

## Barriers of supply chain for Industries in Indian scenario: Pandemic Covid-19 impact using ISM approach

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### CHRONICLE

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### ABSTRACT

Global pandemic has provoked industries with unprecedented challenges. Stratagems to squash the COVID-19 bow like communal lockdown, social isolation, work at home, containment zones and all restraints sited on travel with stay home orders issued by the authorities led to sharp failure in revenues of service and manufacturing industries (Pai et al.,2020). The COVID-19 pandemic has shattered the transportation links with supply chain amongst suppliers, production amenities and consumers. Mostly the business executives are penetrating about passable strategies and plans for restoring production lines to encounter customer mandates. In this paper the pandemic effect of Indian business is considered which are affected by critical barriers of supply chains in the Indian scenario. These critical barriers are identified on a priority basis using the MADM approach. Furthermore, the study will help the scholars to grow conceptual models for maintaining a better supply chain to overwhelm this world-wide problem.

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## 1. Introduction

The economy of developing countries like India has been extremely worrying due to COVID-19 effect. India has already confronted the deepest statistics over several decades of periods since trade liberalization over 1990. Major economic newspapers such as Indian Express wrote that due to lockdown, about 53% of enterprises across the country will be affected. The lockdown restrained the supply chain into stress and deficiency of transparency in streamlining around essential supplies (Debata et al., 2020). Majority of daily wages workers groups were affected which caused uncertainty in production and direct supply as in India enormous dependencies on manpower for manufacturing, maintenance, quality control, transportation, sales and supply chain (Das, 2020). Even in the agriculture sector farmers across the nation who develop and promote major foods, vegetables and fruits items are getting vague (Kumar et al., 2021). Many industries such as hotels, airlines, travels, entertainments and manufacturing related are cutting remunerations and dismissals of workforces (Jamwal et al., 2019). Also, the number of start-ups is affected due to lack of funding. The stock markets in country found their significant droplet in 2020 due to complete lockdown of country which resulted SENSEX and NIFTY show the topmost evolution in last 11 years (Shah et al, 2020). Indian administration has commenced numerous ladders to resolve the predicaments, preparatory with food security, rise funding on healthiness attention, segments linked to sustenance with protracted tax schedules. Japan and other friendly countries are also observing the business for the expansion of supply chain and manufacturing to new destinations. Owing communal awareness, monetary, eco-friendly or legislative reasons, the constraint of Green Supply chain has been improved (Luthra et al., 2011). The Indian government also found a golden opportunity to make industrial hubs for manufacturing and logistics by providing attractive facilities and offers to these industries (Gupta et al., 2018). But the Supply chain is also disturbed in India at native level due to certain barriers which are deliberated in this existing research. In total there are 18 critical barriers which affected the supply chain in the country during Covid 19 period. By eliminating these barriers the supply chain can improve rapidly which will develop inordinate growth to industries and also improves the confidence of managers to develop the conceptual models to overcome this problem (Kannan et al., 2009).

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## 2. Barriers in Supply chain during COVID-19 in India

Several nations have banned the import and export of numerous goods which affected the industrial businesses throughout the world. Many barriers for the Indian supply chain instigated by the Covid-19 are found from the literature and experts of supply chain (Zhu et al., 2020). Out of which 11 imperative critical barriers are found out which are discussed below:

**Table 1**

Notation of Barriers

S.No	NOTATION	NAME OF BARRIER
1	B1	LACK OF RAW MATERIAL
2	B2	LACK OF MAN FORCE
3	B3	DEPENDENCY ON IMPORTED GOODS/ITEMS
4	B4	SHORTAGE OF LIVESTOCK FEED
5	B5	LACK OF TRANSPORTATION
6	B6	LACK OF AWARENESS REGARDING COVID 19
7	B7	LACK OF CASH FLOW
8	B8	PRESSURE FROM LOCAL LAWS ENFORCEMENT
9	B9	LACK OF TRAINING AND EDUCATION
10	B10	MARKET DEMAND- LACK OF BUYERS
11	B11	LACK OF STRATEGIC PLANNING
12	B12	DELAY IN VACCINE
13	B13	Lack of RELIABILITY
14	B14	GLOBAL COMPETITIVENESS
15	B15	LACK OF COMMITMENT BY TOP MANAGEMENT
16	B16	LACK OF AWARENESS ABOUT REVERSE LOGISTICS
17	B17	LACK OF INFORMATION AND TECHNOLOGICAL SYSTEM

(Pokhrel & Chhetri, 2021; Raj et al., 2009; Roy et al., 2021; Singh et al., 2017; Singh et al., 2019; Thakkar et al., 2008)

These barriers are having the excessive impact on Indian industries for the supply chain. Though these concerns in the supply chain are very comprehensive, more exercise and ranking of these barriers will assist the businesses to overcome the supply chain concerns due to the pandemic of Covid-19 (Collen et al., 2020). In this paper MCDM approaches are used for deliberating of these barriers and model validation is done through data analytics techniques.

## 3. Development of ISM Methodology

ISM is an interactive erudition procedure where a usual of innumerable is correct or incidentally associated with essentials/events is organized into a complete organized model. ISM methodology helps to execute direction and order on the complication of associations amongst essentials of the organization (Sage, 1977). It is apparent that ISM is a qualitative instrument used by a number of scholars in various environments since the creation of fiction (Singh et al., 2017; Singh et al., 2015).

Many steps are involved in ISM methodologies which are as follows:

- (1) Identification of elements, which are related to the problematic, this could be done by survey or any group problem solving technique.
- (2) Establishing an appropriate connection amongst elements with respect to which pairs of elements will be pragmatic.
- (3) Emerging a structural self-interaction matrix (SSIM) of elements, this indicates pair-wise relationship amongst elements of the system.
- (4) Evolving a reachability matrix from the SSIM and examining the matrix for transitivity. Transitivity of the related relation is an elementary opportunity in ISM which states that if element A is correlated to B and B is related to C, then A is certainly related to C.
- (5) Separating the reachability matrix into dissimilar levels.
- (6) Established on the associations quantified overhead in the reachability matrix, attract a directed graph (digraph) and eliminate transitive relations.
- (7) Translate the ensuing digraph into an ISM, by substituting element bulges with reports.
- (8) Evaluate the ISM model to check for theoretical inconsistency and to make the vital alterations.

### 3.1 Application of ISM methodology for Indian Industries

The many phases which increase to expand the ISM model are deliberated below.

#### Step 1: Establishing the appropriate relationship between factors

The following four symbols have been used to signify the direction of the association amongst two factors (i and j):

- V is used for the relation from factors i to factors j (i.e. if factors i effects or grasps to factors j).
- A is used for the relation since factors j to factors i (i.e. if factors j reaches to factors i).
- X is used for a joint way to relations (i.e. if factors i and j reach to both other).
- O is used for no relation amongst two factors (i.e. if factors i and j are dissimilar).

Step 2: Development of structural self-interaction matrix (SSIM) The SSIM has been recognized on the basis of the contextual association amongst factors. SSIM has been established and it is presented in Table 2. The following declarations explain the usage of symbols in SSIM:

**Table 2**  
Structural self-interactive matrix (SSIM)

	B 17	B 16	B 15	B 14	B 13	B 12	B 11	B 10	B9	B8	B7	B6	B5	B4	B3	B2	B1
B1	V	V	V	V	V	V	O	V	V	V	V	V	V	V	V	O	
B2	O	O	V	V	O	V	O	V	V	O	O	O	O	O	O		
B3	V	V	O	V	V	V	O	V	V	O	V	V	V	V			
B4	A	A	O	A	O	A	O	V	A	A	V	O	A				
B5	A	A	O	O	O	A	O	O	V	V	V	V					
B6	A	V	V	V	O	V	O	V	V	V	V						
B7	A	A	O	O	V	A	O	V	A	V							
B8	A	V	O	O	V	A	O	V	A								
B9	A	A	O	O	V	A	O	V									
B10	A	O	A	O	O	A	A										
B11	O	O	O	O	O	O											
B12	A	V	V	V	V												
B13	A	O	O	O													
B14	A	O	A														
B15	O	O															
B16	A																
B17																	

**Table 3**  
Initial Reachability Matrix

Factors	B 1	B 2	B 3	B 4	B 5	B 6	B 7	B 8	B 9	B 10	B 11	B 12	B 13	B 14	B 15	B 16	B 17
B1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
B2	0	1	0	1*	1*	0	1*	1*	1	1	0	1	1*	1	1	1*	1*
B3	0	0	1	1	1	1	1	1*	1	1	0	1	1	1	1*	1	1
B4	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0
B5	0	0	0	1	1	1	1	1	1	1*	0	1*	1*	1*	1*	1*	0
B6	0	0	0	1	1*	1	1	1	1	1	0	1	1*	1	1	1	1*
B7	0	0	0	1*	0	0	1	1	0	1	0	0	1	0	0	1*	0
B8	0	0	0	1	1*	0	1*	1	1*	1	0	0	1	0	0	0	1
B9	0	0	0	1	0	0	1	1	1	1	0	0	1	0	0	1*	0
B10	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
B11	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
B12	0	0	0	1	1	1*	1	1	1	1	0	1	1	1	1	1	1
B13	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
B14	0	0	0	1	0	0	1*	0	0	1*	0	0	0	1	0	0	0
B15	0	0	0	1*	0	0	0	0	0	1	0	0	0	1	1	1	0
B16	0	0	0	1	1	1*	1	1*	1	1*	0	0	1*	0	0	1	0
B17	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1*	1	1

Symbol V is assigned to cell (1, 10) because factors 1 influence or reaches to factors 10.

- Symbol A is assigned to cell (4, 10) because factors 10 influence the factor 4.
- Symbol X is assigned to cell (2, 10) because factors 2 and 10 influence each other.
- Symbol O is assigned to cell (7, 10) because factors 7 and 10 are unrelated.

Step 3: Development of the reachability matrix

- The next step is to develop the reachability matrix from SSIM. This transformation has been done with the following rules:
  1. If the cell (i, j) is assigned with symbol V in the SSIM, then, this cell (i, j) entry becomes 1 and the cell (j, i) entry becomes 0 in the initial reachability matrix.
  2. If the cell (i, j) is assigned with symbol A in the SSIM, then, this cell (i, j) entry becomes 0 and the cell (j, i) entry becomes 1 in the initial reachability matrix.
  3. If the cell (i, j) is assigned with symbol X in the SSIM, then, this cell (i, j) entry becomes 1 and the cell (j, i) entry also becomes 1 in the initial reachability matrix.
  4. If the cell (i, j) is assigned with symbol O in the SSIM, then, this cell (i, j) entry becomes 0 and the cell (j, i) entry also becomes 0 in the initial reachability matrix.
- Following the above rules, the initial reachability matrix is prepared as shown in Table 3.

**Table 4**  
Final Reachability matrix

Factors	B1	B2	B3	B4	B5	B6	B7	B8	B9	B	B	B	B	B	B	B	B
										10	11	12	13	14	15	16	17
B1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
B2	0	1	0	0	0	0	0	0	1	1	0	1	0	1	1	0	0
B3	0	0	1	1	1	1	1	0	1	1	0	1	1	1	0	1	1
B4	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0
B5	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
B6	0	0	0	1	0	1	1	1	1	1	0	1	0	1	1	1	0
B7	0	0	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0
B8	0	0	0	1	0	0	0	1	0	1	0	0	1	0	0	1	0
B9	0	0	0	1	0	0	1	1	1	1	0	0	1	0	0	0	0
B10	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
B11	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
B12	0	0	0	1	1	0	1	1	1	1	0	1	1	1	1	1	1
B13	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
B14	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0
B15	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0
B16	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	1	0
B17	0	0	0	1	1	1	1	1	1	1	0	1	1	1	0	1	1

**Table 5**  
Iteration 1

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
<b>B1</b>	B1,B3,B4,B5,B6,B7,B8,B9,B10,B12,B13,B14,B15,B16,B17	B1	B1	
<b>B2</b>	B2,B4,B5,B7,B8,B9,B10,B12,B13,B14,B15,B16,B17	B2	B2	
<b>B3</b>	B3,B4,B5,B6,B7,B8,B9,B10,B12,B13,B14,B15,B16,B17	B1,B3	B3	
<b>B4</b>	B4,B7,B10	B1,B2,B3,B4,B5,B6,B7,B8,B9,B12,B14,B15,B16,B17	B4,B7	
<b>B5</b>	B4,B5,B6,B7,B8,B9,B10,B12,B13,B14,B15,B16	B1,B2,B3,B5,B6,B8,B12,B16,B17	B5,B6,B8,B12,B16	
<b>B6</b>	B4,B5,B6,B7,B8,B9,B10,B12,B13,B14,B15,B16,B17	B1,B3,B5,B6,B12,B16,B17	B5,B6,B12,B16,B17	
<b>B7</b>	B4,B7,B8,B10,B13,B16	B1,B2,B3,B4,B5,B6,B7,B8,B9,B12,B14,B16,B17	B4,B7,B8,B16	
<b>B8</b>	B4,B5,B7,B8,B9,B10,B13,B16	B1,B2,B3,B5,B6,B7,B8,B9,B12,B16,B17	B5,B7,B8,B9,B16	
<b>B9</b>	B4,B7,B8,B9,B10,B13,B16	B1,B2,B3,B5,B6,B8,B9,B12,B16,B17	B8,B9,B16	
<b>B10</b>	B10	B1,B2,B3,B4,B5,B6,B7,B8,B9,B10,B11,B12,B14,B15,B16,B17	B10	<b>I</b>
<b>B11</b>	B10,B11	B11	B11	
<b>B12</b>	B4,B5,B6,B7,B8,B9,B10,B12,B13,B14,B15,B16,B17	B1,B2,B3,B5,B6,B12,B17	B5,B6,B12,B17	
<b>B13</b>	B13	B1,B2,B3,B5,B6,B7,B8,B9,B12,B13,B16,B17	B13	<b>I</b>
<b>B14</b>	B4,B7,B10,B14	B1,B2,B3,B5,B6,B12,B14,B15,B17	B14	
<b>B15</b>	B4,B10,B14,B15	B1,B2,B3,B5,B6,B12,B15,B17	B15	
<b>B16</b>	B4,B5,B6,B7,B8,B9,B10,B13,B16	B1,B2,B3,B5,B6,B7,B8,B9,B12,B16,B17	B5,B6,B7,B8,B9,B16	
<b>B17</b>	B4,B5,B6,B7,B8,B9,B10,B12,B13,B14,B15,B16,B17	B1,B2,B3,B6,B12,B17	B6,B12,B17	

**Table 6**  
Iteration 2

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
<b>B1</b>	B1,B3,B4,B5,B6,B7,B8,B9,B12,B14,B15,B16,B17	B1	B1	
<b>B2</b>	B2,B4,B5,B7,B8,B9,B12,B14,B15,B16,B17	B2	B2	
<b>B3</b>	B3,B4,B5,B6,B7,B8,B9,B12,B14,B15,B16,B17	B1,B3	B3	
<b>B4</b>	B4,B7	B1,B2,B3,B4,B5,B6,B7,B8,B9,B12,B14,B15,B16,B17	B4,B7	<b>II</b>
<b>B5</b>	B4,B5,B6,B7,B8,B9,B12,B14,B15,B16	B1,B2,B3,B5,B6,B8,B12,B16,B17	B5,B6,B8,B12,B16	
<b>B6</b>	B4,B5,B6,B7,B8,B9,B12,B14,B15,B16,B17	B1,B3,B5,B6,B12,B16,B17	B5,B6,B12,B16,B17	
<b>B7</b>	B4,B7,B8,B16	B1,B2,B3,B4,B5,B6,B7,B8,B9,B12,B14,B16,B17	B4,B7,B8,B16	
<b>B8</b>	B4,B5,B7,B8,B9,B16	B1,B2,B3,B5,B6,B7,B8,B9,B12,B16,B17	B5,B7,B8,B9,B16	
<b>B9</b>	B4,B7,B8,B9,B16	B1,B2,B3,B5,B8,B9,B12,B16,B17	B8,B9,B16	
<b>B11</b>	B11	B11	B11	<b>II</b>
<b>B12</b>	B4,B5,B6,B7,B8,B9,B12,B14,B15,B16,B17	B1,B2,B3,B4,B5,B6,B12,B17	B5,B6,B12,B17	
<b>B14</b>	B4,B7,B14	B1,B2,B3,B5,B6,B12,B14,B15,B17	B14	
<b>B15</b>	B4,B14,B15	B1,B2,B3,B5,B6,B12,B15,B17	B15	
<b>B16</b>	B4,B5,B6,B7,B8,B9,B16	B1,B2,B3,B5,B6,B7,B8,B9,B12,B16,B17	B5,B6,B7,B8,B9,B16	
<b>B17</b>	B4,B5,B6,B7,B8,B9,B12,B4,B15,B16,B17	B1,B2,B3,B6,B12,B17	B6,B12,B17	

**Table 7**  
Iteration 3

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
<b>B1</b>	B1,B3,B5,B6,B7,B8,B9,B12,B14,B15,B16,B17	B1	B1	
<b>B2</b>	B2,B5,B7,B8,B9,B12,B14,B15,B16,B17	B2	B2	
<b>B3</b>	B3,B5,B6,B7,B8,B9,B12,B14,B15,B16,B17	B1,B3	B3	
<b>B5</b>	B5,B6,B7,B8,B9,B12,B14,B15,B16	B1,B2,B3,B5,B6,B8,B12,B16,B17	B5,B6,B8,B12,B16	
<b>B6</b>	B5,B6,B7,B8,B9,B12,B14,B15,B16,B17	B1,B3,B5,B6,B12,B16,B17	B5,B6,B12,B16,B17	
<b>B7</b>	B7,B8,B16	B1,B2,B3,B5,B6,B7,B8,B9,B12,B14,B16,B17	B7,B8,B16	<b>III</b>
<b>B8</b>	B5,B7,B8,B9,B16	B1,B2,B3,B5,B6,B7,B8,B9,B12,B16,B17	B5,B7,B8,B9,B16	
<b>B9</b>	B7,B8,B9,B16	B1,B2,B3,B5,B8,B9,B12,B16,B17	B8,B9,B16	
<b>B12</b>	B5,B6,B7,B8,B9,B12,B14,B15,B16,B17	B1,B2,B3,B5,B6,B12,B17	B5,B6,B12,B17,	
<b>B14</b>	B7,B14	B1,B2,B3,B5,B6,B12,B14,B15,B17	B14	
<b>B15</b>	B14,B15	B1,B2,B3,B5,B6,B12,B15,B17	B15	
<b>B16</b>	B5,B6,B7,B8,B9,B16	B1,B2,B3,B5,B6,B7,B8,B9,B12,B16,B17	B5,B6,B7,B8,B9,B16	<b>III</b>
<b>B17</b>	B5,B6,B7,B8,B9,B12,B14,B15,B16,B17	B1,B2,B3,B6,B12,B17	B6,B12,B17	

**Table 8**  
Iteration 4

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
<b>B1</b>	B1,B3,B5,B6,B8,B9,B12 ,B14,B15,B17	B1	B1	
<b>B2</b>	B2,B5,B8,B9,B12,B14,B15,B17	B2	B2	
<b>B3</b>	B3,B5,B6,B8,B9,B12,B14,B15, B17	B1,B3	B3	
<b>B5</b>	B5,B6,B8,B9,B12,B14,B15,	B1,B2,B3,B5,B6,B8,B12,B17	B5,B6,B8,B12	
<b>B6</b>	B5,B6,B8,B9,B12,B14,B15,B17	B1,B3,B5,B6,B12,B17	B5,B6,B12,B17	
<b>B8</b>	B5,B8,B9,	B1,B2,B3,B5,B6,B8,B9,B12,B17	B5,B8,B9	<b>IV</b>
<b>B9</b>	B8,B9	B1,B2,B3,B5,B8,B9,B12,B17	B8,B9	<b>IV</b>
<b>B12</b>	B5,B6,B8,B9,B12,B14,B15,B17	B1,B2,B3,B5,B6,B12,B17	B5,B6,B12,B17,	
<b>B14</b>	B14	B1,B2,B3,B5,B6,B12,B14, B15,B17	B14	<b>IV</b>
<b>B15</b>	B14,B15	B1,B2,B3,B5,B6,B12,B15,B17	B15	
<b>B17</b>	B5,B8,B9,B12,B14,B15, B17	B1,B2,B3,B6,B12,B17	B6,B12,B17	

**Table 9**  
Iteration 5

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
<b>B1</b>	B1,B3,B5,B6,B12,B15,B17	B1	B1	
<b>B2</b>	B2,B5,B12,B15,B17	B2	B2	
<b>B3</b>	B3,B5,B6,B12,B15,B17	B1,B3	B3	
<b>B5</b>	B5,B6,B12,B15,	B1,B2,B3,B5,B6,B12,B17	B5,B6,B12,	
<b>B6</b>	B5,B6,B12,B15,B17	B1,B3,B5,B6,B12,B17	B5,B6,B12,B17	
<b>B12</b>	B5,B6,B12,B15,B17	B1,B2,B3,B5,B6,B12,B17	B5,B6,B12,B17,	
<b>B15</b>	B15	B1,B2,B3,B5,B6,B12,B15,B17	B15	<b>V</b>
<b>B17</b>	B5,B12,B15,B17	B1,B2,B3,B6,B12,B17	B6,B12,B17	

**Table 10**  
Iteration 6

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
<b>B1</b>	B1,B3,B5,B6,B12,B17	B1	B1	
<b>B2</b>	B2,B5,B12,B17	B2	B2	
<b>B3</b>	B3,B5,B6,B12,B17	B1,B3	B3	
<b>B5</b>	B5,B6,B12	B1,B2,B3,B5,B6,B12,B17	B5,B6,B12,	<b>VI</b>
<b>B6</b>	B5,B6,B12,B17	B1,B3,B5,B6,B12,B17	B5,B6,B12,B17	<b>VI</b>
<b>B12</b>	B5,B6,B12,B17	B1,B2,B3,B5,B6,B12,B17	B5,B6,B12,B17,	<b>VI</b>
<b>B17</b>	B5,12,B17	B1,B2,B3,B6,B12,B17	B6,B12,B17	

**Table 11**  
Iteration 7

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
<b>B1</b>	B1,B3,B17	B1	B1	
<b>B2</b>	B2,B17	B2	B2	
<b>B3</b>	B3,B17	B1,B3	B3	
<b>B17</b>	B17	B1,B2,B3,B17	B17	<b>VII</b>

**Table 12**  
Iteration 8

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
<b>B1</b>	B1,B3	B1	B1	
<b>B2</b>	B2	B2	B2	<b>VIII</b>
<b>B3</b>	B3	B1,B3	B3	<b>VIII</b>

**Table 13**  
Iteration 9

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
B1	B1	B1	B1	IX

Similarly, the antecedent set for top level factors (i) will consist of that factors (i) itself and all other factors which may reach it from lower levels and any factors of a strongly connected subset involving factors (i) in the top level. As a result, the intersection of the reachability set, and the antecedent set will be the same as the reachability set (Farris and Sage 1975). Once the top-level factors are identified, it is removed from consideration and other top-level factors of the remaining sub graph are found. This process is continued till all levels of the structure are identified. These identified levels help in the expansion of digraph and the final model. Top level factors are situated at the top of digraph and so on. In the current case, the 17 factors, along with their reachability set, antecedent set, intersection set and levels, are presented in Tables 5–13.

*Step 5: Development of conical matrix*

In the next step, a conical matrix is developed by clubbing together factors in the similar level, crossways rows and columns of the last reachability matrix. The drive power of a factor is derivative by summing up the quantity of ones in the rows and its dependence power by summing up the amount of ones in the columns. Subsequently, drive power and dependence power ranks are intended by giving maximum ranks to the factors that have the maximum number of ones in the rows and columns respectively.

*Step 6: Development of Digraph*

Based on the conical matrix, an initial digraph counting transitivity relations is obtained. This is made by nodes besides lines of edges. After eliminating the unintended links, a final digraph is established (Fig. 1). In this development, the top level factor is situated at the top of the digraph and second level factors are positioned at second placed and so on, until the bottom level is placed at the bottommost position in the digraph.

*Step 7: Development of ISM model*

Subsequently, the digraph is converted into an ISM model by replacing nodes of the essentials with statements as shown in Fig. 1. Due to globalization and emergent consequences in the Indian market, there is extreme competition for service and manufacturing industries. Thus, the industries want to adopt a model for attaining best to remove barriers of this pandemic situation. There is a requirement to make transparency on the supply chain with the perilous list of mechanisms and to control the derivation with alternative causes of supply chain to challenge the existing condition. Need for the assessment of the current record which contains replacement parts with after sale stock and can be used as the bridge to retain the invention processes running till the condition comes below control (Ahmer et al., 2022). The demands of certain products may rise or decline in such circumstances. Hence a requirement to develop a request for forecast strategies which describes the time prospect for the mandate prediction which supported the risk for conversant verdict intended at the industries. The assessments of the capacity besides urgency whenever conceivable similarly sign in adaptable transportation whenever required. There is a necessity to accomplish the cash and net-work money by consecutively anxiety examinations which helps to appreciate when the supply chain of business will start to cause the monetary influence (Sarkar et al., 2020).

- Improvement in market situation of the industries
- Improvement in level of customer satisfaction
- Identify information that will enhance throughput and lower expense
- Improvement in information flow for supply chain
- Reduced overall expenses
- Improvement in team spirit and morale
- Awareness about spreading and controlling of coronavirus

Referring to the result of ISM, the objective is to remove the most effective barriers for industries to consider in the Indian scenario, To recover these standards, industries have identified those good practices that can be learnt from the market leader, and need to change their ideas as per time requirement. However, it indicates the assessment typical of rating for the improvement in replacements as per descending order in the protest only. Since different barriers have their different evaluation standards, there is a requirement of defining their evaluations standard before selection of barriers. By entering the ratings of sub-criteria for each changing opportunity into the step 3 of ISM methodology, the best practice can come out. Table 4 shows the result of the selection of improved alternatives with regard to each criteria and sub-criteria defined previously.

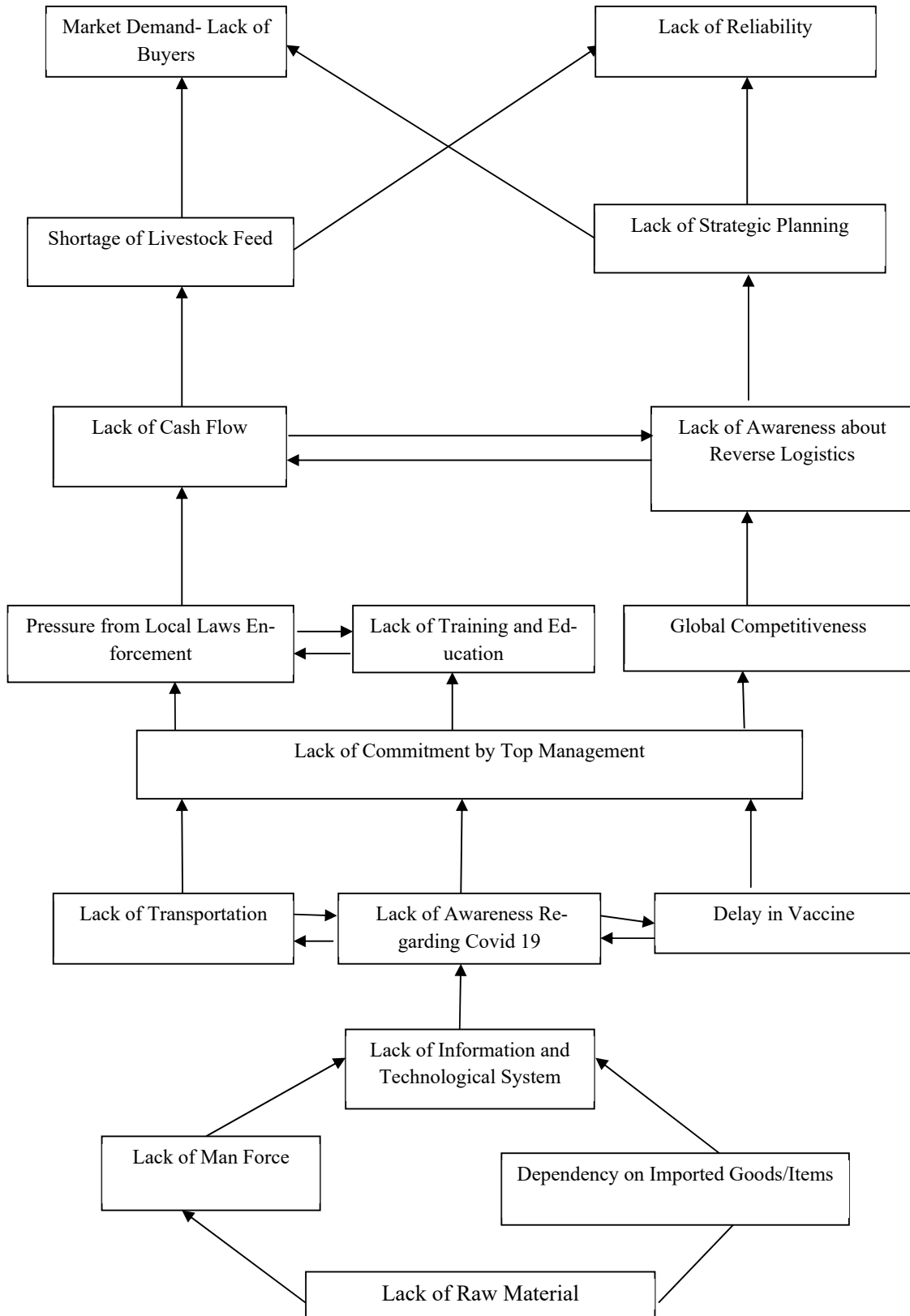


Fig. 1. ISM Model

#### 4. Conclusion

In India, the removal of barriers has not however started in an organized way and wants to be arranged alongside steps to deal with the health crisis. By justifying some relief restraint on the impact of COVID-19 the Indian economy might recognize after execution of measures (Ivanov & Das 2020). As this pandemic situation endures to enlarge, industrialists will probably face contests on many barriers. Industrialists will also want to aspect beyond their own monetary viability. Out of the barriers find out during research lack of manpower, lack of raw material, lack of transportation are measures as key barrier which required to organize attentively through the communal segment to range strategies and are vital to both communal protection with the affluence while keeping the decorations in their procedures (Mathiyazhagan et al., 2013). Long term policies are required to steady and stimulate the economy through this collapse and social-economic growth plan which contain association and outlines for different sectors to ensure the achievement of dependable and maintainable business model (Deb et al., 2022).

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