

The MCDM Technique is Being Utilized to Develop Sustainable Supply Chain Management in the Textile Industries

Ashish Patel*

Abstract

Sustainable Supply Chain Management (SSCM) of production systems is crucial in the current globalization setting. Many businesses are having a lot of issues with supply chain management. In order to determine the most effective SSCM techniques, this research will rank the primary SSCM hurdles. The fuzzy analytical hierarchy process (FAHP) is used to rank the primary barriers in SSCM. A committee of three specialists was assembled to score various variables. Each specialist in the field of supply chain management had more than ten years of expertise. As the top three obstacles to system adoption in the textile sectors, a lack of top management support, a lack of SSCM project training and education, and a lack of strategic planning and implementation have all surfaced. The results suggest that for SSCM to be successful, senior management should be very supportive of various initiatives, training programs, etc. Organizations should work to increase the productivity of the textile industry generally. When developing an efficient SSCM system, professionals in the textile manufacturing industry will find these results to be of great value.

Keywords: Sustainable supply chain management, fuzzy SET, FAHP, MCDM

INTRODUCTION

It is vital for any organization to identify barriers before the implementation of any quality improvement technique. A few writers produced valuable studies to identify the set of Sustainable Supply Chain Management (SSCM) barriers, according to the literature review on the topic.

Several researchers in literature have argued that although companies have successfully deployed many logistics-related improvement initiatives such as supply chain management, green supply chain management, and SSCM, still a significant number of companies have failed to gain any benefits from their deployment and other companies have failed to achieve the expected results. Lee et al., (2013) argued that every supply chain improvement initiative project tends to fail to attain the expected results due to lack of attention towards barriers and failure factors [40]. Reported that up to 40 percent of the companies implementing SSCM have failed. One of the studies conducted in UK organizations showed that fewer than 20 percent of the organizations had implemented SSCM successfully (Hervani et al., 2005) [29]. Many authors like have conducted a survey of companies and reported in their results that respondents' satisfaction with SSCM results was lower than 50 percent.

*Author for Correspondence

Ashish Patel

E-mail: ashishpatel.mech2005@gmail.com

Principal, Department of Mechanical Engineering, Shree Parekh Engineering College, Mahuva, Gujarat, India

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Table 1. Barriers of SSCM reported in the literature.

S. No.	Barriers of SSCM	Literature Support
1	Lack of top management attitude, commitment, and involvement	(Seuring and Muller, 2008 [52]; Kumar and Rahman, 2015) [37].
2	Lack of training and education	(Lee, 2009 [39]).
3	The increased cost of adoption	(Lee, 2009[39])
4	insufficient (financial, technological, human, etc.) resources	(Snee, 2010[53]; Arumugam, Antony and Douglas, 2012[5]; Hilton and Sohal, 2012[30]).
5	Weak connection between the CI initiatives and the organization's strategic goals	(Walker et al., 2008[57]).
6	The resistance of culture change	(Walker et al., 2008[57]).
7	Poor communication	(Jeyaraman and Teo, 2010[35]; Arumugam, Antony and Douglas, 2012[5]; Hilton and Sohal, 2012[30]; Albliwi <i>et al.</i> , 2014[3]).
8	Lack of leadership skills and visionary and supportive leadership	(Smith, 2007; Lee, 2008; Bai & Sarkis, 2010; Vasileiou & Morris, 2006).
9	Lack of consideration of the human factors	(Bastian and Zentes, 2013[9]; Pishvae, Razmi and Torabi, 2014[47]; Pereseina <i>et al.</i> , 2017[45]).
10	Perception of low economic return	(Lee, 2013[40]).
11	Outdated auditing standards	(Amindoust <i>et al.</i> , 2012[4]; Zaabi, Dhaheri and Diabat, 2013[59]; Santiteerakul <i>et al.</i> , 2015[50]).
12	Lack of technology sharing	(Chan et al., 2008;[12])
13	Lack of knowledge of the many customer/VOC types	(Beske, Koplin and Seuring, 2008[10]; Seuring and Müller, 2008a[52]).
14	Lack of team autonomy and low levels of staff involvement and participation	(Roth and Franchetti, 2010[48]; Arumugam, Antony and Douglas, 2012[5]).
15	Lack of process ownership and process thinking	(Hilton and Sohal, 2012[30]; Albliwi <i>et al.</i> , 2014[3]; Ismail <i>et al.</i> , 2014[33]).
16	Poor organization capabilities	(Fraser and Fraser, 2009[19]; Franchetti and Yanik, 2011) [18].
17	High implementation cost	(Jayaraman, Kee and Soh, 2012; Pillai, Pundir and Ganapathy, 2012; Campos, 2013).
18	Ineffective project management	(Karathi, Devadasan and Muruges, 2011[36]; Jayaraman, Kee and Soh, 2012 [34]; Maleyeff, 2012[41]).
19	Absence of a vision for the future and a strategy	(Gibbons and Burgess, 2010 [23]; Chakravorty and Shah, 2012[11]).
20	Absence of a working model or implementation strategy	(Thomas, Barton and Chuke-Okafor, 2009[55]; Gibbons <i>et al.</i> , 2012[22]; Lee, Tai and Sheen, 2013[40]).
21	Poor execution	(Waterbury and Bonilla, 2008[57]; Iii, 2010[32]; Al-Aomar, 2012[2]; Gijo and Antony, 2014[24]).
22	Time-consuming	(Iii, 2010[32]; Snee, 2010[53]; Gupta, Acharya and Patwardhan, 2012[27]; Ismail <i>et al.</i> , 2014[33]).
23	Lack of estimation of implementation cost	(Gremyr and Fouquet, 2012[25]; Jayaraman, Kee and Soh, 2012[34]; Pillai, Pundir and Ganapathy, 2012[46]; Chaplin and O'Rourke, 2014[13]).
24	Weak infrastructure	(Karathi, Devadasan and Muruges, 2011[36]; Al-Aomar, 2012[2]).
25	Replicating another organization's SSCM strategy	(Ayağ, Z. 2010[7]).
26	Absence of a method for measuring performance	(Kumar, A [37])
27	Lack of application of statistical theory	(Kuo [38]).
28	Weak linking to suppliers	(Found, 2012; Habidin[17]).
29	Misalignment of the project's objective with the company's primary objectives and client demands	(Waterbury and Bonilla, 2008[57]; Gremyr and Fouquet, 2012[25]; Assarlind, Gremyr and Bäckman, 2013[6]; Albliwi <i>et al.</i> , 2014[3]).

Management's attitude regarding the alignment of policies and planning for process execution is critical Bastian and Zentes (2013) [9]. Top management's involvement and dedication help to foster a positive work environment and provide as inspiration for staff to complete excellent tasks efficiently Müller, (2008a) [52] and Beske and Seuring, (2014) [10] identified that poor linkage between sustainability and the organization's strategic objectives evolves as the main reason behind the implementation failures. Strategic planning is essential for the goal. Table 1 barriers of SSCM reported in the literature.

The spread of SSCM adoption is fully dependent on the education and training given to specific supply chain participants to carry out projects. Any easing of the worry results in a misalignment with the successful completion of the practical project. In addition to training, departmental communication is crucial; therefore, a lack of technical knowledge communication among departments results in inadequate project control. Because no two firms have the same working environment, repeatedly trying to apply another organization's SSCM strategy often results in failure. As a result, the SSCM strategy must be created in accordance with the environment in which it will be implemented (Beske, Koplin, and Seuring 2008[10]; Seuring and Müller 2008b[52]). In their study, noted that failure to consider human factors, a lack of an efficient model or roadmap to guide the implementation, a poor connection between SSCM and HR rewards, and a lack of technological resources are the major obstacles that need to be properly targeted and avoided by taking preventive action. Poor selection of sustainability practices is [28].

A critical hurdle for effective SSCM implementation. According to the employee viewpoint, the biggest obstacles to SSCM implementation are "lack of trustworthy teamwork" and "lack of employee engagement and team autonomy." multiple authors (Hervani, Helms and Sarkis, 2005[29]; Kumar and Rahman, 2015 [37]; Giannakis, M. and Papadopoulos, T, 2016 [21]) noted some of the critical areas that needed to be examined before SSCM implementation, including the absence of a performance measurement system, ineffective quality information and analysis, culture change, non-value-added time consumption, and a lack of an effective model or roadmap to lead the implementation. While simply identifying the barrier is insufficient, it is crucial to prioritize and rank barriers according to how they will affect the implementation process. Several decision-making strategies, such as the Analytical Hierarchy Process (AHP), Analytical Network Process (ANP), Interpretive Structural Modelling (ISM), etc., are available to rank and prioritize the barriers. The choice of decision-making strategies depends on their applicability and the nature of the situation at hand. The AHP technique is chosen in the current investigation since it offers a hierarchy and pair-wise comparison of all the specified obstacles. The fuzzy set theory and AHP have been merged to maintain the accuracy of results. In the section after that, fuzzy AHP is described.

FUZZY ANALYTICAL HIERARCHY PROCESS (FAHP)

Analytic Hierarchy Process (AHP) is the most suitable and efficient technique for figuring out composite decision issues. Through hierarchical levels, it assists in breaking down complicated decision problems into several smaller problems, with each level portraying a set of criteria that are pertinent to each smaller problem. The FAHP methodology is an additive weighting-related multi-attribute decision-making method where many pertinent criteria are given according to their relative relevance. In the field of engineering, FAHP has a wide range of applications, including financial, implementation, and selection judgments among a variety of available attributes." By applying FAHP, the importance of a number of attributes can be obtained by paired comparison process through experts which represents the priority of each attribute over other attributes".

Despite the many advantages this approach offers, it also has some drawbacks. The majority of FAHP technique applications are manifested to tightly crisp-information decisions; the FAHP approach develops and conducts with a very unstable mode of decision making; human judgment may cause the ranking to be inaccurate. As a result, the decision-makers' judgment has a significant impact on the

results of the AHP approach. Numerous studies used the fuzzy set theory with AHP to address these issues and increase the technique's uncertainty. Case studies were undertaken by several writers to demonstrate the benefits of implementing fuzzy AHP.

In their 2015 paper, Abdullah, and Zulkifli [1] described the use of fuzzy AHP in human resource management. The hybrid fuzzy AHP-TOPSIS approach was used by Patil and Kant (2014b) [43] to rank the approaches for knowledge management adoption in the supply chain and remove its obstacles. It used integrated fuzzy AHP-VIKOR to choose the top organization that practices knowledge flow. The uses of FAHP that have been covered by various writers are shown in Table 2.

Table 2. Applications of FAHP.

Author	Area of Application
(Guo <i>et al.</i> , 2017)[26]	Green supplier evaluation
(Giannakis and Papadopoulos, 2016)[21]	Assessment of sustainability adoption
(Abdullah and Zulkifli, 2015)[1]	Human resource management
(Bastian, J. and Zentes, J. (2013)[9])	Agile supplier selection
(Kumar, Shankar and Debnath, 2015)[37]	customer preference and efficiency analysis
(Ayuso,2013)[8]	Line balancing
(Santiteerakul, S. et al. (2015)[50]	Modelling supply chain co-ordination
(Dadhich, P. et al. (2015)[15]	Choosing the ideal company to practice knowledge flow
Tachizawa, E. M. and Wong, C. Y. (2014)[54]	Ranking of knowledge management obstacles
Tachizawa, E. M. and Wong, C. Y. (2014)[54]	Ranking approaches to knowledge management adoption in order to remove obstacles
(Lee, 2013)[40]	Design scheme evaluation
(Samvedi, Jain and Chan, 2013)[49]	Quantifying risks in supply chain
Wolf, C. and Seuring, S. (2010)[58]	Transshipment problem
(Vance, L. et al. (2015)[56]	Evaluation of eco design alternatives
(Ding, 2011)[16]	Assessing value activities for ocean freight
(Ganguly and Guin, 2013)[20]	Supply risk assessment
(Chen and Hung, 2010)[14]	Choosing industrial partners for outsourcing
(Kuo, Lee and Hu, 2010)[38]	Developing supplier selection system
(Ayağ, 2010)[7]	Designing software selection
(Huang <i>et al.</i> , 2009)[31]	Performance evaluation model
(Lee, 2009)[39]	Buyer-supplier relationship
(Chan <i>et al.</i> , 2008)[12]	Global supplier selection

METHODOLOGY ADOPTED FOR THE STUDY

For precise prioritization of SSCM barriers, the entire structure is divided into two phases, where the first phase comprises conducting a literature review of SSCM barriers, and the second phase includes application of fuzzy AHP for ranking the identified SSCM barriers. In the initial phase, the extensive literature review of SSCM barriers is conducted through articles from the only peer-reviewed journals of reputed publishers such as Science Direct, Taylor & Francis, Emerald full text, Inderscience, and Springer link. The barriers of SSCM identified through literature are further discussed with industrial professionals for their expert opinion. For the above purpose, a group of 6 industry experts and two experts from academia consulted to build the main criteria, create the hierarchical structure, and make the pairwise comparison of the categorized barriers. The obtained outputs will act as an input for the next phase of fuzzy AHP application to rank the barriers of SSCM. Figure 1 describes the methodology adopted in the present study [51].

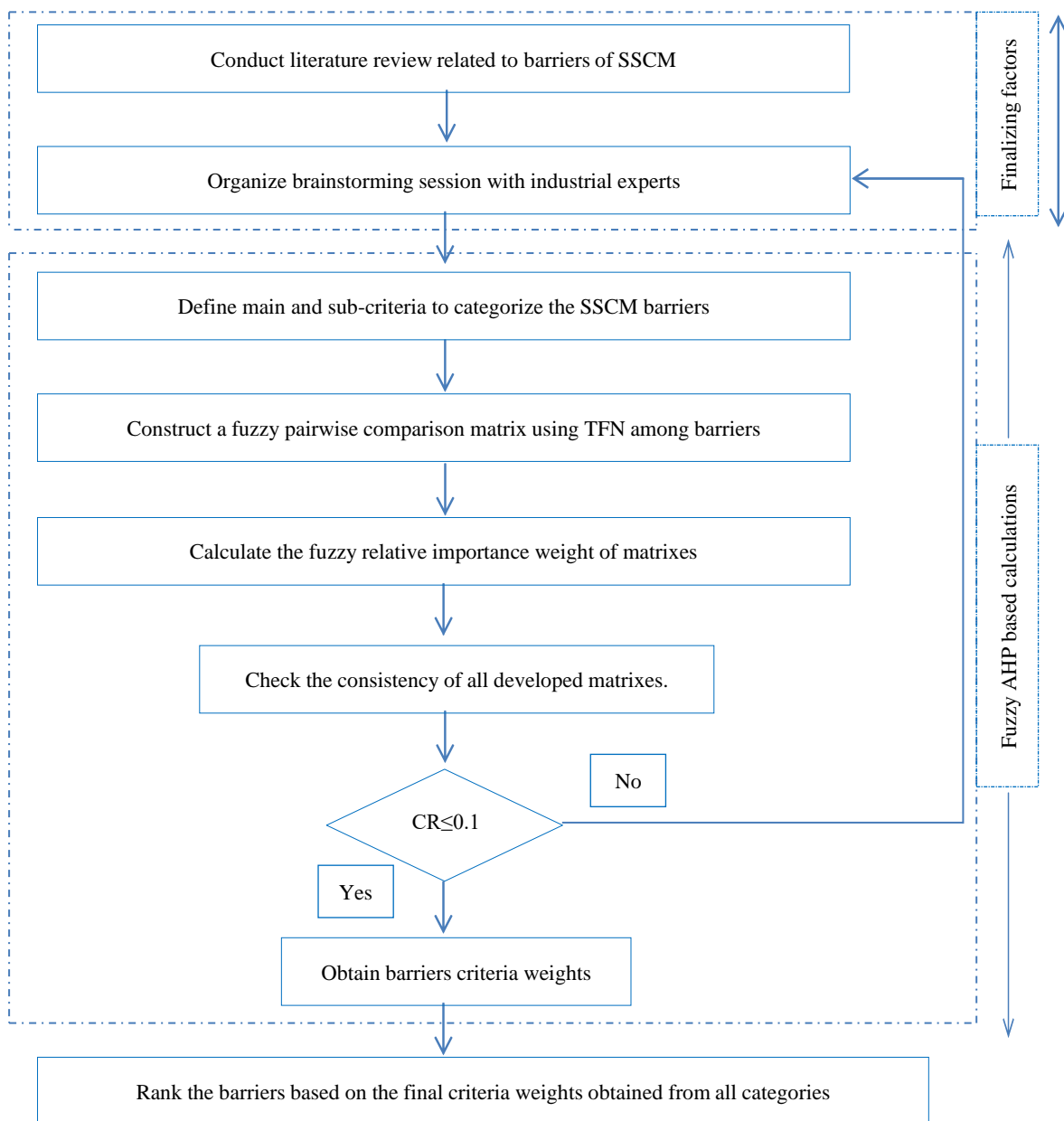


Figure 1. Methodology adopted for the present study.

FUZZY LOGIC

Managerial decisions are the most important strategic decisions which decide the future financial performance aspects of the organization. For vague and uncertain environments, it becomes the prime responsibility of managers to handle the vagueness to achieve the most optimum solution for the defined problem. To overcome the mentioned obstacle, various researchers started using the fuzzy set theory. In their 2015 paper, Abdullah and Zulkifli [1] described the use of fuzzy AHP in human resource management. The hybrid fuzzy AHP-TOPSIS approach was used by Patil and Kant (2014b) [43] to rank the approaches for knowledge management adoption in the supply chain and remove its obstacles. It is used integrated fuzzy AHP-VIKOR to choose the top organization that practices knowledge flow. The uses of FAHP that have been covered by various writers are shown in Table 2.

For the application purpose, linguistic values are demonstrated by fuzzy numbers, whereas most frequently used is the Triangular Fuzzy Number (TFN). Suppose a triangular fuzzy number denoted as $\tilde{N} = (x, y, z)$, where $x \leq y \leq z$ has the triangular type membership function [44].

For defining the confidence level α , the fuzzy triangular numbers are characterized using the below equation:

$$\forall \alpha [0,1] \tilde{M}_\alpha = [l^\alpha, u^\alpha] = [(m-l)\alpha + l, -(u-m)\alpha + u] \tag{1}$$

SSCM BARRIERS PRIORITIZATION THROUGH FUZZY AHP METHOD

As was covered in the previous section, the fuzzy AHP approach is used to rank the SSCM barriers. For priority, the actions listed below are carried out.

Form the Decision Group

To assess the SSCM barriers; a decision group panel is formed, which consists of 8 experts. Six experts from Indian textile industries and two academicians from educational institutes are selected to judge selected SSCM barriers.

Enumerate Main and Sub-criteria to Build a Hierarchical Structure

In the current study, a thorough literature assessment across peer-reviewed publications yielded the identification of 27 putative SSCM hurdles. After discussion with the expert panel assembled in the preceding step, they are later finalized. The hierarchy for carrying out the complete procedure is developed by categorizing these finalized barriers under a set of criteria. The main objective of the established hierarchy is to prioritize the selected SSCM barriers which exist at the first level. The primary criteria at the second level are strategy-oriented barriers, technology-oriented barriers, social-cultural barriers, system-oriented barriers, and independent barriers. These are all the criteria that were shortlisted. The 27 SSCM barriers, which are organized according to their separate key criteria, make up the third level. Figure 2 represents the hierarchy of the selected SSCM barriers [42].

Specify the Triangular Fuzzy Number Scale Adopted for Forming the Pairwise Comparison Matrix

In the present study, the TFN scale $\tilde{1}, \tilde{9}$ is employed to enhance the solution's accuracy for the selected problem. Tables 3–8 shows the scale of relative importance utilized in the pairwise comparison matrix.

Build the Fuzzy Pairwise Comparison Matrix (FCM)

The decision group panel is asked to construct the pairwise comparison matrix for the hierarchy's primary and sub-criteria with the help of the included linguistic factors. The FCM for all primary criterion and sub-criteria has been constructed, similar to the TFN scale.

Table 3. Pairwise comparison of main criteria.

Attributes	Strategy oriented barriers	Technology oriented barriers	Social-cultural barriers	System oriented barriers	Independent barriers
Strategy oriented barriers	1	3	7	3	9
Technology oriented barriers	1/3	1	7	3	7
Social-cultural barriers	1/7	1/7	1	1/5	3
System oriented barriers	1/3	1/3	5	1	5
Individual barriers	1/9	1/7	1/3	1/5	1

Table 4. Pairwise comparison of strategic oriented barriers (SBC).

Attributes	SBC1	SBC2	SBC3	SBC4	SBC5	SBC6	SBC7
SBC1	1	5	3	7	1/3	9	3
SBC2	1/5	1	1/3	3	1/7	5	1/3
SBC3	1/3	3	1	5	1/3	9	3
SBC4	1/7	1/3	1/5	1	1/9	3	1/5
SBC5	3	7	3	9	1	9	5
SBC6	1/9	1/5	1/9	1/3	1/9	1	1/7
SBC7	1/3	3	1/3	5	1/5	7	1

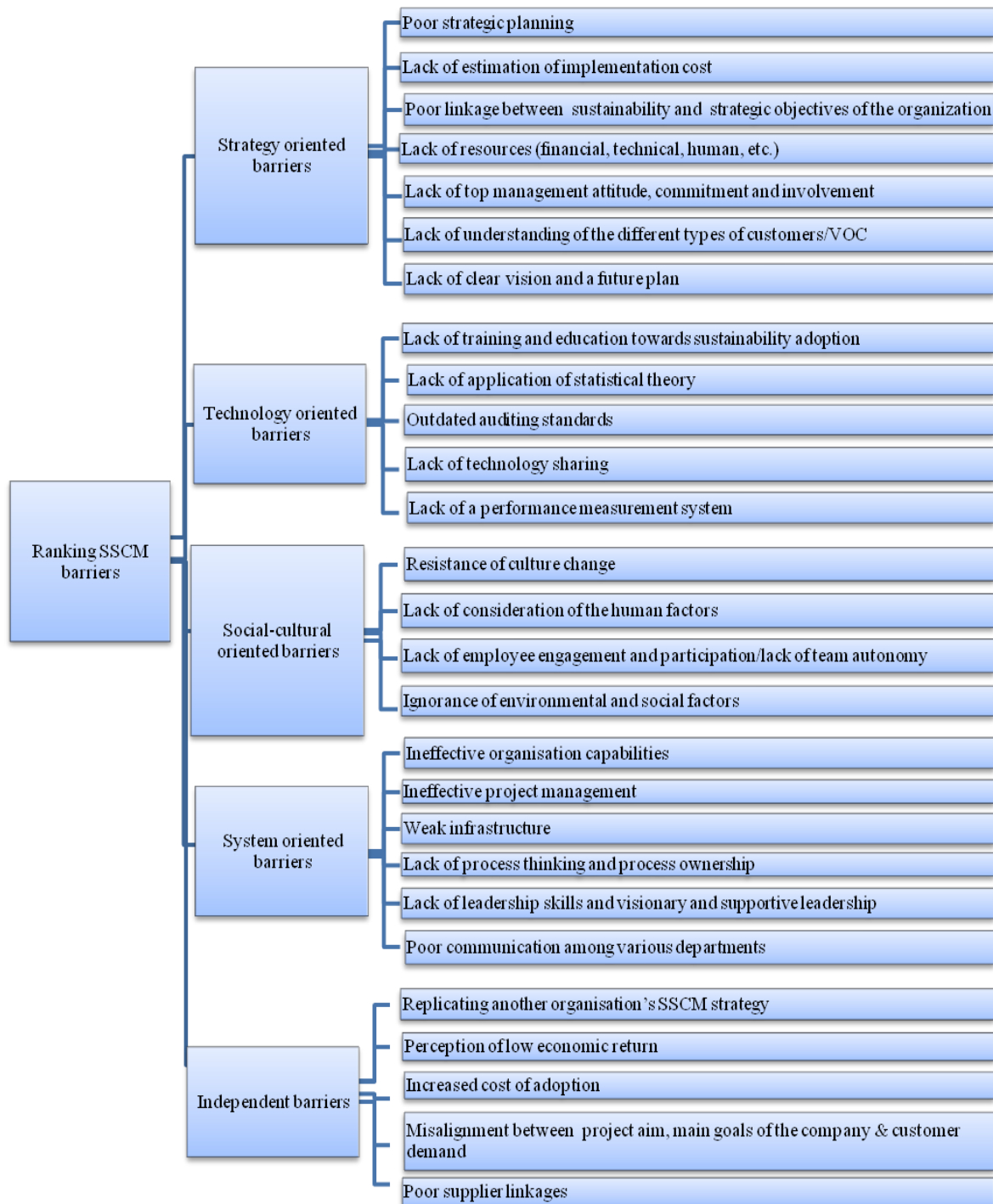


Figure 2. Hierarchy of selected SSCM barriers in Indian textile industries.

Table 5. Pairwise comparison of technology oriented barriers (TBC).

Attributes	TBC1	TBC2	TBC3	TBC4	TBC5
TBC1	1	1/9	1/3	1/3	1/7
TBC2	9	1	7	7	3
TBC3	3	1/7	1	1/3	1/5
TBC4	3	1/7	3	1	1/3
TBC5	7	1/3	5	3	1

Table 6. Pairwise comparison of Social-cultural barriers (SCBC).

Attributes	SCBC1	SCBC2	SCBC3	SCBC4
SCBC1	1	3	1/5	1/5
SCBC2	1/3	1	1/9	1/9
SCBC3	5	9	1	1/5
SCBC4	5	9	5	1

Table 7. Pairwise comparison of System oriented Barriers (SOBC).

Attributes	SOBC1	SOBC2	SOBC3	SOBC4	SOBC5	SOBC6
SOBC1	1	7	5	3	3	1/3
SOBC2	1/7	1	1/3	1/5	1/7	1/9
SOBC3	1/5	3	1	1/3	1/5	1/7
SOBC4	1/3	5	3	1	1/3	1/5
SOBC5	1/3	7	5	3	1	1/3
SOBC6	3	9	7	5	3	1

Table 8. Pairwise comparison of individual barriers (IBC).

Attributes	IBC1	IBC2	IBC3	IBC4	IBC5
IBC1	1	3	1/5	1/7	1/3
IBC2	1/3	1	1/7	1/7	1/5
IBC3	5	7	1	1/3	3
IBC4	7	7	3	1	5
IBC5	3	5	1/3	1/5	1

The Transition of FCM into Crisp Comparison Matrix (CCM)

According to α -cut, equation (5) is used to allow the lower and upper the fuzzy number ceiling. Therefore, the equation (5) is applied to each element of the prescribed matrix. Here, the value for $\alpha = 0.5$ is taken to ensure safety and produce accurate findings. This implies that the decision group panel has reasonable assurance in the assessments made while building the pairwise comparison matrix. So by deputizing the value of α in the given equation (5), the FCM \tilde{X} is converted into \tilde{X}^α , representing the Crisp Comparison Matrix (CCM). Hence the converted α -cut crisp comparison matrix \tilde{X}^α for main criteria is shown below:

$$\tilde{X}^\alpha = \begin{bmatrix} 1 & 2,4 & 6,8 & 2,4 & 8,10 \\ 0.25,0.50 & 1 & 6,8 & 2,4 & 6,8 \\ 0.13,0.17 & 0.13,0.17 & 1 & 0.17,0.25 & 2,4 \\ 0.25,0.50 & 0.25,0.50 & 4,6 & 1 & 4,6 \\ 0.10,0.13 & 0.13,0.17 & 0.25,0.50 & 0.17,0.25 & 1 \end{bmatrix} \tag{8}$$

For the calculation purpose, the value of μ (degree of optimism) is taken as 0.5, which implies that the assessments made by decision group panel are balanced in case optimism. Hence by replacing the value of μ in equation (8) of the α -cut comparison matrix \tilde{X}^α is converted to CCM X.

$$X = \begin{bmatrix} 1 & 3 & 7 & 3 & 9 \\ 0.375 & 1 & 7 & 3 & 7 \\ 0.145 & 0.145 & 1 & 0.208 & 3 \\ 0.375 & 0.375 & 5 & 1 & 5 \\ 0.115 & 0.145 & 0.375 & 0.208 & 1 \end{bmatrix} \tag{9}$$

Carry out the Check for Consistency

Eigenvalues are calculated for major criteria as below:

$$\lambda_1 = 5.437, \lambda_2 = 0.036 + 1.235i, \lambda_3 = 0.036 - 1.235i, \lambda_4 = -0.254 + 0.404i, \lambda_5 = -0.254 - 0.404i$$

From the above-obtained eigenvalues, it is observed that $\lambda_{\max} = \lambda_1 = 5.437$ Hence consistency index (CI):

$$CI = \frac{\lambda_{\max} - n}{n-1} = \frac{5.437 - 5}{5 - 1} = 0.10925$$

From standardise RI = 1.11 corresponding to n = 5,

$$CR = \frac{CI}{RI} = \frac{0.10925}{1.11} = 0.09842$$

Since the value of $CR \leq 0.1$, hence the CCM for the calculated major criteria is satisfactory and valid. If the CCM for X exhibits consistency, then it indicates that the FCM \tilde{X} is also consistent. For all of the sub criteria, the same process is used to calculate and verify the consistency of designed matrixes. All of the calculated matrixes' CR values are found to be 0.1. Therefore, all are appropriate. Table 9 displays the respective CR values for each matrix.

Determine the Weight Criteria of the Selected Matrix

The next step is to establish the weight criterion for each chosen factor after collecting the CR values for all of the matrices. Following are the primary criteria's weights:

- The column sum is calculated for all elements of each column.

$$[2.01 \quad 4.665 \quad 20.375 \quad 7.416 \quad 25]$$

- Now the column sum of each column is used to divide their respective element of CCM.

$$X = \begin{bmatrix} 0.4975 & 0.6430 & 0.3435 & 0.4045 & 0.36 \\ 0.1865 & 0.2143 & 0.3435 & 0.4045 & 0.28 \\ 0.0721 & 0.0310 & 0.0490 & 0.0280 & 0.12 \\ 0.1865 & 0.0803 & 0.2453 & 0.1348 & 0.2 \\ 0.0572 & 0.0310 & 0.0184 & 0.0280 & 0.04 \end{bmatrix} \quad (10)$$

- Lastly, compute the row sum for each row of the matrix and divide each row sum by order of array (i.e., criteria included in the selected matrix); it reflects the corresponding weight of the criteria.

$$X = \begin{bmatrix} 0.4497 \\ 0.2858 \\ 0.0600 \\ 0.1694 \\ 0.0349 \end{bmatrix} \quad (15)$$

Prioritize Each Criterion According to Final Weight Obtained!

The final weights for each criterion are then calculated by multiplying the weight of the major criteria by the weight of the sub-criteria for that criterion. All the criteria are prioritized according to their final weights, which are displayed in Table 9.

FINDINGS AND DISCUSSIONS

In the current study, 27 SSCM hurdles for the Indian textile industries were removed thanks to thorough literature searches and expert advice from the decision group panel. The selected barriers are grouped under five primary defined criteria, namely strategic oriented barriers, technology-oriented barriers, social-cultural barriers, and system oriented barriers and independent barriers. Therefore, the

fuzzy AHP approach is utilized to order the chosen SSCM barriers. Table 9 presents the outcomes of the used procedure. With a weight of 0.449, strategy-oriented barriers stand out as the most important of all the major criteria. It speculates that around 45 percent of barriers for SSCM implementation is on account of the strategic barriers. The Indian textile manufacturers must therefore prioritize overcoming these obstacles. The primary use of technology and communication contributes to the efficient implementation of SSCM, since system-oriented barriers are followed by technology-oriented barriers in terms of weight (0.285), with a weight of 0.169. Since removing organizational barriers is a time-consuming process, major efforts should be taken right away to produce the desired outcomes.

Table 9. Final prioritization of SSCM barriers.

Main Criteria	Main Criteria Wt.	Sub Criteria	CR value	Local Wt.	Global Wt.	Rank
Strategy oriented barriers	0.449	SBC1	0.088	0.236	0.106	3
		SBC2		0.063	0.028	12
		SBC3		0.159	0.071	5
		SBC4		0.034	0.015	16
		SBC5		0.375	0.169	1
		SBC6		0.020	0.009	20
		SBC7		0.109	0.049	7
Technology oriented barriers	0.285	TBC1	0.083	0.038	0.011	18
		TBC2		0.522	0.149	2
		TBC3		0.069	0.019	13
		TBC4		0.111	0.031	10
		TBC5		0.257	0.073	4
Social-cultural barriers	0.060	SCBC1	0.049	0.110	0.006	22
		SCBC2		0.047	0.002	25
		SCBC3		0.250	0.015	17
		SCBC4		0.591	0.035	9
System oriented barriers	0.169	SOBC1	0.085	0.240	0.040	8
		SOBC2		0.027	0.004	24
		SOBC3		0.050	0.008	21
		SOBC4		0.098	0.016	15
		SOBC5		0.177	0.030	11
		SOBC6		0.405	0.068	6
Independent barriers	0.034	IBC1	0.089	0.070	0.002	26
		IBC2		0.039	0.001	27
		IBC3		0.266	0.009	19
		IBC4		0.484	0.016	14
		IBC5		0.139	0.004	23

According to Table 9, of all the sub-criteria barriers, "Lack of top management attitude, commitment, and involvement" (SBC 5) has the highest weight among the strategy-based barriers. The strategic policies and vision mapping are mostly made possible by the top management's accommodating approach. Engagement and dedication create a positive work environment and boost employee productivity to meet corporate objectives. Therefore, in order to increase organizational productivity, senior management must comprehend the significance of SSCM and properly implement it. The second-ranking sub-criteria barrier is a lack of SSCM project training and education. Empathize the SSCM project efficaciously; it is imperative to provide training to the employees; as untrained hands lead to the failure of SSCM implementation. The third sub-barrier under strategy-based barriers is poor strategic planning (SBC 1). Uncertain objectives and a hazy vision never result in a clear plan for increasing productivity. Therefore, having clear objectives is important for better strategic planning.

Lack of technology sharing (TBC 4), which falls under the technical standpoint, is the fourth crucial SSCM obstacle identified by the investigation. The availability of technology-based resources is crucial for carrying out the SSCM properly. These tools aid in keeping track of numerous activities, observing changes, and doing analyses. "Lack of resources" (SBC 3) which is the sub-criterion of strategy-based barrier ranks the fifth position followed by 'Misalignment between organizational goals, (IBC 4) project aim and customer demand' (IBC3) at the sixth position under the independent barrier. Synchronizing between an organization's primary goal, sub goal, and customer needs is crucial, as any misbalancing directly affects the Indian textile industries performance. 'Lack of clear vision and plan' (SBC7) holds the seventh position in the list, which indicates the importance of corporate vision linking to future activities bounded. The remaining SSCM obstacles are then graded in accordance with the ultimate weights discovered.

CONCLUSION

The quality enhancement activities turn out to be productive under assembling condition. Late writing legitimizes SSCM to be a standout amongst the best productivity enhancement procedures as it holds the customary inventory network viewpoints by fusing the maintainability perspectives as well. A few analysts detailed the advantages increased through SSCM usage. Be that as it may, the present examination centres on organizing the SSCM obstructions. To actualize SSCM viably, it is essential to distinguish and organize the obstructions so the association can centre the high need boundaries and create methodologies to conquer them. In the present investigation to organize the SSCM hindrances, fuzzy AHP procedure was proposed. To enhance the accuracy among the positioning procedure, triangular fluffy numbers are utilized in the connected FAHP approach. By fusing the fluffy numbers all the while, the choice gathering board gets the adaptability for retribution the significance of boundaries. The present investigation recognizes 27 SSCM boundaries through writing pursuit and master assessment. These obstructions are arranged among five noteworthy hindrances specifically procedure situated boundaries, innovation situated boundaries, framework arranged boundaries, social-social boundaries, and free obstructions. The results of the connected FAHP technique reflect system and innovation based hindrances to be generally basic. The 'Absence of best administration demeanour, responsibility and contribution' falling under the umbrella of procedure arranged obstruction turns out to be exceedingly vital regarding weight gotten from FAHP pursued by 'Absence of SSCM venture preparing and training' at second and 'Absence of vital arranging' at the third position among the sub criteria boundaries chose for organizing.

The fuzzy AHP technique as proposed in the examination gives a real and bona fide methodology for organizing the SSCM hindrances. The positioning of boundaries accomplished in the examination will assist the supervisors with developing their procedures to defeat these obstructions and continue towards effective usage of SSCM. It is normal that the present investigation will go about as solid advantageous contribution for specialists and analysts to proceed with their future work in an altered and organized way.

Despite the different advantages offered, the present examination has certain impediments. The SSCM boundaries were at first recognized through the writing look, while an overview can be directed so as to fuse more hindrances identified with assembling concerns. The specialists drew nearer were constrained to material associations as it were. Subsequently the outcomes accomplished may not be summed up to other modern segments, yet at the same time it might give a base to start the procedure. Constrained specialists were incorporated into the choice gathering board, however as the piece of future investigation; a similar work can be stretched out on a huge scale to acquire progressively exact outcomes.

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