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Development of a Framework to Improve Sustainable Manufacturing and Service Economics Using ISM for Food Industries

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Abstract

The goal of this study is to look to the most important sustainable practices that fresh food start ups can use to improve their resilience and environmental responsibility. It also aims to identify the difficulties and impediments these companies face when putting these sustainable strategies into effect. Fresh food startups can integrate several sustainable techniques and innovations into their operations, as identified by the study. These include using IoT technology to enhance supply chain management and implementing packaging with a modified environment to keep goods fresher for longer. Advances have improved product attributes, uniformity, and consistency as a result of increases in quality control capabilities afforded by A Food monitoring system based on Bluetooth Low Energy (BLE) and Internet of Things of all phases of industrial manufacturing processes. This paper is a review of some of the more important and modern applications that have been of greatest benefit to the humankind The review also emphasizes the difficulties these firms have had putting these strategies into practice. The structural framework is developed by adopting an interpretive structural modeling approach. Furthermore, fuzzy-MICMAC approach is applied to compute the driving and the dependence power of each selected enabler. This study develops a structural framework that indicates the improved supply chain performance is achieved by "development of supply chain Transportation system", "strong customer relationship management", and "enhancement in control over cost quality and Process of sustainability" as the most critical enablers. The enablers for the development of the framework are obtained through the inputs from an expert panel. However, the researchers may conduct large-scale surveys to strengthen the input components of the framework. This is one of the unique studies that list a set of 15 most critical e-business process and sustainability based enablers to improve supply chain performance.

Keywords: Sustainable manufacturing, Supply Chain Management, SMSCM Enablers, Survey, ISM, fuzzy MICMAC

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INTRODUCTION

The world's population is expected to grow by over at third by then of 2050.It is anticipated that practically all of this expansion will occur in developing countries like India. Predictions at that to feed the 7.1 billion people who will live in the world by 2050, there will need to be an almost 70% increasing global food production [8]. India is a major factor in the global food chain and the second-largest producer and consumer of food globally. It has11.3% of the world's agricultural land [8].

Fresh foods include fruits, vegetables, meats, seafood, eggs, and dairy products. They are raw goods grown, harvested, gathered, and sold straight for human use without any processing or very little processing [10]. The global improvement in living conditions and socio economic progress has led to a substantial shift in people's spending habits and needs. Food requirements for nutrition, safety, and health have also increased [11]. Sustainability is an increasingly important component of managing the supply chain for fresh and short foods [22]. It is believed that 35% of food goods are lost on average during the whole supply chain, from the point of manufacturing to their tails half and the customer's refrigerator [19]. Businesses urge theirs take holders to adopt practices that positively influence the value chain as environmental awareness grows.

For food security, fresh and short food supply chain needs innovation and technological transfer [1–4]. When businesses pursue vertical integration, they must pay close at mention to Sustainable supplier development strategies. Supplier development was highlighted by [23] as a means of achieving green supply chain integration. These might be classified as indirect supplier development techniques, such as audits and standard operating procedures, as opposed to direct supplier development techniques, which include cooperation and training [26].

According [23], innovation like industry 4.0 plays a crucial role in enabling scale ability and flexibility, enhancing productivity in supply chain processes, lowering food waste, and achieving sustainable growth. But implementing sustainable, controlled innovation and measures which call for fresh food start-ups is far more difficult [14, 18]. Problems, including food spoilage, labor shortages, and last-mile delivery challenges, are resolved by startups. Eco-friendly consumer practices (EFCP) and sustainable supply chain practices (GSCP) guarantee sustainable supply chain practices.

This examination begins with the intention to investigate the interdependency of the Enablers of SMSCM and how firmly they impact the execution of SMSCM in the whole framework. Henceforth, it is critical to choose the proper arrangement of Enablers and after that discover the connections among them. Be that as it may, the quantity of collaborations inside Enablers, particularly when the quantity of Enablers is high, makes the mapping between the Enablers confounded. To accomplish the best progressive structure, the incorporated ISM-Fuzzy MICMAC approach is utilized. It will prompt decrease the multifaceted nature and discover the effect of the chose Enablers towards fruitful SMSCM execution [15–17].

Sustainable Supply Chain Management Practices

The organization's sustainability activities are deeply ingrained in its culture. Every activity is interconnected, from organizational culture to design thinking tools [9]. Programs for environmental certification effectively guarantee the security of food supplies worldwide [24]. An active certification program that promotes ender quality, appropriate land use, and land rights lessens the exploitation of farmers. A program for environmental certification is now necessary to overcome problems with social and environmental sustainability [25]. Market-driven tools are presently being used most commonly in the fresh and short food supply chain, where the scale of "sustainable markets "has increased gradually in recent years [13, 19]. Practitioners in the industry recognize the significance of sustainable supply chain design in fresh food.

Notwithstanding the abovementioned, Carter and Jennings [5] likewise talked about reasonable warehousing, which incorporates exercises, for example, terminal and stockroom area, appropriate putting away and discarding perilous materials, gift of overabundance or outdated stock to neighborhood networks, and preparing to securely work forklifts. Feasible covering was introduced by James et al. [12] as bundling that increases the value of society by successfully containing and securing items amid development over the production network; is intended to utilize materials and vitality efficiently; is comprised of materials that are reused consistently and does not represent any dangers to human wellbeing or environments. Another supportable inventory network practice is Reverse Logistics [8] measured turn around Logistics as a procedure that ensures the utilization and re-use (efficiently and successfully) of the esteem put into items.

Enablers Identified for Modeling

The Table 1 mentioned below represents the set of Enablers identified through literature review and expert consultation.

Table 1. Enablers of SMSCM Identified through literature review.

Enablers of SMSCM (SMSCMEs)	**Literature Support**
Maintainable Organizational Culture	Bhaskaran et al., 2014; Gabzdylova et al., 2019; Kuik et al., 2010.
Health and safety issues	Carter and Roger, 20021; Carter et al., 2015.
Sustainable transport and logistics	So, and Xu, 2014; Tay et al., 2022; Uysal and Tosun, 2014
Sustainable Processing	Carter and Roger, 2019; Carter et al., 2015.
Sustainable production	Sarkis, 2022; Mudgal et al., 2018
Reception of green practices	Sarkis, 2012; Govindan et al., 2013a
Linking SMSCM to Customers	Zhu et al., 2016; Vojdani and Lootz, 2012
Waste reduction and resource efficiency	Waheed et al., 2013
Customer satisfaction	Faisal, 2017, Hussain, 2011;
Management Engagement	Carter and Roger, 2008
Economic input to infrastructural development	Kleindorfer et al., 2005
Information Sharing	Oberhofer and Dieplinger, 2014; vSeuring and Müller, 2018; de Sousa Jabbour et al., 2023
Powerful correspondence	Luthra et al., 2016; Sadaghiani et al., 2015; Wittstruck and Teuteberg, 2022.
Successful stock administration	Eskandarpour et al., 2015; Kara et al., 2019; Sadaghiani et al., 2015.
Natural instruction and preparing	Zhu et al. (2022), Liu, Low and He (2012)

Research Methods Adopted for the Study of Interpretive Structural Modeling Methodology

Interpretive Structural Modeling (ISM) is a technique for creating a progressive system of framework Enablers to speak to the framework structure. Interpretive auxiliary displaying (ISM) is an intuitive learning process in which a lot of various and specifically related components are organized into a thorough deliberate model. The fundamental thought of ISM is to break down a confounded framework into a few subsystems (components) by utilizing reasonable experience of specialists and their insight. The technique is interpretive as the judgment of the gathering chooses whether and how the Enablers are connected. It is basic as based on relationship; a general structure is removed from the mind-boggling set of Enablers. It is demonstrating in the sense that the particular connections and generally speaking structure are depicted in a graphical model. The ISM procedure changes misty, inadequately enunciated mental models of frameworks into unmistakable, all around characterized models filling differed needs.

Habidin et al., have connected the ISM strategy for the demonstrating of factors of inventory network the board to distinguish key factors by utilizing immediate just as circuitous between connections among the factors [12]. Hsiao [6, 7] have utilized the ISM strategy to dissect a portion of the vital measure on item family improvement and have demonstrated the between connections of paradigm [20] have utilized the ISM approach to build up a progressive system of activity required to choose the switch coordination's gave in a half breed frame by consolidating it with TOPSIS [3]. Have used ISM philosophy to Model the readiness of the inventory network [13]. Have utilized incorporated ISM for displaying the basic achievement variables of world-class production.

Steps Involved in ISM Methodology

The different advances engaged with the ISM procedure are as per the following:

1. *Identification of Enablers:* The components of the framework are distinguished which are

pertinent to the issue or issue and after that accomplished with a gathering critical thinking method like meetings to generate new ideas.

2. *Contextual Relationship:* From the Enablers recognized in stage 1, a relevant relationship is distinguished among Enablers regarding whom sets of factors would be analyzed. In the wake of settling the driver set and the relevant connection, an auxiliary self-cooperation framework (SSIM) is readied dependent on match savvy examination of Enablers of the framework under thought.
3. Reachability grid is produced from the SSIM, and the network is checked for transitivity. The transitivity of the logical connection is an essential supposition made in ISM. It expresses that if a driver an is identified with B and B is identified with C, at that point an is essentially identified with C.
4. The reachability framework acquired in stage 3 is changed over into the standard network design by organizing the components as indicated by their dimensions.
5. From the sanctioned framework type of the reachability grid, a coordinated diagram is drawn by methods for vertices or hubs and lines of edges and the transitive connections are evacuated dependent on the connections given above in the reachability lattice [21].

FUZZY MICMAC ANALYSIS

Simply characterizing the dimensions of the parcel does not enable the professionals to settle on the right choices for the execution of SMSCM, as it is vital to comprehend the intensity of driving just as a reliance of Enablers incorporated into the model. To defeat the depicted issue, the Fuzzy MICMAC examination is fused in the last phase of the investigation. The point behind the incorporation of fluffy is to consider the ambiguity factor.

Philosophy for MICMAC Analysis

To secure also refined yield an additional substance incorporates portraying the significance of association among the parts is encased in Fuzzy MICMAC. The affiliation credibility can be considered as an abstract measure on 0– 1 pointer scale which is shown in Table 2 underneath:

Table 2. Depth of Relation Value.

Depth of relation	No	Very Low (VL)	Low (LW)	Medium (MD)	High (HG)	Very High (VH)	Complete
Value	0	0.1	0.3	0.5	0.7	0.9	1

The profundity of connection esteem for reachability is laid over the immediate relationship grid to accomplish the immediate relationship framework of fluffy. Double immediate reachability framework is set up by researching the immediate interrelations between the Enablers as saw from the ISM display, barring the transitivity and setting all the askew passages 0.

Table 3. Select SMSCM Enablers

SMSCM Code	**Enablers of SMSCM**	**SMSCM Code**	
SMSCM1	Maintainable Organizational Culture	SMSCM9	Customer Satisfaction
SMSCM2	Health and Safety Issues	SMSCM10	Management Engagement
SMSCM3	Sustainable Transport and Logistics	SMSCM11	Economic Input to Infrastructural Development
SMSCM4	Sustainable Processing	SMSCM12	Information Sharing
SMSCM5	Sustainable Production	SMSCM13	Powerful Correspondence
SMSCM6	Reception of Green Practices	SMSCM14	Successful Stock Administration
SMSCM7	Linking SMSCM to Customers	SMSCM15	Natural Instruction and Preparing
SMSCM8	Waste Reduction and Resource Efficiency		

Modeling of SMSCM Enablers

Step 1: To signify the heading of the relationship among the empowering agents (I and j) four images (V, A, X, O) have been utilized to investigate SMSCMEs in building up the SSIM.

- V-SMSCME i will achieve SMSCMEs j.
- A-SMSCME j will achieve SMSCMEs i.
- X-SMSCME i and j will achieve one another.
- O-SMSCME i and j are random. Table 4 Structural Self Interaction Matrix (SSIM) for SMSCMEs

Table 4. Structural Self Interaction Matrix (SSIM) for SMSCMEs.

SMSCM Code	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**
SMSCM 1	V	V	V	V	V	V	V	X	V	V	V	V	V	V
SMSCM 2	A	V	A	A	A	V	A	A	A	A	A	A	A	
SMSCM 3	A	V	O	V	O	V	A	A	A	A	A	A		
SMSCM 4	O	V	O	V	V	V	V	A	A	V	V			
SMSCM 5	O	V	O	V	V	V	V	A	A	A				
SMSCM 6	O	V	O	V	V	V	V	A	A					
SMSCM 7	V	V	V	V	V	V	V	V						
SMSCM 8	V	V	V	V	V	A	V							
SMSCM 9	A	V	O	V	O	V								
SMSCM 10	A	X	A	A	A									
SMSCM 11	O	V	O	V										
SMSCM 12	A	V	O											
SMSCM 13	O	V												
SMSCM 14	A													
SMSCM 15														

Step 2: Transformation of SSIM into a twofold network speaks to the underlying reachability framework (IRM). Table 3 presents IRM where the images of SSIM (V, A, X, O) are changed over into double structure (0 and 1). The standards for double transformation are recorded beneath:

- When SSIM esteem (I, j) demonstrates V, the (I, j) esteem in IRM changes to 1 while (j, I) esteem changes to 0.
- When SSIM esteem (I, j) demonstrates A, the (I, j) esteem in IRM changes to 0 and (j, I) esteem changes to 1.
- When SSIM esteem (I, j) indicates X, the (I, j) esteem in IRM changes to 1 and (j, I) esteem changes to 1.
- When SSIM esteem (I, j) indicates O, the (I, j) esteem in IRM changes to 0 and (j, I) esteem changes to 0.

Table 5. Initial Matrix for Reachability (IRM) for SMSCMEs.

SMSCM Code	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
SMSCM 1	1	1	1	0	0	1	1	1	0	1	0	1	0	1	0
SMSCM 2	1	1	1	0	1	1	1	0	1	0	1	0	1	1	1
SMSCM 3	0	1	1	0	1	0	0	0	1	1	1	1	0	1	0
SMSCM 4	0	1	1	1	1	1	0	0	1	1	1	1	0	1	0
SMSCM 5	0	1	1	1	1	1	0	0	1	1	1	1	0	1	0
SMSCM 6	0	1	1	0	0	1	0	0	1	1	0	1	0	1	0
SMSCM 7	1	0	0	0	0	1	1	1	1	1	0	0	1	0	1
SMSCM 8	0	1	1	1	0	1	0	1	1	0	1	1	1	0	1
SMSCM 9	0	1	1	0	0	0	0	0	1	1	0	1	0	1	0
SMSCM 10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
SMSCM 11	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0
SMSCM 12	0	1	0	1	1	1	0	0	0	1	0	1	0	1	0
SMSCM 13	0	1	0	0	0	0	0	0	0	1	0	0	1	1	0
SMSCM 14	0	0	0	0	0	1	1	1	0	1	0	0	0	1	1
SMSCM 15	0	1	1	0	1	0	0	0	1	0	0	0	0	0	0

Step 3: In the wake of setting up the underlying reachability lattice, the following stage incorporates evacuation of transitivity. The fundamental constitution in ISM is the transitivity of connection. As per this presumption if a driver C1 is identified with driver C2 and C2 is identified with C3, at that point C1 is identified with C3. Consequently, after the expulsion of transitivity, the Final reachability framework is readied. Table 6 speaks to a conclusive reachability grid.

Step 4: In the wake of expelling the transitivity, the subsequent stage incorporates level apportioning. With the guide of FRM, the reachability band and precursor band for each SMSCME is distinguished. The reachability band includes SMSCME itself just as others which it may accomplish, while the predecessor band speaks to SMSCME itself and different SMSCMEs which help in achieving it. After setting up these two groups, the following stage incorporates the finding of their crossing point focuses. Table 7 speaks to the first emphasis segment of the reachability framework.

Table 6. Final Reachability Matrix (FRM) for SMSCMEs.

SMSCM Code	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
SMSCM 1	1	1	1	0	0	1	0	1	0	1	0	1	0	1	0
SMSCM 2	1	1	1	1	0	1	1	1	1	0	1	0	1	1	1
SMSCM 3	0	1	1	0	1	0	0	0	1	1	1	1	0	1	0
SMSCM 4	0	1	1	1	1	1	0	0	1	1	1	0	0	1	0
SMSCM 5	0	1	1	1	1	1	0	0	1	1	1	1	1	1	0
SMSCM 6	0	1	1	0	0	1	0	0	1	1	0	1	0	1	0
SMSCM 7	1	1	1	1	0	0	0	1	1	1	1	0	1	1	1
SMSCM 8	0	1	1	1	0	1	0	1	1	0	1	1	1	0	1
SMSCM 9	0	1	1	0	1	0	0	0	1	1	0	1	0	1	0
SMSCM 10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
SMSCM 11	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0
SMSCM 12	1	1	1	0	0	0	0	0	0	1	1	1	0	1	0
SMSCM 13	0	1	0	0	0	0	0	0	0	1	0	0	1	1	0
SMSCM 14	1	0	0	0	1	0	0	0	0	1	0	1	0	1	1
SMSCM 15	0	1	0	0	0	1	0	0	1	0	0	1	0	0	1

 # represents transitivity

Table 7. Final Iteration Partition of Reach ability matrix.

SMSCM Code	**Reachability Set**	**Antecedent Set**	**Intersection Set**	**Level Partition**
SMSCM 1	1,2,3,6,8,10,12,14	1,2,7,12,14	1,2,14	Level 3
SMSCM 2	1,2,3,4,6 ,8,10,11,14	1,2,3,4,5,6,7,8,9,10,11,12,13,15	1,2,3,4,6,8,10,11	Level 1
SMSCM 3	2,3,5, 9,10,11,12, 14	1,2,3,4,5,6,7,8,9,10,12	2,3,5,9,10,12	Level 3
SMSCM 4	2,3,4,5,6, 9,10,11,0, 14	2,4,5,7,8,10	2,4,5,10	Level 3
SMSCM 5	2,3,4,5,6, 9,10,11,12, 14	4,5,9,10,14	4,5,9,10,14	Level 3
SMSCM 6	2,3,4,5,6,9,10,11,12,13,14	1,2,4,5,6,8,10,15	2,4,5,6,10	Level 3
SMSCM 7	1,2,3,4,8,9,10,11,13,14	1,10	1,10	Level 2
SMSCM 8	2,3,4,6,8,9,11,12,13	1,2,7,8,10	2,8	Level 2
SMSCM 9	2,3,5,9,10,12,	2,3,4,5,6,7,8,9,10,15	2,3,5,9,10	Level 3
SMSCM 10	1,2,3,4,5,6,7,8,9,10,11,12, 13,14,15	1,3,4,5,6,7,9,10,11,12,13,15	1,3,4,5,6,7,9,10,11, 12,13,15	Level7
SMSCM 11	2,10,11,12,14	1,2,3,4,5,6,7,8,9,10,11,12,13,14, 15	2,10,11,12,14	Level 4
SMSCM 12	1,2,3,10,11,12, ,14	1,7,8,12	1,12	Level 2

SMSCM 13	2,10,13,14	1,3,4,5,6,7,8,9,12,13,15	13	Level 1
SMSCM 14	1,5,10,12,14,15	1,2,3,4,5,6,7,8,9,11,12,13,14,15	1,5,12,14,15	Level6
SMSC 15	2,6,9,12,14	1,3,4,5,6,7,8,9,10,11,12,13,14	6,9,12,14	Level5

Step 5: The last advance of ISM incorporates the organizing of the SMSCMEs at various dimensions got through dimension segment of reach ability grid. Figure 1 demonstrates the basic progression of SMSCMEs which speaks to the relationship among the Enablers in the organized structure.

The above model displays nine distinct dimensions of parcel among the chose Enablers. SMSCMEs at the base of the model speak to solid information factors while the SMSCMEs at center and best dimension speak to the middle of the road and yield factors.

MICMAC ANALYSIS OF SMSCM ENABLERS

In the past segment, the basic chain of command is gotten for the arrangement of shortlisted SMSCM Enablers. Yet, the last technique reflects any part of driving and reliance intensity of the Enablers being incorporated for the computation. Consequently, all the distinguished Enablers and now gone through Fuzzy MICMAC investigation to get progressively proper and exact outcomes as shown in Table 8. The BDRM and FDRM at last gotten by fusing above advances are given in Table 5 and Table 6.

FDRM goes about as a base for the examination procedure as the two frameworks are increased until the order of driving and reliance intensity of Enablers gets to balance out. For duplicating any two lattices, it is fundamental to pursue the essential standard of fluffy augmentation. Concurring fluffy set hypothesis, a fluffy grid is constantly gotten when two fluffy lattices are increased. While as indicated by augmentation rule:

$Z = X, Y = max\ k\ [min(x_{ik},y_{kj})]$, *Where* $X = [x_{ik}]$ *and* $Y = [y_{kj}]$.

Figure 2 shows Cluster Diagram for SMSCMEs respectively.

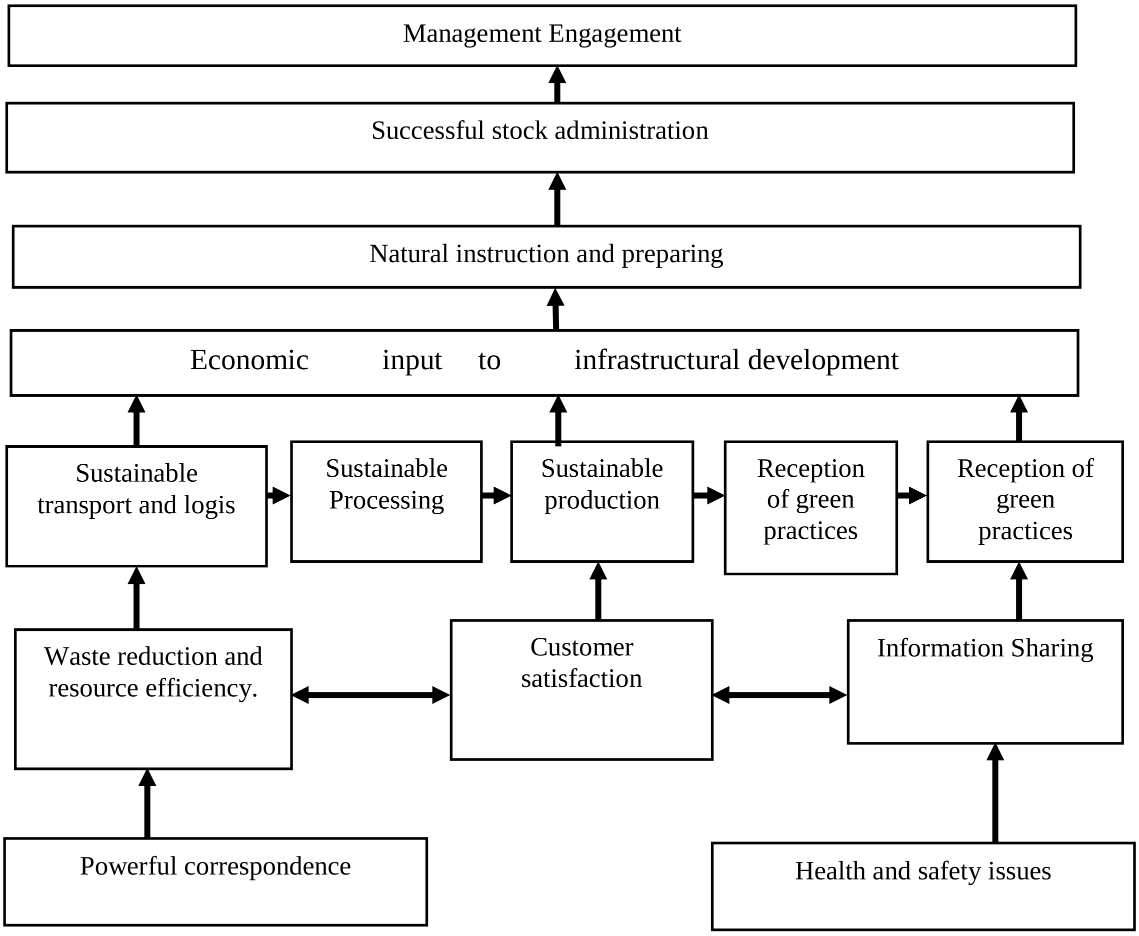

Figure 1. Structural Hierarchy model for SMSCMEs.

Table 8. Fuzzy MICMAC stabilized Matrix.

Co De	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	0	0.9	0.9	0	0.9	0	0	0	0	0.9	0.7	0.9	0	0.9	0	11
2	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	17
3	0	0.9	0.7	0	0	0	0	0	0	0.9	0.7	0	0	0.9	0	7.7
4	0	0.9	0.9	0.7	0.9	0	0	0	0.9	0.9	0.9	0.9	0	0.9	0	12
5	0	0.9	0	0	0	0	0	0	0	0.9	0	0	0	0.9	0	5.4
6	0	0.9	0.9	0	0.9	0.7	0	0	0.9	0.9	0.9	0.9	0	0.9	0	12
7	0	0.9	0.9	0.7	0.9	0.7	0	0	0.9	0.9	0.9	0.9	0	0.9	0	13
8	0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	17
9	0	0.9	0.9	0	0	0	0	0	0.9	0.9	0.9	0.9	0	0.9	0	11
10	0	0	0	0	0	0	0	0	0	0.9	0	0	0	0	0	3.6
11	0	0.9	0.7	0	0	0	0	0	0	0.9	0.7	0	0	0.9	0	8.8
12	0	0.9	0	0	0	0	0	0	0	0.9	0	0.9	0	0.9	0	8.1
13	0	0.9	0.7	0	0	0	0	0	0	0.9	0	0	0	0.9	0	9
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	0	3.6
15	0	0.9	0.9	0	0.9	0	0	0	0	0.9	0.7	0.9	0	0.9	0	11
	0.9	13	9.3	3.2	6.3	3.2	1.8	0.9	5.4	14.4	8.2	9	1.8	14.4	1.8	

20
15
10
5
0

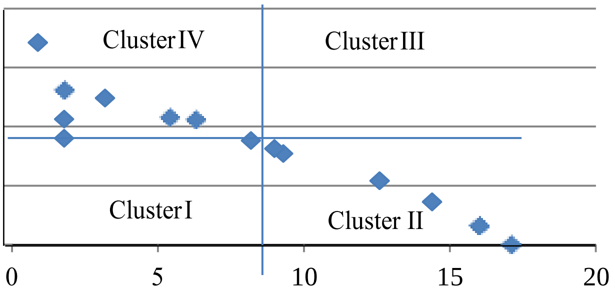

Figure 2. Cluster Diagram for SMSCMEs.

FINDINGS FROM THE ANALYSIS

Because of half breed organizing of procedures in assembling association it turns out to be basic for professionals to perceive and arrange the critical factors with the goal that distinctive empowering influences might be organized efficiently. Even though countless exist in executing SMSCM effectively, subsequently this examination helps in distinguishing proof and organizing of most critical Enablers of SMSCM in the wake of assessing different research articles and sentiments from modern specialists. In the wake of the shortlisting procedure of Enablers at last twenty Enablers were distinguished which were given as a contribution to ISM way to deal with fabricate the various leveled structure of SMSCMEs, later the result of ISM show went about as contribution to fluffy MICMAC approach.

In the present examination, a progressive model of SMSCMEs is produced utilizing ISM and Fuzzy MICMAC approach, which might be useful to administrators to use this model to distinguish and order the critical factors as indicated by the necessities of explicit assembling condition and explore the immediate and aberrant impacts of every factor on one another. The Enablers distinguished in this model are very conventional for assembling concerns, still, with a few changes; it tends to be made increasingly explicit identified with car, building and process businesses.

Discoveries from this examination will give a huge guide to the experts and academicians for better execution of SMSCM. The created model entirely focusses on producing conditions henceforth for a future degree; specialists may build up the model relevant for administration enterprises as well and apply different basic leadership methods to give a superior establishment to SMSCM usage.

CONCLUSION

The enablers found through a survey of the literature are presented in this paper along with a case study for modeling SMSCM enablers. The interpretive structural modeling technique is used to model the enablers in order to determine their structural hierarchy. The driving and dependent forces of each enabler are discovered using the fuzzy MICMAC method. Establishing connections and identifying the enablers would aid organizations in developing their plans and comprehending the actions of the elements that influence them. Enhancing the elements (enablers) that drive the implementation of a sustainable supply chain would put the companies in a better position to raise revenue, lessen negative environmental effects, and improve societal well-being. According to a fuzzy MICMAC study, management involvement, supplier dedication, Government sustainability policies that are in line with the system and strategic planning are the main drivers [15]. These enablers are helpful for the deployment of SMSCM since they are also minimally dependent. The concept of an autonomous enabler does not exist. An autonomous enabler is one who needs little assistance and little power to operate [17].

The categorization of enablers into four distinct clusters will aid practitioners in formulating their plans for the seamless integration of SMSCM in the food supply sectors. Using ISM and the fuzzy MICMAC approach, a hierarchical model of SMSCMEs is developed [18]. This model can help leaders identify and describe the fundamental factors that are indicated by the requirements of a clear assembly climate and look into the direct and indirect effects of each factor on one another. The enabling factors identified in this approach are not limited to issues related to material assembly. It might be made clearer in relation to vehicle, design, and interface projects for specific adjustments. Experts in the field made decisions that contributed to the development of the fluffy MICMAC and the ISM model. The judgments, however, are emotional, and any biasing by the experts in passing judgment on the SMSCMEs could have a direct impact on the final outcomes.

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