	0.7	0.3	0.5	0.7	0.7	0.9	1.0	0.3	0.5	0.7	0.5	0.7	0.9
C12	0.5	0.7	0.9	0.5	0.7	0.9	0.5	0.7	0.9	0.3	0.5	0.7	0.5	0.7	0.9	0.3	0.5	0.7	0.5	0.7	0.9
C13	0.3	0.5	0.7	0.5	0.7	0.9	0.7	0.9	1.0	0.5	0.7	0.9	0.5	0.7	0.9	0.7	0.9	1.0	0.5	0.7	0.9
C14	0.3	0.5	0.7	0.5	0.7	0.9	0.3	0.5	0.7	0.3	0.5	0.7	0.5	0.7	0.9	0.3	0.5	0.7	0.7	0.9	1.0
C15	0.5	0.7	0.9	0.7	0.9	1.0	0.3	0.5	0.7	0.7	0.9	1.0	0.7	0.9	1.0	0.5	0.7	0.9	0.5	0.7	0.9
C16	0.5	0.7	0.9	0.7	0.9	1.0	0.5	0.7	0.9	0.5	0.7	0.9	0.7	0.9	1.0	0.5	0.7	0.9	0.5	0.7	0.9
C17	0.5	0.7	0.9	0.3	0.5	0.7	0.5	0.7	0.9	0.5	0.7	0.9	0.5	0.7	0.9	0.5	0.7	0.9	0.5	0.7	0.9
C18	0.3	0.5	0.7	0.5	0.7	0.9	0.5	0.7	0.9	0.5	0.7	0.9	0.5	0.7	0.9	0.3	0.5	0.7	0.5	0.7	0.9
C19	0.5	0.7	0.9	0.3	0.5	0.7	0.5	0.7	0.9	0.5	0.7	0.9	0.3	0.5	0.7	0.5	0.7	0.9	0.3	0.5	0.7
C20	0.5	0.7	0.9	0.5	0.7	0.9	0.3	0.5	0.7	0.5	0.7	0.9	0.5	0.7	0.9	0.3	0.5	0.7	0.7	0.9	1.0
C21	0.5	0.7	0.9	0.3	0.5	0.7	0.5	0.7	0.9	0.5	0.7	0.9	0.3	0.5	0.7	0.5	0.7	0.9	0.3	0.5	0.7
C22	0.5	0.7	0.9	0.3	0.5	0.7	0.5	0.7	0.9	0.3	0.5	0.7	0.5	0.7	0.9	0.3	0.5	0.7	0.5	0.7	0.9

Step 2: Ranking the criteria

In step 2, the fuzzy numbers are transformed into crisp values. Subsequently, in step 3, the weight of each criterion v_{ij} is acquired. Table 4 presents the best alternative (AS_b) and important weight rankings to provide a comparative basis for acquiring the top three criteria.

Table 4. Fuzzy importance weights and rankings.

Criterion	v_{ij}			AS_b	Ranking
C1	0.643	0.843	0.971	0.819	1
C2	0.614	0.814	0.957	0.795	2
C3	0.586	0.786	0.943	0.771	3
C4	0.443	0.643	0.829	0.638	16
C5	0.500	0.700	0.886	0.695	9
C6	0.529	0.729	0.886	0.714	7
C7	0.471	0.671	0.857	0.667	11
C8	0.500	0.700	0.886	0.695	8
C9	0.414	0.614	0.814	0.614	17
C10	0.414	0.614	0.814	0.614	19
C11	0.471	0.671	0.843	0.662	13
C12	0.443	0.643	0.843	0.643	14
C13	0.529	0.729	0.900	0.719	6
C14	0.414	0.614	0.800	0.610	22
C15	0.557	0.757	0.914	0.743	5
C16	0.557	0.757	0.929	0.748	4
C17	0.471	0.671	0.871	0.671	10
C18	0.443	0.643	0.843	0.643	15
C19	0.414	0.614	0.814	0.614	19
C20	0.471	0.671	0.857	0.667	11
C21	0.414	0.614	0.814	0.614	19
C22	0.414	0.614	0.814	0.614	17

Next, the rest of step 3 is focused on gathering the W_D. To enhance the reliability of this study, a decision-making trial and evaluation laboratory approach was adopted to rank the criteria, and TOPSIS is used to confirm the results by comparing the ranking of the criteria in Tables 4 and 5. The purpose of this process is to enhance the accuracy of the decision-making. Thus, the results reveal that the top three most highly weighted criteria are systematic knowledge (C1), advanced knowledge acquisition (C2) and archived knowledge from projects and meetings (C3).

Table 5. Criteria Ranking.

	W_D	Average	Fuzzy Importance Weight			DEMATEL Best Non-Fuzzy Performance	Normalized Weights	DEMATEL-Ranking
C1	0.210	0.021	0.135	0.177	0.204	0.172	0.0547	1
C2	0.640	0.063	0.129	0.171	0.201	0.167	0.0531	2
C3	0.180	0.018	0.123	0.165	0.198	0.162	0.0515	3
C4	0.950	0.093	0.093	0.135	0.174	0.134	0.0426	16
C5	0.150	0.015	0.105	0.147	0.186	0.146	0.0464	8
C6	0.650	0.064	0.111	0.153	0.186	0.150	0.0477	7
C7	0.190	0.019	0.099	0.141	0.180	0.140	0.0445	11
C8	0.970	0.095	0.105	0.147	0.186	0.146	0.0464	8
C9	0.900	0.088	0.087	0.129	0.171	0.129	0.0410	17
C10	0.420	0.041	0.087	0.129	0.171	0.129	0.0410	19
C11	0.350	0.034	0.099	0.141	0.177	0.139	0.0442	13
C12	0.330	0.032	0.093	0.135	0.177	0.135	0.0429	14
C13	0.450	0.044	0.111	0.153	0.189	0.151	0.0480	6
C14	0.390	0.038	0.087	0.129	0.168	0.128	0.0407	22
C15	0.250	0.025	0.117	0.159	0.192	0.156	0.0496	5
C16	0.620	0.061	0.117	0.159	0.195	0.157	0.0499	4
C17	0.290	0.028	0.099	0.141	0.183	0.141	0.0448	10
C18	0.770	0.075	0.093	0.135	0.177	0.135	0.0429	15
C19	0.240	0.024	0.087	0.129	0.171	0.129	0.0410	19
C20	0.230	0.023	0.099	0.141	0.180	0.140	0.0445	12
C21	0.150	0.015	0.087	0.129	0.171	0.129	0.0410	19
C22	0.870	0.085	0.087	0.129	0.171	0.129	0.0410	17

Step 3: Reassessment after aspect consideration

The experts were asked to assess the effects of the aspects under each criterion. The assessments are still stated as linguistic preferences that need to be transformed into an assessment scale, as shown in Table 6. The assessment of criteria under aspects presents the final transformation of the seven experts, e.g., expert 1 expressed VI for C1 under AS1, and this linguistic preference is transformed into $\begin{bmatrix} 7 & 9 & 10 \end{bmatrix}$ (as shown in Table A1).

Table 6. Linguistic scale for aspects and criteria.

Linguistic Preference	Assessment Scales (Aspects)		
Unimportant (U)	0	1	3
Less Important (LI)	1	3	5
Important (I)	3	5	7
Moderately Important (MI)	5	7	9
Very Important (VI)	7	9	10

Step 4: Generating the fuzzy-weighted normalized decision matrix

Next, these assessments need to be combined into an integrated decision matrix through the procedure employed in step 2 (presented in Table A2). Then, we repeat step 3 to obtain the normalized decision matrix in Table A3. Therein, the normalized values are computed as $5.000/8.857 = 0.565$, as displayed in gray color. Subsequently, each aspect has its own original weight that needs to be associated with the normalized decision matrix to obtain the weighted normalized decision matrix, as shown in the weighted normalized decision matrix (as Table A4).

Step 5: Ranking the aspects

Steps 4 through 7 are followed to obtain the S_{iw} for each aspect. Therein, S_{iw} for AS1 is calculated as $166.852/(93.347 + 166.852) = 0.641$. Based on the values of S_{iw}, the ranking of the aspects is determined, as shown in Table 7. Furthermore, the results show that the top two aspects are top management support (AS1) and the KM process cycle (AS2).

Table 7. Ranking the aspects.

Aspect	d_{ib}	d_{iw}	S_{iw}	Ranking
AS1	93.347	166.852	0.641	1
AS2	85.058	155.405	0.646	3
AS3	84.486	154.678	0.647	4
AS4	90.904	163.637	0.643	2

5. Implications

This section presents the theoretical and managerial contributions.

5.1. Theoretical Implications

The results confirmed that top management support (AS1) is the decisive attribute of SKM. Top management support comprises knowledge sharing and systematic knowledge in order to use knowledge effectively to develop an approach. Knowledge must be formatted in such a manner that allows it to circulate and be exchanged, and archiving documentation at the completion of a project is the primary method of knowledge retention and transfer. Top management support is the basis for facilitating communication among supply chain partners, and value creation is a vital element for skill development. Moreover, top management support is important for creating and maintaining positive knowledge in a firm. Thus, enhancing top management support is viewed as an important means of improving SSCM.

The growing importance of knowledge has encouraged managers to pay greater attention to firms' SKM. SKM is always linked with firm activities, such as improved quality of products/services, employee training, or the efficient use of resources.

Prior studies have reported significant relationships between firm performance and SKM. However, these studies have not provided clarity regarding the real impact of SKM on firm performance [6]. Firms tend to support competence building through learning and interacting, thus enhancing the ability to pursue product or service innovations. Knowledge is both a crucial input and a crucial output of innovation processes [51]. Positive firm performance requires considerable effort directed toward training, improving the quality of products/services and encouraging innovative employees. Thus, firms can attain new skills, techniques, and information from outside firms. In addition, knowledge improves a firm's performance and competitiveness and ensures the synchronous development of certain aspects of the firm, such as enhancing the value of its products and services and contributing to the development of employees' abilities.

The KM process cycle (AS2) systematically shows how information is transformed into knowledge via creation and application processes [44]. Through this process, knowledge embodied in human networks, knowledge creation, and storage applications enable effective problem solving, decision-making and innovation. The gathering of knowledge builds on the process of finding and synthesizing external knowledge for operations related to the firm's context to upgrade the knowledge level of the firm [52]. Knowledge accumulated through databases and firm learning has become a basis for the core competence of today's firms. Moreover, the KM process cycle generates quality and useful information to benefit a range of firm activities. Hence, the KM process cycle has become one of the key means by which SKM helps firms survive and succeed in a highly competitive environment.

In conclusion, this study contributes to the field of KM by exploring important attributes of SKM and providing deeper insights for SKM research. This study provides evidence suggesting that top management support, firm performance and KM process cycles are the most important attributes of SKM. Therefore, greater effort should be directed toward fostering these three attributes to achieve efficient SKM. In addition, the combination of data, information technology and the innovative capacity of people contributes to innovation, improved performance and competitiveness.

5.2. Managerial Implications

This study aims to address the lack of evidence about SKM in closed-loop SSCM. This study also provides suggestions for firms to improve SKM performance and consequently firm performance. Few studies have identified the SKM attributes and the impact of the key attributes in the agribusiness industry. The results of this study indicate that the five most important SKM-related criteria are systematic knowledge (C1), advanced knowledge acquisition (C2), archived knowledge from projects and meetings (C3), firm learning and growth (C16), and customer satisfaction (C15). These five criteria reinforce the importance of the basic attributes of closed-loop SSCM. Therefore, these top-ranked criteria provide the focal points for practices in operational activities in order to achieve better performance.

Systematic knowledge (C1) is the most important criterion related to improving SKM. Systematic knowledge includes basic knowledge, planning knowledge, and analysis and design knowledge. Systematic knowledge is the result of learning a system through studying it or acquiring experience through the firm's activities and the relationship between them. This criterion also relates to the interaction between knowledge and systematics to obtain a clear understanding of market trends for long-term development in addition to the exchange of technology to create new products and services that suit the requirements of the market. Thus, agribusiness firms are encouraged to exert effort to create common knowledge, such as through outsourcing, product innovation and collaborative research. Therefore, managers must pay closer attention to systematic knowledge in SKM and competitors in order to achieve closed-loop SSCM. Advanced knowledge acquisition (C2) constitutes a higher level of knowledge system that extends the vision of resources and knowledge to the industry and leads to competitive advantage. Advanced knowledge in specialized areas requires management to determine how to develop questions for study and specific methods for firms. These attributes provide an effective means to transfer new knowledge and technical skills to firms so that they can adapt to market changes and customer needs that benefit the firms in terms of faster production, reduced production and logistics costs, improved efficiency, and maximized return on investment. Firms in this industry are recommended to encourage the creation of common knowledge, such as software, product innovation and collaborative research. Therefore, managers should pay more attention to SKM and their competitors in order to determine how to improve performance via SKM in closed-loop SSCM.

Archived knowledge from projects and meetings (C3) is a method to improve SKM. Firms can document and record the lessons learned from projects as a means to communicate what should or should not be done in the future. This process begins by incorporating the lessons learned at the end of each project into a database. This practice is greatly beneficial for firms: it enables continuous learning and avoids repetitive mistakes. To maintain projects, knowledge can be transferred through lessons learned for future study. Learning from errors is an essential issue in closed-loop SSCM. Firms need to consider placing greater emphasis on archived knowledge for capacity building, especially in efforts to improve SKM. A firm's learning and growth (C16) can be observed as important parts of building SKM. The two attributes that relate to sustained growth are the functions of size and age: the expected growth rate of a firm decreases with age and depends on its size. The third part relates to the normative nature of the criteria. A reallocation of resources is required in the economy that can lead to improved social welfare versus a decentralized equilibrium. A firm may make decisions that result in low sales or it can exit the market, especially if it is unsure about its true needs, rather than remaining and recording low growth. Hence, effective SKM has benefits for closed-loop SSCM with regard to firm learning and growth.

Customer satisfaction (C15) is a commonly used term in marketing and is a measure of whether the products and services provided by firms meet or exceed customer expectations [53]. Customer satisfaction is represented by the number of clients or the percentage of the total clients who report to a firm that its products or services exceed a satisfaction goal. Customer satisfaction also provides marketers and firm owners with a metric that they can use to manage and improve closed-loop SSCM. Customer satisfaction is the best indicator of whether customers will make future purchases. Asking customers to rate their satisfaction on a scale is a good method to determine whether they will be repeat customers or even promoters [54]. This approach can provide a useful instrument for a firm operating under SKM.

These findings confirm that SKM relies on a central role to facilitate the integration of resources directly and to lead an industry in making improvements. Furthermore, the results provide a path to closed-loop SSCM, which can enable these firms to successfully exploit development opportunities through the development of knowledge systems, and in turn, develop new products and services before competitors and thus improve their performance.

6. Conclusions

SKM has received increased attention in recent years; however, the current literature is lacking in terms of guidance with regard to integrating SKM in closed-loop supply chain management, specifically in the area of agribusiness. This study reveals that the decisive attribute for SKM is top management support. Thus, the circular agribusiness industry needs to improve its top management support and take systematic knowledge, advanced knowledge acquisition and archived knowledge from projects and meetings into account. These criteria enable a firm to enhance its competitive advantage and performance. Moreover, this study includes a set of measures and applies fuzzy TOPSIS with interrelationship weights, which is a practical and useful technique for ranking, selecting and comparing a solution through the proposed SKM measures. The proposed aspects and criteria have been ranked by experienced experts. Top management support, KM process cycles, KM performance and firm performance are the four main aspects, and these are quantified using 22 criteria that can be measured in the industry. The results show that systematic knowledge, advanced knowledge acquisition, archived knowledge from projects and meetings, firm learning and growth, and customer satisfaction are the top five criteria that support the set of measures and contribute to the industry's performance. The findings indicate that top management support, firm performance and the KM process cycle must receive higher priority than other aspects of management decision making. There is a significant gap in terms of operational SKM processes in firms and the degree to which top management creates and maintains positive knowledge about firms' operations in the agribusiness industry. Firm performance supports competence building through learning and interacting, thus enhancing the ability to pursue product or service innovation. The KM process cycle generates quality and useful information to benefit a range of firm activities.

The results regarding the consequences of the KM process cycle support prior studies by filling in gaps in terms of interrelationships and key successful attributes. The SKM process cycle must be improved and successfully implemented within firm strategies to enhance SKM performance and firm performance in closed-loop SSCM. Systematic knowledge, advanced knowledge acquisition, and archived knowledge from projects and meetings help firms to improve management skills and build the right strategy in the agribusiness industry. Firm learning and growth and customer satisfaction are instruments that can help a closed-loop SSCM operate. Finally, the set of measures for conceptual frameworks and limitations is essential for promoting the use of SKM. First, the set of attributes might not be comprehensive, and future studies should provide a more extensive examination of the SKM context. The sample collection was based only on the agribusiness industry in Vietnam; therefore, the generalizability of the findings is limited. Future studies should focus on multiple countries or industries to broaden the results. Finally, this study uses the fuzzy TOPSIS method; thus, future studies using other methods could have different results. In addition, the small sample size is another limitation of this study, as assessments must be made twice, and there are many items on the questionnaire. This might reduce the consistency of the study. Thus, decreasing the number of items on the questionnaire is one the major barriers that needs to be overcome in future studies. In addition, future research could also redesign the assessment procedure to make only one assessment to enhance the consistency. Although it has the above limitations, this paper still offers a precise guideline for the circular agribusiness industry to take SKM into account.

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Appendix A.

Table A1. Assessment of criteria under aspects.

		Expert 1			**Expert 2**			**Expert 3**			**Expert 4**			**Expert 5**			**Expert 6**			**Expert 7**		
C1	AS1	7	9	10	5	7	9	3	5	7	5	7	9	5	7	9	3	5	7	7	9	10
	AS2	7	9	10	5	7	9	1	3	5	3	5	7	7	9	10	7	9	10	5	7	9
	AS3	7	9	10	7	9	10	5	7	9	7	9	10	5	7	9	7	9	10	5	7	9
	AS4	3	5	7	5	7	9	5	7	9	7	9	10	3	5	7	7	9	10	7	9	10
C2	AS1	1	3	5	7	9	10	5	7	9	1	3	5	7	9	10	7	9	10	1	3	5
	AS2	3	5	7	3	5	7	7	9	10	5	7	9	7	9	10	1	3	5	5	7	9
	AS3	1	3	5	3	5	7	1	3	5	5	7	9	3	5	7	3	5	7	3	5	7
	AS4	3	5	7	3	5	7	5	7	9	3	5	7	5	7	9	3	5	7	1	3	5
C3	AS1	5	7	9	7	9	10	1	3	5	7	9	10	5	7	9	7	9	10	5	7	9
	AS2	3	5	7	1	3	5	1	3	5	7	9	10	3	5	7	1	3	5	5	7	9
	AS3	7	9	10	5	7	9	1	3	5	5	7	9	1	3	5	3	5	7	3	5	7
	AS4	7	9	10	1	3	5	3	5	7	5	7	9	5	7	9	3	5	7	3	5	7
C4	AS1	3	5	7	3	5	7	1	3	5	5	7	9	7	9	10	3	5	7	5	7	9
	AS2	5	7	9	5	7	9	7	9	10	3	5	7	7	9	10	1	3	5	1	3	5
	AS3	1	3	5	5	7	9	1	3	5	1	3	5	1	3	5	5	7	9	7	9	10
	AS4	1	3	5	1	3	5	3	5	7	7	9	10	5	7	9	7	9	10	1	3	5
C5	AS1	5	7	9	1	3	5	5	7	9	3	5	7	5	7	9	1	3	5	5	7	9
	AS2	5	7	9	5	7	9	1	3	5	5	7	9	5	7	9	5	7	9	1	3	5
	AS3	7	9	10	1	3	5	5	7	9	3	5	7	3	5	7	5	7	9	7	9	10
	AS4	7	9	10	5	7	9	3	5	7	5	7	9	5	7	9	5	7	9	7	9	10
C6	AS1	7	9	10	3	5	7	3	5	7	1	3	5	1	3	5	3	5	7	5	7	9
	AS2	7	9	10	7	9	10	5	7	9	1	3	5	3	5	7	5	7	9	1	3	5
	AS3	5	7	9	5	7	9	3	5	7	7	9	10	7	9	10	3	5	7	7	9	10
	AS4	5	7	9	5	7	9	7	9	10	5	7	9	7	9	10	5	7	9	1	3	5
C7	AS1	7	9	10	5	7	9	3	5	7	1	3	5	7	9	10	7	9	10	3	5	7
	AS2	3	5	7	7	9	10	1	3	5	7	9	10	1	3	5	5	7	9	1	3	5
	AS3	1	3	5	7	9	10	3	5	7	7	9	10	5	7	9	7	9	10	5	7	9
	AS4	5	7	9	5	7	9	5	7	9	7	9	10	1	3	5	5	7	9	7	9	10
C8	AS1	3	5	7	5	7	9	3	5	7	7	9	10	3	5	7	7	9	10	1	3	5
	AS2	5	7	9	5	7	9	7	9	10	7	9	10	7	9	10	3	5	7	5	7	9
	AS3	3	5	7	1	3	5	1	3	5	7	9	10	5	7	9	3	5	7	5	7	9
	AS4	3	5	7	1	3	5	1	3	5	3	5	7	1	3	5	5	7	9	5	7	9
C9	AS1	3	5	7	1	3	5	7	9	10	1	3	5	3	5	7	5	7	9	5	7	9
	AS2	5	7	9	3	5	7	5	7	9	1	3	5	5	7	9	1	3	5	7	9	10
	AS3	7	9	10	1	3	5	3	5	7	3	5	7	1	3	5	3	5	7	7	9	10
	AS4	5	7	9	5	7	9	3	5	7	7	9	10	7	9	10	3	5	7	1	3	5
C10	AS1	5	7	9	5	7	9	7	9	10	7	9	10	3	5	7	3	5	7	5	7	9
	AS2	7	9	10	7	9	10	1	3	5	7	9	10	1	3	5	1	3	5	5	7	9
	AS3	1	3	5	7	9	10	7	9	10	3	5	7	5	7	9	1	3	5	1	3	5
	AS4	7	9	10	7	9	10	3	5	7	3	5	7	5	7	9	3	5	7	1	3	5
C11	AS1	5	7	9	5	7	9	5	7	9	1	3	5	3	5	7	5	7	9	3	5	7
	AS2	1	3	5	1	3	5	7	9	10	5	7	9	3	5	7	7	9	10	1	3	5
	AS3	1	3	5	5	7	9	3	5	7	5	7	9	3	5	7	1	3	5	3	5	7
	AS4	7	9	10	5	7	9	3	5	7	1	3	5	7	9	10	3	5	7	7	9	10
C12	AS1	5	7	9	5	7	9	3	5	7	1	3	5	7	9	10	5	7	9	5	7	9
	AS2	1	3	5	5	7	9	7	9	10	1	3	5	7	9	10	3	5	7	3	5	7
	AS3	7	9	10	1	3	5	5	7	9	3	5	7	5	7	9	7	9	10	1	3	5
	AS4	1	3	5	3	5	7	1	3	5	7	9	10	1	3	5	5	7	9	5	7	9
C13	AS1	5	7	9	5	7	9	7	9	10	3	5	7	1	3	5	7	9	10	3	5	7
	AS2	1	3	5	7	9	10	3	5	7	3	5	7	7	9	10	3	5	7	1	3	5
	AS3	1	3	5	1	3	5	3	5	7	7	9	10	7	9	10	1	3	5	5	7	9
	AS4	5	7	9	3	5	7	3	5	7	7	9	10	7	9	10	1	3	5	3	5	7
C14	AS1	3	5	7	7	9	10	5	7	9	1	3	5	3	5	7	7	9	10	7	9	10
	AS2	7	9	10	7	9	10	7	9	10	7	9	10	3	5	7	3	5	7	3	5	7
	AS3	3	5	7	5	7	9	7	9	10	7	9	10	1	3	5	7	9	10	5	7	9
	AS4	5	7	9	3	5	7	1	3	5	7	9	10	7	9	10	1	3	5	5	7	9

Table A1. *Cont.*

		Expert 1			**Expert 2**			**Expert 3**			**Expert 4**			**Expert 5**			**Expert 6**			**Expert 7**		
C15	AS1	5	7	9	7	9	10	1	3	5	1	3	5	1	3	5	7	9	10	1	3	5
	AS2	7	9	10	1	3	5	5	7	9	7	9	10	7	9	10	3	5	7	7	9	10
	AS3	3	5	7	7	9	10	7	9	10	5	7	9	5	7	9	3	5	7	7	9	10
	AS4	1	3	5	5	7	9	7	9	10	5	7	9	5	7	9	1	3	5	7	9	10
C16	AS1	1	3	5	5	7	9	3	5	7	1	3	5	1	3	5	7	9	10	1	3	5
	AS2	3	5	7	3	5	7	3	5	7	3	5	7	3	5	7	5	7	9	1	3	5
	AS3	3	5	7	5	7	9	1	3	5	3	5	7	3	5	7	7	9	10	1	3	5
	AS4	7	9	10	3	5	7	7	9	10	3	5	7	7	9	10	1	3	5	3	5	7
C17	AS1	1	3	5	3	5	7	3	5	7	1	3	5	1	3	5	5	7	9	3	5	7
	AS2	3	5	7	1	3	5	7	9	10	3	5	7	7	9	10	7	9	10	3	5	7
	AS3	7	9	10	3	5	7	1	3	5	3	5	7	7	9	10	5	7	9	5	7	9
	AS4	5	7	9	5	7	9	1	3	5	7	9	10	1	3	5	7	9	10	7	9	10
C18	AS1	7	9	10	7	9	10	3	5	7	3	5	7	1	3	5	7	9	10	1	3	5
	AS2	1	3	5	1	3	5	3	5	7	1	3	5	5	7	9	5	7	9	5	7	9
	AS3	1	3	5	3	5	7	7	9	10	1	3	5	1	3	5	7	9	10	7	9	10
	AS4	3	5	7	3	5	7	1	3	5	3	5	7	5	7	9	1	3	5	5	7	9
C19	AS1	5	7	9	1	3	5	5	7	9	7	9	10	5	7	9	3	5	7	5	7	9
	AS2	5	7	9	7	9	10	1	3	5	7	9	10	3	5	7	3	5	7	1	3	5
	AS3	7	9	10	1	3	5	1	3	5	5	7	9	5	7	9	1	3	5	7	9	10
	AS4	3	5	7	3	5	7	1	3	5	5	7	9	7	9	10	1	3	5	1	3	5
C20	AS1	1	3	5	5	7	9	7	9	10	5	7	9	7	9	10	3	5	7	7	9	10
	AS2	1	3	5	1	3	5	1	3	5	5	7	9	7	9	10	3	5	7	7	9	10
	AS3	7	9	10	1	3	5	1	3	5	5	7	9	5	7	9	5	7	9	5	7	9
	AS4	5	7	9	3	5	7	3	5	7	3	5	7	5	7	9	3	5	7	5	7	9
C21	AS1	3	5	7	1	3	5	1	3	5	3	5	7	3	5	7	7	9	10	3	5	7
	AS2	1	3	5	1	3	5	1	3	5	5	7	9	1	3	5	3	5	7	5	7	9
	AS3	7	9	10	7	9	10	1	3	5	1	3	5	7	9	10	5	7	9	5	7	9
	AS4	1	3	5	7	9	10	1	3	5	3	5	7	7	9	10	3	5	7	7	9	10
C22	AS1	1	3	5	5	7	9	7	9	10	1	3	5	5	7	9	5	7	9	1	3	5
	AS2	5	7	9	3	5	7	7	9	10	5	7	9	7	9	10	5	7	9	7	9	10
	AS3	1	3	5	5	7	9	3	5	7	7	9	10	3	5	7	7	9	10	7	9	10
	AS4	5	7	9	5	7	9	1	3	5	1	3	5	5	7	9	3	5	7	1	3	5

Table A2. Integrated decision matrix.

	AS1			**AS2**			**AS3**			**AS4**		
C1	5.000	7.000	8.714	5.000	7.000	8.571	6.143	8.143	9.571	5.286	7.286	8.857
C2	4.143	6.143	7.714	4.429	6.429	8.143	2.714	4.714	6.714	3.286	5.286	7.286
C3	5.286	7.286	8.857	4.571	3.857	5.857	7.714	5.571	7.429	3.857	5.857	7.714
C4	3.857	5.857	7.714	3.000	5.000	6.857	3.000	5.000	6.857	3.571	5.571	7.286
C5	3.571	5.571	7.571	3.857	5.857	7.857	4.429	6.429	8.143	5.286	7.286	9.000
C6	3.286	5.286	7.143	4.143	6.143	7.857	5.286	7.286	8.857	5.000	7.000	8.714
C7	4.714	6.714	8.286	3.571	5.571	7.286	5.000	7.000	8.571	5.000	7.000	8.714
C8	4.143	6.143	7.857	5.571	7.571	9.143	3.571	5.571	7.429	2.714	4.714	6.714
C9	3.571	5.571	7.429	3.857	5.857	7.714	3.571	5.571	7.286	4.429	6.429	8.143
C10	5.000	7.000	8.714	4.143	6.143	7.714	3.571	5.571	7.286	4.143	6.143	7.857
C11	3.857	5.857	7.857	3.571	5.571	7.286	3.000	5.000	7.000	4.714	6.714	8.286
C12	4.429	6.429	8.286	3.857	5.857	7.571	4.143	6.143	7.857	3.286	5.286	7.143
C13	4.429	6.429	8.143	3.571	5.571	7.286	3.571	5.571	7.286	4.143	6.143	7.857
C14	4.714	6.714	8.286	5.286	7.286	8.714	5.000	7.000	8.571	4.143	6.143	7.857
C15	3.286	5.286	7.000	5.286	7.286	8.714	5.286	7.286	8.857	4.429	6.429	8.143
C16	2.714	4.714	6.571	3.000	5.000	7.000	4.429	6.429	8.143	4.429	6.429	8.000
C17	2.429	4.429	6.429	4.429	6.429	8.000	4.429	6.429	8.143	4.714	6.714	8.286
C18	4.143	6.143	7.714	3.000	5.000	7.000	3.857	5.857	7.429	3.000	5.000	7.000
C19	4.429	6.429	8.286	3.857	5.857	7.571	3.857	5.857	7.571	3.000	5.000	6.857
C20	5.000	7.000	8.571	3.571	5.571	7.286	4.143	6.143	8.000	3.857	5.857	7.857
C21	3.000	5.000	6.857	2.429	4.429	6.429	4.714	6.714	8.286	4.143	6.143	7.714
C22	3.571	5.571	7.429	5.571	7.571	9.143	4.714	6.714	8.286	3.000	5.000	7.000
Max			8.857			9.143			9.571			9.000

Table A3. Normalized decision matrix.

	AS1			AS2			AS3			AS4		
C1	0.565	0.790	0.984	0.547	0.766	0.938	0.642	0.851	1.000	0.587	0.810	0.984
C2	0.468	0.694	0.871	0.484	0.703	0.891	0.284	0.493	0.701	0.365	0.587	0.810
C3	0.597	0.823	1.000	0.500	0.422	0.641	0.806	0.582	0.776	0.429	0.651	0.857
C4	0.435	0.661	0.871	0.328	0.547	0.750	0.313	0.522	0.716	0.397	0.619	0.810
C5	0.403	0.629	0.855	0.422	0.641	0.859	0.463	0.672	0.851	0.587	0.810	1.000
C6	0.371	0.597	0.806	0.453	0.672	0.859	0.552	0.761	0.925	0.556	0.778	0.968
C7	0.532	0.758	0.935	0.391	0.609	0.797	0.522	0.731	0.896	0.556	0.778	0.968
C8	0.468	0.694	0.887	0.609	0.828	1.000	0.373	0.582	0.776	0.302	0.524	0.746
C9	0.403	0.629	0.839	0.422	0.641	0.844	0.373	0.582	0.761	0.492	0.714	0.905
C10	0.565	0.790	0.984	0.453	0.672	0.844	0.373	0.582	0.761	0.460	0.683	0.873
C11	0.435	0.661	0.887	0.391	0.609	0.797	0.313	0.522	0.731	0.524	0.746	0.921
C12	0.500	0.726	0.935	0.422	0.641	0.828	0.433	0.642	0.821	0.365	0.587	0.794
C13	0.500	0.726	0.919	0.391	0.609	0.797	0.373	0.582	0.761	0.460	0.683	0.873
C14	0.532	0.758	0.935	0.578	0.797	0.953	0.522	0.731	0.896	0.460	0.683	0.873
C15	0.371	0.597	0.790	0.578	0.797	0.953	0.552	0.761	0.925	0.492	0.714	0.905
C16	0.306	0.532	0.742	0.328	0.547	0.766	0.463	0.672	0.851	0.492	0.714	0.889
C17	0.274	0.500	0.726	0.484	0.703	0.875	0.463	0.672	0.851	0.524	0.746	0.921
C18	0.468	0.694	0.871	0.328	0.547	0.766	0.403	0.612	0.776	0.333	0.556	0.778
C19	0.500	0.726	0.935	0.422	0.641	0.828	0.403	0.612	0.791	0.333	0.556	0.762
C20	0.565	0.790	0.968	0.391	0.609	0.797	0.433	0.642	0.836	0.429	0.651	0.873
C21	0.339	0.565	0.774	0.266	0.484	0.703	0.493	0.701	0.866	0.460	0.683	0.857
C22	0.403	0.629	0.839	0.609	0.828	1.000	0.493	0.701	0.866	0.333	0.556	0.778

Table A4. Weighted normalized decision matrix.

	AS1			AS2			AS3			AS4		
C1	4.182	4.465	4.823	4.051	4.326	4.596	4.754	4.806	4.902	4.350	4.574	4.824
C2	3.465	3.918	4.269	3.588	3.972	4.366	2.101	2.783	3.439	2.704	3.318	3.968
C3	4.421	4.647	4.902	3.704	2.383	3.140	5.970	3.289	3.805	3.175	3.677	4.202
C4	3.226	3.736	4.269	2.431	3.090	3.676	2.322	2.951	3.512	2.939	3.497	3.968
C5	2.987	3.554	4.190	3.125	3.619	4.213	3.427	3.795	4.170	4.350	4.574	4.902
C6	2.748	3.372	3.953	3.356	3.796	4.213	4.091	4.301	4.536	4.115	4.394	4.746
C7	3.943	4.283	4.586	2.894	3.443	3.906	3.870	4.132	4.390	4.115	4.394	4.746
C8	3.465	3.918	4.349	4.514	4.679	4.902	2.764	3.289	3.805	2.234	2.959	3.657
C9	2.987	3.554	4.111	3.125	3.619	4.136	2.764	3.289	3.731	3.645	4.036	4.435
C10	4.182	4.465	4.823	3.356	3.796	4.136	2.764	3.289	3.731	3.410	3.856	4.279
C11	3.226	3.736	4.349	2.894	3.443	3.906	2.322	2.951	3.585	3.880	4.215	4.513
C12	3.704	4.101	4.586	3.125	3.619	4.059	3.206	3.626	4.024	2.704	3.318	3.890
C13	3.704	4.101	4.507	2.894	3.443	3.906	2.764	3.289	3.731	3.410	3.856	4.279
C14	3.943	4.283	4.586	4.282	4.502	4.672	3.870	4.132	4.390	3.410	3.856	4.279
C15	2.748	3.372	3.874	4.282	4.502	4.672	4.091	4.301	4.536	3.645	4.036	4.435
C16	2.270	3.007	3.637	2.431	3.090	3.753	3.427	3.795	4.170	3.645	4.036	4.357
C17	2.031	2.825	3.558	3.588	3.972	4.289	3.427	3.795	4.170	3.880	4.215	4.513
C18	3.465	3.918	4.269	2.431	3.090	3.753	2.985	3.457	3.805	2.469	3.139	3.813
C19	3.704	4.101	4.586	3.125	3.619	4.059	2.985	3.457	3.878	2.469	3.139	3.735
C20	4.182	4.465	4.744	2.894	3.443	3.906	3.206	3.626	4.097	3.175	3.677	4.279
C21	2.509	3.189	3.795	1.968	2.737	3.447	3.648	3.963	4.243	3.410	3.856	4.202
C22	2.987	3.554	4.111	4.514	4.679	4.902	3.648	3.963	4.243	2.469	3.139	3.813

References

1. Behzadi, G.; O'Sullivan, M.J.; Olsen, T.L.; Zhang, A. Agribusiness supply chain risk management: A review of quantitative decision models. *Omega* **2017**. [CrossRef]
2. Filho, C.P.M.; Caleman, S.M.Q.; Cunha, C.F. Governance in agribusiness organizations: Challenges in the management of rural family firms. *Rev. Adm.* **2017**, *52*, 81–92. [CrossRef]
3. Rothaermel, F. *Strategic Management: Concepts and Cases*; McGraw-Hill: New York, NY, USA, 2013.
4. Tseng, M.-L. Using linguistic preferences and grey relational analysis to evaluate the environmental knowledge management capacity. *Expert Syst. Appl.* **2010**, *37*, 70–81. [CrossRef]

5. Al-Hakim, L.A.Y.; Shahizan, H. Knowledge management strategies, innovation, and organisational performance: An empirical study of the Iraqi MTS. *J. Adv. Manag. Res.* **2013**, *10*, 58–71. [CrossRef]
6. López-Nicolás, C.; Meroño-Cerdán, Á.L. Strategic knowledge management, innovation and performance. *Int. J. Inf. Manag.* **2011**, *31*, 502–509. [CrossRef]
7. García Del Junco, J.; De Reyna Zaballa, R.; García Álvarez de Perea, J. Evidence-based administration for decision making in the framework of knowledge strategic management. *Learn. Organ.* **2010**, *17*, 343–363. [CrossRef]
8. Venkitachalam, K.; Willmott, H. Strategic knowledge management—Insights and pitfalls. *Int. J. Inf. Manag.* **2017**, *37*, 313–316. [CrossRef]
9. Martinsons, M.G.; Davison, R.M.; Huang, Q. Strategic knowledge management failures in small professional service firms in China. *Int. J. Inf. Manag.* **2017**, *37*, 327–338. [CrossRef]
10. Venkitachalam, K.; Willmott, H. Factors shaping organizational dynamics in strategic knowledge management. *Knowl. Manag. Res. Pract.* **2015**, *13*, 344–359. [CrossRef]
11. Garavelli, C.; Gorgoglione, M.; Scozzi, B. Knowledge management strategy and organization: A perspective of analysis. *Knowl. Process Manag.* **2004**, *11*, 273–282. [CrossRef]
12. Lwoga, E.T.; Ngulube, P.; Stilwell, C. Managing indigenous knowledge for sustainable agricultural development in developing countries: Knowledge management approaches in the social context. *Int. Inf. Libr. Rev.* **2010**, *42*, 174–185. [CrossRef]
13. Tseng, M.L.; Lim, M.K.; Wong, W.P.; Chen, Y.C.; Zhan, Y. A framework for evaluating the performance of sustainable service supply chain management under uncertainty. *Int. J. Prod. Econ.* **2018**, *195*, 359–372. [CrossRef]
14. Li, J.; Pan, S.Y.; Kim, H.; Linn, J.H.; Chiang, P.C. Building green supply chains in eco-industrial parks towards a green economy: Barriers and strategies. *J. Environ. Manag.* **2015**, *162*, 158–170. [CrossRef] [PubMed]
15. Rudnik, K.; Kacprzak, D. Fuzzy TOPSIS method with ordered fuzzy numbers for flow control in a manufacturing system. *Appl. Soft Comput.* **2017**, *52*, 1020–1041. [CrossRef]
16. Sehnem, S.; Oliveira, G.P. Analysis of the supplier and agribusiness relationship. *J. Clean. Prod.* **2017**, *168*, 1335–1347. [CrossRef]
17. Fabbe-Costes, N.; Roussat, C.; Taylor, M.; Taylor, A. Sustainable supply chains: A framework for environmental scanning practices. *Int. J. Oper. Prod. Manag.* **2014**, *34*, 664–694. [CrossRef]
18. Hernaus, T.; Mikulić, J. Work characteristics and work performance of knowledge workers. *EuroMed J. Bus.* **2014**, *9*, 268–292. [CrossRef]
19. Abdel Aziz, H.H.; Rizkallah, A. Effect of organizational factors on employees' generation of innovative ideas: Empirical study on the Egyptian software development industry. *EuroMed J. Bus.* **2015**, *10*, 134–146. [CrossRef]
20. Bloodgood, J.M. Organizational routines as mechanisms for knowledge creation, utilization, and storage. In *Knowledge Management and Organizational Learning*; King, W.R., Ed.; Springer US: Boston, MA, USA, 2009; pp. 41–58.
21. Duhon, B. It's all in our heads. *Inform* **1998**, *12*, 8–13.
22. Bueno, E.; Aragón, J.A.; Salmador, M.P.; García, V.J. Tangible slack versus intangible resources: The influence of technology slack and tacit knowledge on the capability of organisational learning to generate innovation and performance. *Int. J. Technol. Manag.* **2010**, *49*, 314–337. [CrossRef]
23. Lee, H.; Choi, B. Knowledge management enablers, processes, and organizational performance: An integrative view and empirical examination. *J. Manag. Inf. Syst.* **2003**, *20*, 179–228. [CrossRef]
24. Krogh, G.V. Care in knowledge creation. *Calif. Manag. Rev.* **1998**, *40*, 133–153. [CrossRef]
25. Hansen, M.T.; Nohria, N.; Tierney, T. What's your strategy for managing knowledge. *Harvard Bus. Rev.* **1999**, *77*, 106–116.
26. Gloet, M.; Terziovski, M. Exploring the relationship between knowledge management practices and innovation performance. *J. Manuf. Technol. Manag.* **2004**, *15*, 402–409. [CrossRef]
27. Darroch, J. Knowledge management, innovation and firm performance. *J. Knowl. Manag.* **2005**, *9*, 101–115. [CrossRef]
28. Massey, A.P.; Montoya-Weiss, M.M.; Tony, M.O.D. Knowledge management in pursuit of performance: Insights from nortel networks. *MIS Q.* **2002**, *26*, 269–289. [CrossRef]

29. Kirchherr, J.; Reike, D.; Hekkert, M. Conceptualizing the circular economy: An analysis of 114 definitions. *Resour. Conserv. Recycl.* **2017**, *127*, 221–232. [CrossRef]
30. Shankar, R.; Bhattacharyya, S.; Choudhary, A. A decision model for a strategic closed-loop supply chain to reclaim End-of-Life Vehicles. *Int. J. Prod. Econ.* **2018**, *195*, 273–286. [CrossRef]
31. Tsao, Y.-C.; Linh, V.-T.; Lu, J.-C. Closed-loop supply chain network designs considering RFID adoption. *Comput. Ind. Eng.* **2017**, *113*, 716–726. [CrossRef]
32. Hosoda, T.; Disney, S.M. A unified theory of the dynamics of closed-loop supply chains. *Eur. J. Oper. Res.* **2017**. [CrossRef]
33. Östlin, J.; Sundin, E.; Björkman, M. Importance of closed-loop supply chain relationships for product remanufacturing. *Int. J. Prod. Econ.* **2008**, *115*, 336–348. [CrossRef]
34. Akçalı, E.; Çetinkaya, S. Quantitative models for inventory and production planning in closed-loop supply chains. *Int. J. Prod. Res.* **2011**, *49*, 2373–2407. [CrossRef]
35. Pagell, M.; Shevchenko, A. Why research in SSCM should have no future. *J. Supply Chain Manag.* **2014**, *50*, 44–55. [CrossRef]
36. Marshall, D.; McCarthy, L.; Heavey, C.; McGrath, P. Environmental and social supply chain management sustainability practices: Construct development and measurement. *Prod. Plan. Control* **2015**, *26*, 673–690. [CrossRef]
37. Börjeson, N.; Gilek, M.; Karlsson, M. Knowledge challenges for responsible supply chain management of chemicals in textiles—As experienced by procuring organisations. *J. Clean. Prod.* **2015**, *107*, 130–136. [CrossRef]
38. Kumar, V.; Koehl, L.; Zeng, X. A fully yarn integrated tag for tracking the international textile supply chain. *J. Manuf. Syst.* **2016**, *40*, 76–86. [CrossRef]
39. Tseng, M.-L. Using a hybrid MCDM model to evaluate firm environmental knowledge management in uncertainty. *Appl. Soft Comput.* **2011**, *11*, 1340–1352. [CrossRef]
40. Aliewi, A.; El-Sayed, E.; Akbar, A.; Hadi, K.; Al-Rashed, M. Evaluation of desalination and other strategic management options using multi-criteria decision analysis in Kuwait. *Desalination* **2017**, *413*, 40–51. [CrossRef]
41. Patil, S.K.; Kant, R. A fuzzy AHP-TOPSIS framework for ranking the solutions of Knowledge Management adoption in Supply Chain to overcome its barriers. *Expert Syst. Appl.* **2014**, *41*, 679–693. [CrossRef]
42. Li, M.; Jin, L.; Wang, J. A new MCDM method combining QFD with TOPSIS for knowledge management system selection from the user's perspective in intuitionistic fuzzy environment. *Appl. Soft Comput.* **2014**, *21*, 28–37. [CrossRef]
43. Ng, A.H.H.; Yip, M.W.; Din, S.B.; Bakar, N.A. Integrated knowledge management strategy: A preliminary literature review. *Procedia Soc. Behav. Sci.* **2012**, *57*, 209–214. [CrossRef]
44. Huang, F.; Gardner, S.; Moayer, S. Towards a framework for strategic knowledge management practice: Integrating soft and hard systems for competitive advantage. *VINE J. Inf. Knowl. Manag. Syst.* **2016**, *46*, 492–507. [CrossRef]
45. Kim, T.H.; Lee, J.-N.; Chun, J.U.; Benbasat, I. Understanding the effect of knowledge management strategies on knowledge management performance: A contingency perspective. *Inf. Manag.* **2014**, *51*, 398–416. [CrossRef]
46. Zhang, P.; Ng, F.F. Explaining knowledge-sharing intention in construction teams in Hong Kong. *J. Constr. Eng. Manag.* **2013**, *139*, 280–293. [CrossRef]
47. Ward, J.; Aurum, A. Knowledge management in software engineering-describing the process. In Proceedings of the 2004 Australian Software Engineering Conference, Melbourne, Australia, 13–16 April 2004; pp. 137–146.
48. Pawlowski, J.M.; Bick, M. The global knowledge management framework: Towards a theory for knowledge management in globally distributed settings. *Electron. J. Knowl. Manag.* **2012**, *10*, 92–108.
49. Hwang, C.L.; Yoon, K. *Multiple Attribute Decision Making: Methods and Applications: A State-of-the-Art Survey*; Springer: New York, NY, USA, 1981.
50. Ho, K.L.P.; Nguyen, C.N.; Adhikari, R.; Miles, M.P.; Bonney, L. Leveraging innovation knowledge management to create positional advantage in agricultural value chains. *J. Innov. Knowl.* **2017**. [CrossRef]
51. Lundvall, B.Å.; Nielsen, P. Knowledge management and innovation performance. *Int. J. Manpow.* **2007**, *28*, 207–223. [CrossRef]

52. Tuamsuk, K.; Phabu, T.; Vongprasert, C. Knowledge management model of community business: Thai OTOP champions. *J. Knowl. Manag.* **2013**, *17*, 363–378. [CrossRef]
53. Cui, L.; Wu, K.J.; Tseng, M.L. Selecting a remanufacturing quality strategy based on consumer preferences. *J. Clean. Prod.* **2017**, *161*, 1308–1316. [CrossRef]
54. Cui, L.; Zhang, M.; Wu, K.J.; Tseng, M.L. Constructing a hierarchical agribusiness framework in Chinese belt and road initiatives under uncertainty. *Sustainability* **2018**, *10*, 251. [CrossRef]