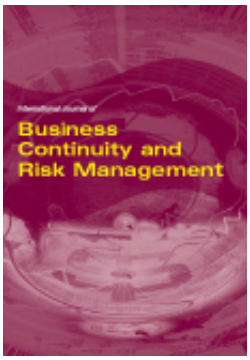

International Journal of Business Continuity and Risk Management

ISSN online: 1758-2172 - ISSN print: 1758-2164
https://www.inderscience.com/ijbcrm

A multilevel model for the successful turnaround of declining manufacturing organisations – an investigative study

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DOI: 10.1504/IJBCRM.2023.10055474

Article History:

Received:	29 September 2021
Last revised:	27 January 2022
Accepted:	09 February 2022
Published online:	17 April 2023

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Abstract: Indian manufacturing organisations are under constant scrutiny. The entry of global supply chain and manufacturing players made it difficult for Indian manufacturers to establish themselves in the competitive market. This led to the continual decline of firms that were unable to cope with the competition. The decrease in a firm's performance further demoralises owners and stakeholders, thereby forcing them to sell the firm to global players. This study presents a two levelled model that divides the entire working of a manufacturing firm into six impact areas where firms must focus on improving their performance. The model consists of various reasons for an organisation's decline and presents suitable strategies to overcome these reasons. A survey was conducted based on the developments from the model from five manufacturing clusters to compare their stand against leading performers and to suggest areas of improvement with the help of the analytical hierarchy process and the Pugh matrix methodology. The comparison involved a biological method that birds use to differentiate their eggs from a cuckoo's egg. This method can be used for performance measurement and suggestions for performance improvement of any manufacturing firm among the identified clusters.

Keywords: supply chain; decline; performance improvement; turnaround; impact areas; analytical hierarchy process; AHP; Pugh matrix methodology; biological methodology.

Reference to this paper should be made as follows: Mahapatruni, S.M.G., Bolisetty, M.S.S., Bonthu, S.B., Ganesh, S.S. and Saleeshya, P.G. (2023) 'A multilevel model for the successful turnaround of declining manufacturing organisations – an investigative study', *Int. J. Business Continuity and Risk Management*, Vol. 13, No. 1, pp.49–83.

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1 Introduction

Indian manufacturing sector aims at increasing its share in the gross domestic product (GDP) contribution to 25% by the end of the year 2025 (*The Economic Times*, n.d.). Government initiatives like 'Make in India' shifted global manufacturing giants' focus towards India. India is on its way to becoming a leading global manufacturing hub after China and Taiwan. Turning India into a manufacturing hub increases the number of job vacancies and per capita income of the nation.

Though this transformation has many advantages, Indian micro, small and medium enterprises (MSMEs) face serious trouble surviving in the industry. With over 250,000 factories setup all over the nation (CEIC, n.d.), Indian manufacturing firms are already facing a difficult time in competing against global manufacturing firms and multinational companies (MNCs). With product variety becoming a significant trend in today's market, manufacturing giants are turning towards MSMEs that are not ready to compete with these players either sells their stakes or face severe losses leading to shut down permanently. Factors like brand image and brand value play a significant role in this fall. Manufacturing giants are always ready to invest in small-scale firms with added

conditions and clauses restricting them from working based on their principles and methodologies. Therefore, the decline of MSMEs becomes an opportunity for multinational manufacturing firms to step into the Indian manufacturing market by buying their stakes.

Firms' inability to turn around implies reduced competition to the multinationals and a reduced choice available to the customer. The lesser the number of native manufacturers, the greater the profits of multinational firms. Therefore, the need for turnaround strategies that help in the performance improvement and successfully overcoming the state of decline is identified. This study aims to develop a multilevel model to identify reasons for the decline of Indian manufacturing firms and strategies to overcome them. The first level of the model comprises the reasons for the decline of manufacturing firms. The second level comprises the strategies that overcome the reasons in Level 1. A quantitative relationship between Level 1 and Level 2 of the model is established using Pugh matrix and analytical hierarchy process (AHP) analysis. A survey was conducted by framing a questionnaire based on the model developed. A total of 31 responses out of 78 have been received. The responses have been divided into five clusters of companies based on the type of product they manufacture. The five clusters obtained are chemical manufacturing, construction equipment manufacturing, power and steel manufacturing, general manufacturing clusters and textile manufacturing.

With the help of a survey, a real-time situation of various manufacturing firms has been measured using a nature-inspired methodology. A cuckoo lays its egg in another bird's (host) nest. When the host observes an additional egg, it compares it with its original eggs to determine if the new egg belongs to the host or not. The host bird nurtures abandon or kicks out the new egg based on the comparison. Similarly, the results obtained from the survey are compared with the academic and the industrial overlook that is obtained based on the opinions of academic and industry subject experts. This comparison enabled the performance measurement of these clusters and suggested areas to focus on and methods to improve their performance.

2 Literature survey

Supply chain management is a set of practices used to integrate suppliers, manufacturers, warehouses, and stores so that products are produced and distributed in the right quantities, to the right locations and at the right time, to minimise costs across the system and satisfying service level requirements (Felea and Albăstroiu, 2013). According to Christopher (2011), firms now compete as supply chains and not individuals. Supply chains include the manufacturer and its suppliers and transporters, warehouses, retailers and consumers themselves. Application of lean and agile concepts to supply chains ensures better improvement in the performance of supply chains. Vonderembse et al. (2006) described supply chains based on product design, production and delivery. This division was referred to as supply chain design. There are four design procedures available based on recent works of literature. They are:

1 Designing of physical flow: Involves how materials should flow through a supply chain. It involves:
    a modelling the problem

   b solving the problem
   c interpreting and implementing the solution.

2 Understanding the financial flow: Involves translating supply chain concepts and actions into financial outputs by implementing cost-effective techniques and increasing stakeholder value. It contains three primary tools:
   a activity-based costing
   b working capital
   c cash flow analysis.

3 Managing the information flow.

4 Designing the organisation.

Based on this design of supply chain management, the impact areas (IAs) for the study have been identified. The IA's identified in the study are as follows:

1 information processing and sharing – information flow

2 operations and administration – designing the organisation

3 shop floor process management – physical flow

4 finance and time management – financial flow

5 product development and designing – additionally added factor

6 customer and employee management – additionally added factor.

These areas together cover the entire supply chain of organisations and hence focus on improvement.

Performance metrics from lean supply chains and agile metrics by Saleeshya and Binu (2019) have provided a large set of supply chain measures that a firm must implement. Ali and Husain (2014) discussed the issues faced by Indian MSMEs and suggested possible improvements for their growth. Akyuz and Erkan (2010) have studied various supply chain performance metrics. The author has stated that there is much scope for research in that area. Based on the conclusions obtained from these studies, it was found that the present research studies on performance improvement concentrated solely on successful or developing organisations. The study by Sathish et al. (2019) suggests inventory management to be of utmost importance and suggests improvement methodologies. Nandakumar et al. (2020) suggested the role of Six Sigma and lean hybrid in identifying bottlenecks and process improvements.

Research conducted in Zimbabwe (Sibanda et al., 2016) focused on organisations that had declined due to the economic crisis and inflation due to a policy implemented by their government. However, few organisations had managed to turn from their decline and are now either prosperous or developing organisations. Santana et al. (2017) researched that downsizing is considered a common method for all crises, including decline. The research states that downsizing may or may not produce the required result as it does not eliminate the root cause.

Based on these research papers and suggestions, the study focuses on performance improvement measures for Indian MSMEs. The implementation aims to develop a multilevel model that comprises the issues that impact the IAs of an organisation,

followed by the second level that comprises the strategies for a turnaround by overcoming the issues affecting the IAs.

3 The model framework

The framework is an outline of the multilevel model. Sources like research papers, internet websites, textbooks, and relevant data concerning organisations' decline were collected. The two levels in the model consist of categorised data divided into two.

3.1 The first level of the model: reasons for the decline of organisations

Various literature, textbooks, and other literary sources have worked on many issues. However, there is a lack of adequate discussions on these issues and their impact. Firms tend to neglect a few issues they face as their impact may be less. However, there are always more than one such low-impact issues that tend to compound the impact to be much larger. In this case, the root cause cannot be pointed out, leading to a dead end. Therefore, the first level of the model consists of reasons for an organisation's decline, making it the base of the model. The traditional supply chain was divided into six categories based on its design. These categories are called the IAs in a firm. The reasons noted are classified into the IAs below based on their role in the decline of organisations:

1 Information processing and sharing – consists of all the reasons that impact the information flow in a company.

2 Product development and designing – consists of all the reasons that impact the product and its development.

3 Customer and employee management – consists of all the reasons that impact the people involved in a company. It includes employees, customers and shareholders.

4 Operations and administration – consists of all the reasons that impact the administration of an organisation.

5 Shop floor process management – consists of reasons that impact the production and maintenance of the product.

6 Finance and time management – consists of all the reasons that impact the economy and time conversions.

The adaptations of reasons and strategies are cited later in this section under a note*.

3.2 The second level of the model: turnaround strategies

The second step in the model is to gather turnaround strategies and performance improvement strategies. Various sources, such as textbooks, expert knowledge, and research papers, resulted in around seventy unique strategies relating to the turnaround of organisations and performance improvement measures. The strategies obtained combine lean, agile and sustainable supply chain strategies. Based on each strategy's impact on an organisation, they are placed in the corresponding IA.

Table 1 Level 1 – reasons for the decline of organisations

Information processing and sharing	
1	Forrester effect
2	Improper order-information-plan (OIP) conversion methods
3	Complex hierarchy
4	Improper implementation of ideas
5	Insufficient research and development (R&D)
Finance and time management	
1	Insufficient cash inflow
2	Excessive through-put time
3	Promotional effect
4	Improper capital management
Shop floor and process management	
1	Lack of supplier trust
2	Houlilian effect
3	Burbidge effect
4	Improper inventory management
5	Improper process planning
6	Improper employee management
7	Excessive lead and replenishment time
8	Insufficient maintenance levels
9	Insufficient level of service
10	Inflexible to customer demand

Source: Abdallah et al. (2017), AMBE (2010), Akyuz and Erkan (2010), Berraies et al. (2014), Bititci et al. (2000), Spina et al. (2014), Burgess et al. (2006), Cheser (1998), Choi and Krause (2006), Chopra and Meindl (2001), Cohen et al. (1996), GoI and UNDP (n.d.), Grigore (n.d.), Gunasekaran et al. (2004), Harrigan (1980), Hedin et al. (2006), Hooi and Leong (2017), Tsung et al. (2008), Krishnamoorthy and D'Lima (2014), DEAR Cloud Inventory Management (n.d.), Strategos (n.d.), Bain & Company (n.d.), Department of Enterprise Services (n.d.), Sustainable Logistics and Supply Chain Management I (n.d.), Epiq (n.d.), Notanubun et al. (2019), Onuh and Yusuf (1999), Qi et al. (2009), Nakajima (1988), Saleeshya et al. (2011, 2012, 2013), Saleeshya and Sachin (2015), Saleeshya and Vyass (2017), Serdarasan and Tanyas (2013), Shahidul et al. (2013), Sibanda et al. (2016), Subburaj et al. (2020), Suh et al. (2015), Tatoglu et al. (2016), Thanki and Thakkar (2018), Thonemann and Bradley (2002), Venugopal and Saleeshya (2019) and Womack and Jones (2006)

Table 1 Level 1 – reasons for the decline of organisations (continued)

Customer and employee management	
1	Uninvolvement of employees
2	Improper employee management
3	Low employee morale
4	Low employee confidence
5	Low level of service
6	Lack of customer knowledge
Product development and design	
1	Improper profit margin
2	Improper product life cycle
3	Product mix and variety
Operations and administration	
1	Administration or leadership issues
2	Decision making irregularities
3	Improper public relations
4	Improper human resources
5	Insufficient R&D

Source: Abdallah et al. (2017), AMBE (2010), Akyuz and Erkan (2010), Berraies et al. (2014), Bititci et al. (2000), Spina et al. (2014), Burgess et al. (2006), Cheser (1998), Choi and Krause (2006), Chopra and Meindl (2001), Cohen et al. (1996), GoI and UNDP (n.d.), Grigore (n.d.), Gunasekaran et al. (2004), Harrigan (1980), Hedin et al. (2006), Hooi and Leong (2017), Tsung et al. (2008), Krishnamoorthy and D'Lima (2014), DEAR Cloud Inventory Management (n.d.), Strategos (n.d.), Bain & Company (n.d.), Department of Enterprise Services (n.d.), Sustainable Logistics and Supply Chain Management I (n.d.), Epiq (n.d.), Notanubun et al. (2019), Onuh and Yusuf (1999), Qi et al. (2009), Nakajima (1988), Saleeshya et al. (2011, 2012, 2013), Saleeshya and Sachin (2015), Saleeshya and Vyass (2017), Serdarasan and Tanyas (2013), Shahidul et al. (2013), Sibanda et al. (2016), Subburaj et al. (2020), Suh et al. (2015), Tatoglu et al. (2016), Thanki and Thakkar (2018), Thonemann and Bradley (2002), Venugopal and Saleeshya (2019) and Womack and Jones (2006)

3.3 Survey-based research

A study about the current industry practices was conducted by administering a questionnaire. The questionnaire was developed based on the framework model by focusing on the decline of organisations and turnaround strategies.

Table 2 Level 2 – strategies for the turnaround of declining organisations

Area of importance		*Strategies to be followed*	
1	Information processing and sharing	1	Centralisation of information
		2	Communication pattern
		3	Individual initiative
		4	Employee involvement
		5	Utilisation of creativity
		6	Being technologically and competitively updated
		7	Employee empowerment
		8	Using efficient information flow channels
		9	Using effective order entry method
		10	Reducing levels of hierarchy
2	Finance and time management	1	Reducing lead times
		2	Identifying and reducing cost of production
		3	Proper asset utilisation
		4	Implementing proper inventory models
		5	Reducing costs associated with information processing and planning
		6	Trade-off between cash inflow and cash outflow
		7	Reducing new product development (NPD) time
3	Shop floor and process management a) Supply	1	Trusted collaborations
		2	Centralisation of information
		3	Supplier performance measurement
		4	Supplier pricing against market norms
		5	Supplier lead time
		6	Implementing easier supplier ordering procedures
		7	Improving supplier delivery time
		8	Trade-off between supplier and organisation goals

Source: Abdallah et al. (2017), AMBE (2010), Akyuz and Erkan (2010), Berraies et al. (2014), Bititci et al. (2000), Spina et al. (2014), Burgess et al. (2006), Cheser (1998), Choi and Krause (2006), Chopra and Meindl (2001), Cohen et al. (1996), GoI and UNDP (n.d.), Grigore (n.d.), Gunasekaran et al. (2004), Harrigan (1980), Hedin et al. (2006), Hooi and Leong (2017), Tsung et al. (2008), Krishnamoorthy and D'Lima (2014), DEAR Cloud Inventory Management (n.d.), Strategos (n.d.), Bain & Company (n.d.), Department of Enterprise Services (n.d.), Sustainable Logistics and Supply Chain Management I (n.d.), Epiq (n.d.), Notanubun et al. (2019), Onuh and Yusuf (1999), Qi et al. (2009), Nakajima (1988), Saleeshya et al. (2011, 2012, 2013), Saleeshya and Sachin (2015), Saleeshya and Vyass (2017), Serdarasan and Tanyas (2013), Shahidul et al. (2013), Sibanda et al. (2016), Subburaj et al. (2020), Suh et al. (2015), Tatoglu et al. (2016), Thanki and Thakkar (2018), Thonemann and Bradley (2002), Venugopal and Saleeshya (2019) and Womack and Jones (2006)

Table 2 Level 2 – strategies for the turnaround of declining organisations (continued)

Area of importance			*Strategies to be followed*
3	Shop floor and process management b) Manufacture	1	Managing range of products and services
		2	Top management support
		3	Utilisation of economic order quantity (EOQ)
		4	Effective determination of push-pull boundary
		5	Performing regular capacity utilisation analysis
		6	Value stream mapping
		7	Application of lean principles
		8	Critical process improvements
		9	Sequencing and scheduling
3	Shop floor and process management c) Delivery	1	Flexible to customer demand
		2	Efficient distribution and planning schedules
		3	Delivery reliability and performance
		4	Improving quality of goods delivered
		5	Implementing cost effective transports
		6	Utilising third party logistics and other services
		7	Inventory management based on demand
4	Customer and employee management	1	CRM – customer resource management
		2	Job enrichment
		3	Employee empowerment
		4	Customer education and training
		5	Employee involvement and identification
		6	Supervisor training
5	Product development and design	1	Trade-off between product and organisation goals
		2	Trade-off between product variety and level of profits
		3	Reducing product costs
		4	Value stream mapping
		5	Reducing profit margins (in case of high sales)
		6	Reducing new product development costs

Source: Abdallah et al. (2017), AMBE (2010), Akyuz and Erkan (2010), Berraies et al. (2014), Bititci et al. (2000), Spina et al. (2014), Burgess et al. (2006), Cheser (1998), Choi and Krause (2006), Chopra and Meindl (2001), Cohen et al. (1996), GoI and UNDP (n.d.), Grigore (n.d.), Gunasekaran et al. (2004), Harrigan (1980), Hedin et al. (2006), Hooi and Leong (2017), Tsung et al. (2008), Krishnamoorthy and D'Lima (2014), DEAR Cloud Inventory Management (n.d.), Strategos (n.d.), Bain & Company (n.d.), Department of Enterprise Services (n.d.), Sustainable Logistics and Supply Chain Management I (n.d.), Epiq (n.d.), Notanubun et al. (2019), Onuh and Yusuf (1999), Qi et al. (2009), Nakajima (1988), Saleeshya et al. (2011, 2012, 2013), Saleeshya and Sachin (2015), Saleeshya and Vyass (2017), Serdarasan and Tanyas (2013), Shahidul et al. (2013), Sibanda et al. (2016), Subburaj et al. (2020), Suh et al. (2015), Tatoglu et al. (2016), Thanki and Thakkar (2018), Thonemann and Bradley (2002), Venugopal and Saleeshya (2019) and Womack and Jones (2006)

Table 2 Level 2 – strategies for the turnaround of declining organisations (continued)

Area of importance		*Strategies to be followed*	
6	Operations and administration	1	Manufacturing and/or organisational restructuring
		2	Employee empowerment
		3	Stastical process control
		4	Supervisor training
		5	Maintaining and improving stakeholder relationship
		6	Total productive maintenance
		7	Benchmarking (process and employees)
		8	Quick complaint processing
		9	Customer education and training
		10	Employee identity and involvement
		11	Job enrichment
7	Miscellaneous	1	Improving product flexibility
		2	Quick reaction to customer needs
		3	Conducting proper research and development
		4	Technological updates in the form of software, hardware and sustainable developments
		5	Customer relations development
		6	Shifting towards e-commerce for sales
		7	Competitive pricing
		8	Rapid prototyping
		9	Alternate transporting routes
		10	Disaster management
		11	Establishing a flexible supply base

Source: Abdallah et al. (2017), AMBE (2010), Akyuz and Erkan (2010), Berraies et al. (2014), Bititci et al. (2000), Spina et al. (2014), Burgess et al. (2006), Cheser (1998), Choi and Krause (2006), Chopra and Meindl (2001), Cohen et al. (1996), GoI and UNDP (n.d.), Grigore (n.d.), Gunasekaran et al. (2004), Harrigan (1980), Hedin et al. (2006), Hooi and Leong (2017), Tsung et al. (2008), Krishnamoorthy and D'Lima (2014), DEAR Cloud Inventory Management (n.d.), Strategos (n.d.), Bain & Company (n.d.), Department of Enterprise Services (n.d.), Sustainable Logistics and Supply Chain Management I (n.d.), Epiq (n.d.), Notanubun et al. (2019), Onuh and Yusuf (1999), Qi et al. (2009), Nakajima (1988), Saleeshya et al. (2011, 2012, 2013), Saleeshya and Sachin (2015), Saleeshya and Vyass (2017), Serdarasan and Tanyas (2013), Shahidul et al. (2013), Sibanda et al. (2016), Subburaj et al. (2020), Suh et al. (2015), Tatoglu et al. (2016), Thanki and Thakkar (2018), Thonemann and Bradley (2002), Venugopal and Saleeshya (2019) and Womack and Jones (2006)

3.3.1 Questionnaire development

The questionnaire aims to identify reasons and strategies that the organisation's representative believes are used to ensure better performance and avoid decline. The questionnaire includes guidelines for filling it and reasons and strategies relating to the IAs identified from the literature survey. After developing the questionnaire, it was verified and validated with the help of experts. Validation of the questionnaire is required to check if it serves to gather the information required for further processing.

3.3.2 The survey

The tool for the survey is a questionnaire. The survey tool is decided based on factors such as length and type of survey to be conducted. The period of the survey is between December 2019 to January 2020. Therefore, the length of the survey is for two months. A combination of online and face-to-face interviews was conducted wherever applicable. A few questionnaires were e-mailed for responses. The questionnaire was sent out to various industry professionals from various organisations. Responses from various respondents ensure diversity in the results obtained. This diversity in results can help various organisations use the developed model.

In total, more than 80 industry professionals from various organisations were approached for taking part in the survey. A total of 31 responses have been received after neglecting all incomplete responses. The responses received were classified into five different clusters based on the product manufactured. The clusters identified are given below. The number associated with the clusters is used as reference in Table 5 and Table 6.

1 chemical manufacturing cluster – seven responses

2 general manufacturing cluster – eight responses

3 power and steel manufacturing cluster – five responses

4 textile manufacturing cluster – three responses

5 construction equipment manufacturing cluster – eight responses.

Figure 1 Survey responses (see online version for colours)

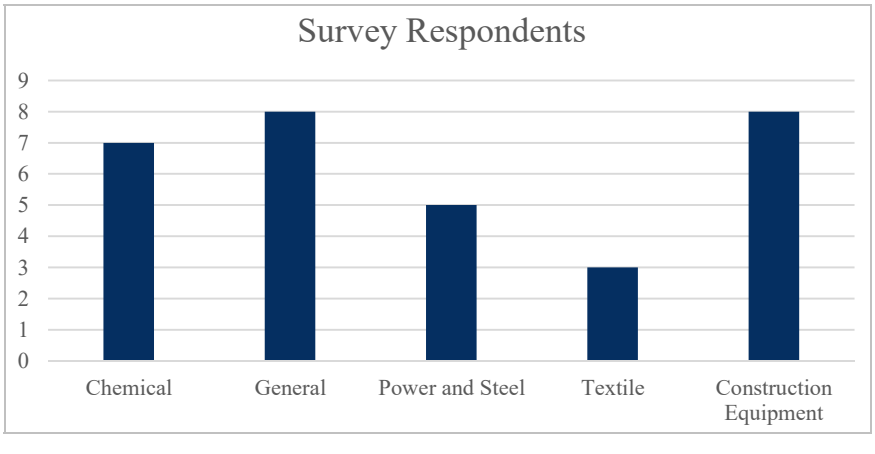


Table 3 AHP analysis sample calculation

S. no.		*1. Forrester effect*	*2. Improper O-I-P* conversion*	*3. Hierarchy levels*	*4. Improper idea implementation*	*5. R&D issues*	*Product*	*Nth root*	*Priority vector*	*Rank*
1	Forrester effect	1	1	0.5	2	3	3	1.245731	0.237025283	2
2	Improper O-I-P conversion	1	1	1	0.5	1	0.5	0.870551	0.165639695	4
3	Hierarchy levels	2	1	1	1	3	6	1.430969	0.272270552	1
4	Improper idea implementation	0.5	2	1	1	2	2	1.148698	0.218562888	3
5	R&D issues	0.333	1	0.33	0.5	1	0.054945	0.559739	0.106501582	5
							Sum	5.255688		

Table 4 Pugh analysis sample calculation

Weightage		*0.243*	*0.167*	*0.271*	*0.217*	*0.102*	*Without weightage*			*With weightage*	
		1	*2*	*3*	*4*	*5*					
Strategies	*Reasons*	*Forrester effect*	*Improper O-I-P* conversion*	*Hierarchy levels*	*Improper idea implementation*	*R&D issues*	*Negative*	*Positive*	*Sum of + and –*	*Weight * value*	*Rank*
1	Centralisation of information	0	0	0	0	0	0	0	0	0	6
2	Effective communication patterns	–1	2	1	0	0	3	6	2	0.362	5
3	Individual initiative	2	2	–1	2	–1	0	6	5	0.983	2
4	Employee involvement	–1	–1	–2	2	–1	4	3	–2	–0.518	8
5	Utilising creativity	–3	–2	–3	4	–1	5	2	–4	–1.008	9
6	Being technologically updated	1	3	–2	–1	1	1	5	1	–0.015	4
7	Employee empowerment	–3	–3	2	3	–1	4	1	–1	–0.037	7
8	Using effective order entry method	0	2	–1	1	3	–1	6	10	0.28	3
9	Reducing hierarchy levels	1	2	4	4	1	0	12	12	2.529	1

4 Analyses of findings of survey

The responses obtained are analysed with the help of suitable mathematical analysis and calculation methods. Quantitative analysis and the relationship between the two model levels have to be developed. The Pugh matrix analysis invented by Stuart Pugh helps in the quantitative analysis of the relationship between criteria and alternatives (Level 1 and Level 2 of the model). To ensure an extra level of discrimination when making decisions, weighing the criteria (Level 1) is preferred. Stuart Pugh (2010) suggested three approaches for finding the weights for the first level of the model. One of the suggested methods is the AHP. The AHP method is thus used in determining the weights of the first level of the model.

4.1 The AHP

The AHP is a decision-making process based on the pairwise comparison of a selected set of criteria that needs analysis. The criteria being compared in this work are the reasons derived from Level 1 of the model developed in Section 3. The AHP method was developed by Thomas L. Saaty in the 1970s and has been refined constantly ever since. The advantage of using the AHP matrix for decision-making is that it allows users to assess the relative weight of multiple criteria (in this case, the reason for an organisation's decline) against each other in a pairwise comparison matrix. In case quantitative ratings are not available, respondents can still recognise whether one criterion is more important than another on a scale of 1 to 9 based on subjective intuition. Alonso and Lamata (2006) have stated a method for checking the consistency of response in AHP. This method was followed to validate the responses. Only responses with a consistency ratio (CR) less than 0.1 were chosen and proceeded forward to Pugh formulation.

4.2 The Pugh matrix analysis

The Pugh matrix invented by Stuart Pugh is also a comparison matrix based on subjective evaluation of criteria and alternatives for choosing the better alternatives for the given criteria and the combination of all the criteria. The Pugh matrix scale depends upon the number of alternatives present in the comparison. If 'n' alternatives are being assessed, the scale varies from +n to –n. The Pugh matrix provides better comparisons when the criteria being compared are weighted. The weights for the criteria can be obtained based on another mathematical model or subjective analysis. This study treats the priority vector obtained from the AHP process as weights used in Pugh matrix analysis.

4.3 Academic and industrial overlook

Academicians and industry subject experts provide greater depths into the standards and methods to be followed by industries to be thriving and ever-growing. Few academicians and subject experts from various high-performing manufacturing industries were interviewed to obtain more significant insights into industries' working.

Figure 2 Academic and industrial overlook for the chemical manufacturing cluster (see online version for colours)

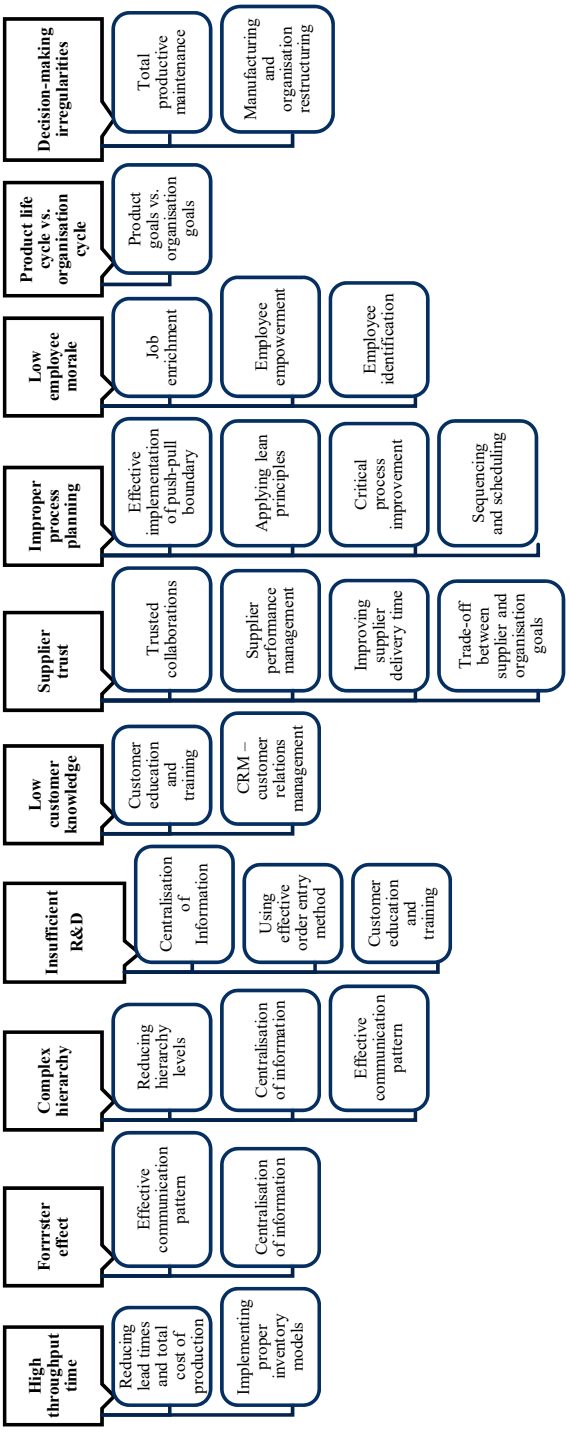


Figure 3 Academic and industrial overlook for the general manufacturing cluster (see online version for colours)

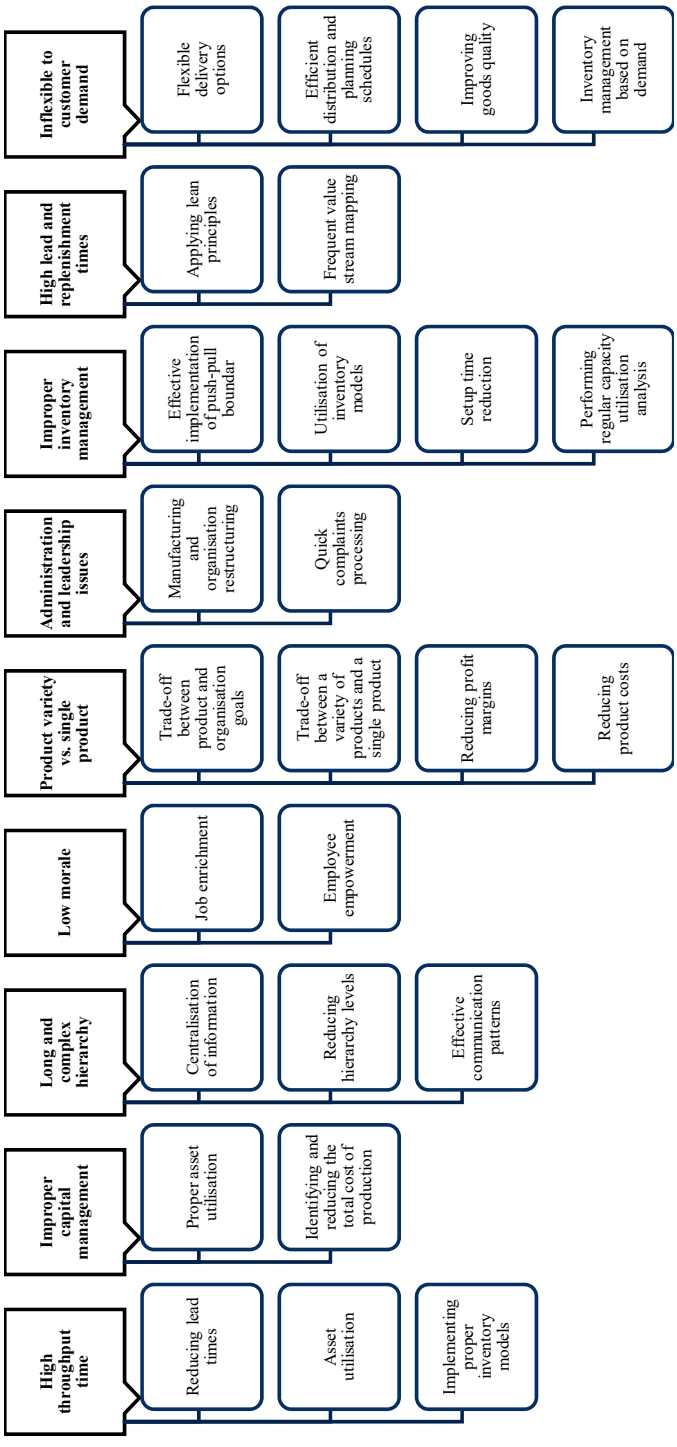


Figure 4 Academic and industrial overlook for textile manufacturing cluster (see online version for colours)

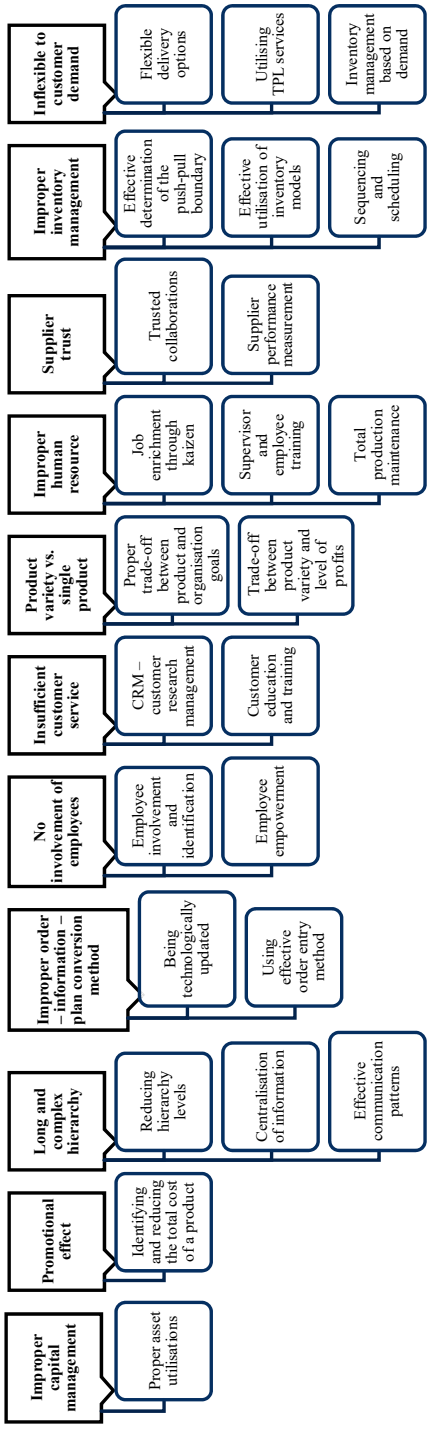


Figure 5 Academic and industrial overlook for the construction equipment manufacturing cluster (see online version for colours)

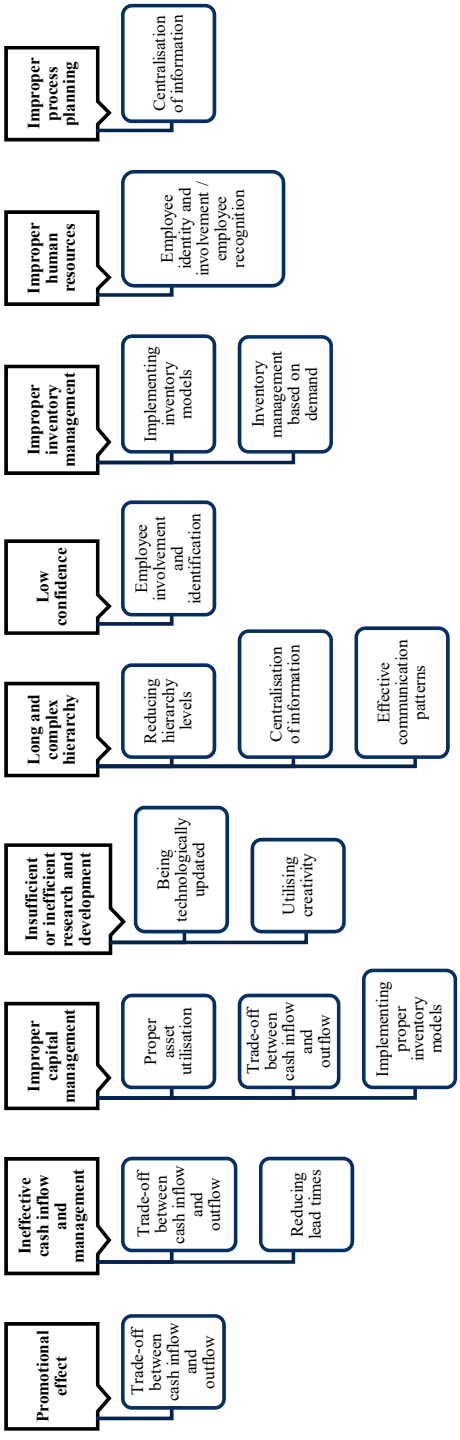
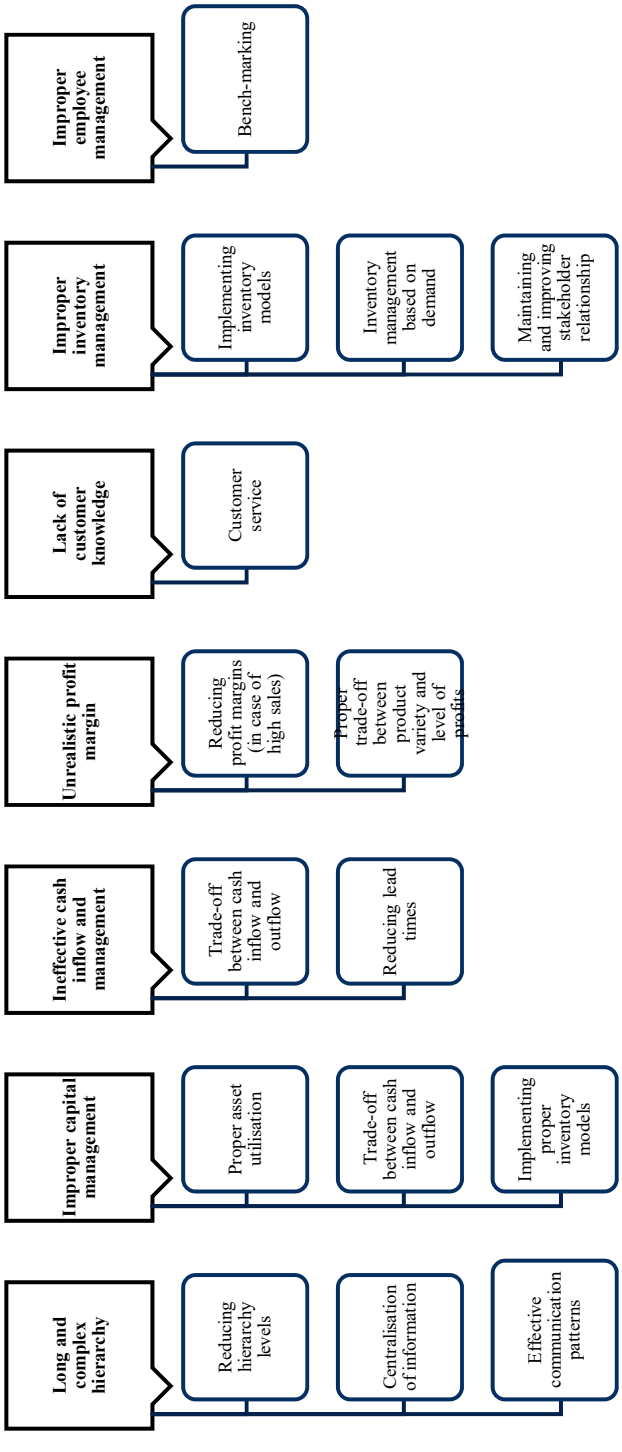


Figure 6 Academic and industrial overlook for the steel manufacturing cluster (see online version for colours)



4.3.1 Overlook of chemical manufacturing cluster

The overlook for the chemical manufacturing cluster, obtained after interviews and discussions with academicians and Industry professionals, is shown in Figure 2.

4.3.2 Overlook of general manufacturing cluster

The overlook for the general manufacturing cluster, obtained after interviews and discussions with academicians and Industry professionals, is shown in Figure 3.

4.3.3 Overlook of textile manufacturing cluster

The overlook for the textile manufacturing cluster, obtained after interviews and discussions with academicians and industry professionals, is shown in Figure 4.

4.3.4 Overlook for construction equipment manufacturing cluster

The overlook for the construction equipment manufacturing cluster, obtained after interviews and discussions with academicians and Industry professionals, is shown in Figure 5.

4.3.5 Overlook of power and steel manufacturing cluster

The overlook for the steel manufacturing cluster, obtained after interviews and discussions with academicians and industry professionals, is shown in Figure 6.

Based on the information obtained from these discussions, the following conclusions have been made:

1 A set of reasons were found to have a greater effect on performance than those identified in the literature survey.

2 Strategies pertaining to the reasons identified were also determined. When followed or applied, these strategies have the most impact on the reasons.

3 The set obtained theoretically ensures maximum performance improvement, and therefore, ensures declining organisations' turnaround.

This set of reasons and strategies from the model obtained are termed the academic and industrial overlook. The overlook is used to compare with the consolidated results of the survey. This is similar to the theoretical and experimental results obtained in a laboratory. The theoretical results are the academic and industrial overlook, and the experimental results are the clusters' survey results. The analysis of the comparison results gives an overview of the cluster's performance.

Table 5 Level 1 comparison result

IAs	*Reasons*	*Clusters*									
		1		*2*		*3*		*4*		*5*	
		I/NI	*R/NR*	*I/NI*	*R/NR*	*I/NI*	*R/NR*	*I/NI*	*R/NR*	*I/NI*	*R/NR*
Information processing and sharing	Forrester effect	N	Y	Y	N	Y	N	Y	N	Y	N
	Improper OIP conversion methods	N	N	N	N	N	N	N	Y	N	N
	Complex hierarchy	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
	Improper implementation of ideas	N	Y	Y	N	N	N	N	Y	N	N
	Inefficient R&D	Y	N	Y	N	Y	N	Y	N	Y	N
Finance and time management	Insufficient cash inflow	N	N	N	N	N	N	N	N	N	N
	Improper capital management	Y	N	Y	Y	Y	N	N	Y	Y	Y
	High throughput time	N	Y	N	N	Y	N	Y	N	Y	Y
	Promotional effect	N	N	N	N	N	Y	N	N	N	N
Shop floor and process management	Lack of supplier trust	Y	N	Y	Y	Y	N	Y	N	Y	N
	Houlihan effect	Y	N	Y	N	Y	N	Y	N	Y	N
	Burbidge effect	N	N	N	Y	N	N	N	Y	N	N
	Improper inventory management	Y	N	N	N	N	N	N	N	N	N
	Improper process planning	Y	N	Y	N	Y	N	N	Y	Y	N
	Inefficient employee management	N	Y	N	N	Y	Y	Y	N	Y	N
	High lead and restock time	Y	Y	Y	N	N	N	N	N	N	N
	Low maintenance levels	N	N	N	N	N	N	Y	N	N	Y
	Inflexible to changing demands	Y	N	Y	N	Y	N	Y	Y	Y	N
	Insufficient level of service	N	N	Y	N	Y	Y	Y	N	Y	N
Customer and employee management	Uninvolvement of employees	N	Y	N	N	N	N	N	N	N	N
	Lack of customer knowledge	Y	N	Y	Y	Y	N	N	Y	N	N
	Low employee morale	N	N	N	Y	N	N	N	N	N	N
	Low employee confidence	N	N	N	N	N	N	N	N	N	N
	Insufficient level of service	Y	Y	Y	N	Y	N	Y	Y	Y	N
Product development and design	Irregular profit margin setup	Y	N	Y	N	Y	Y	Y	N	Y	N
	Product and organisations goals do not match	Y	Y	Y	N	N	N	Y	N	N	Y
	Improper product variety decisions	N	Y	Y	N	N	N	N	Y	N	N
Operations and administration	Administration or leadership issues	Y	N	Y	N	Y	N	Y	N	Y	N
	Improper process planning	N	N	N	N	N	N	N	N	N	N
	Decision-making irregularities	Y	N	Y	Y	Y	N	N	Y	Y	Y
	Improper HR	N	Y	N	N	Y	N	Y	N	Y	Y
	Inefficient R&D	N	N	N	N	N	Y	N	N	N	N

Table 6 Survey and overlook comparison for Level 2

IAs	*Reasons*	*Clusters*									
		1		*2*		*3*		*4*		*5*	
		F/NF	*R/NR*	*F/NF*	*R/NR*	*F/NF*	*R/NR*	*F/NF*	*R/NR*	*F/NF*	*R/NR*
Information processing and sharing	Centralisation of information	N	Y	N	Y	N	Y	N	N	N	N
	Effective communication pattern	Y	N	N	Y	Y	Y	Y	Y	Y	Y
	Individual initiative	Y	N	Y	N	Y	N	Y	N	Y	N
	Employee involvement	N	N	N	N	N	N	N	N	N	N
	Utilising creativity	N	Y	N	N	N	N	N	N	N	N
	Being technologically updated	N	N	Y	N	Y	N	Y	N	N	N
	Employee empowerment	N	N	N	N	N	N	N	N	N	N
	Using effective order entry method	Y	N	Y	N	N	N	Y	N	Y	N
	Reducing hierarchy levels	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
Finance and time management	Reducing lead times	N	Y	N	Y	N	Y	N	N	N	N
	Reducing production costs	Y	N	N	Y	N	N	N	N	N	N
	Proper asset utilisation	Y	N	Y	Y	Y	Y	Y	N	Y	Y
	Proper inventory models	Y	Y	N	Y	N	Y	N	N	N	Y
	Reducing information processing and planning costs	Y	N	Y	N	Y	N	Y	N	Y	N
	Cash inflow and outflow trade-off	Y	N	Y	N	Y	Y	Y	N	Y	Y
	Reducing new product development (NPD) time	N	N	N	N	N	N	N	N	N	N
Shop floor and process management – supply	Trusted collaborations	N	N	Y	N	Y	N	N	N	Y	N
	Centralisation of information	Y	N	Y	N	Y	N	Y	N	N	Y
	Supplier performance measurement	Y	N	Y	N	N	N	Y	N	N	N
	Supplier pricing against market norms	N	N	N	N	N	N	N	N	N	N
	Supplier lead time against market norms	N	N	N	N	N	N	N	N	N	N
	Improving supplier delivery time	N	N	N	N	Y	N	N	N	Y	N
	Supplier and organisation trade-off	Y	N	Y	N	Y	N	Y	N	Y	N
	Easier supplier ordering procedures	Y	N	N	N	N	N	Y	N	N	N

Table 6 Survey and overlook comparison for Level 2 (continued)

IAs	*Reasons*	*Clusters*									
		1		*2*		*3*		*4*		*5*	
		F/NF	*R/NR*	*F/NF*	*R/NR*	*F/NF*	*R/NR*	*F/NF*	*R/NR*	*F/NF*	*R/NR*
Shop floor and process management – manufacture	Managing range of products and services	N	N	N	N	N	N	N	N	N	N
	Top management support	N	N	N	N	N	N	N	N	N	N
	Implementing inventory models	Y	N	N	N	N	N	N	N	N	N
	Effective determination of push-pull boundary	N	Y	Y	N	Y	N	N	N	Y	N
	Performing regular capacity utilisation analysis	Y	N	Y	N	Y	N	Y	N	Y	N
	Frequent value stream mapping	Y	N	Y	N	Y	N	Y	N	Y	N
	Application of lean principles	Y	Y	Y	Y	N	N	Y	N	Y	N
	Critical process improvement	Y	N	Y	N	Y	N	Y	N	Y	N
	Setup time reduction	N	N	N	N	N	N	Y	N	N	N
	Sequencing and scheduling	N	Y	N	N	N	N	N	N	N	N
Shop floor and process management – delivery	Flexibility in delivery options	Y	N	N	Y	N	N	Y	N	N	N
	Efficient distribution and planning schedules	Y	N	Y	Y	Y	N	Y	N	Y	N
	Delivery reliability and performance	Y	N	Y	N	Y	N	Y	N	Y	N
	Improving the quality of goods delivered	N	N	N	N	N	N	N	N	N	N
	Implementing cost-effective transporting techniques	N	N	N	N	N	N	N	N	N	N
	Utilising TPL and other services	Y	N	N	N	N	N	Y	N	N	N
	Inventory management based on demand	N	N	Y	Y	Y	N	N	N	Y	Y
Customer and employee management	Customer research management	N	Y	N	N	N	N	N	Y	N	N
	Job enrichment through kaizen	Y	N	Y	Y	Y	N	N	N	Y	N
	Employee involvement and identification	Y	Y	Y	N	Y	N	Y	N	Y	Y
	Supervisor training	Y	N	Y	N	N	N	N	N	N	N
	Customer education / training	N	Y	N	N	N	Y	N	N	N	N
	Employee empowerment	N	Y	N	Y	Y	N	N	N	Y	N

Table 6 Survey and overlook comparison for Level 2 (continued)

IAs	*Reasons*	*Clusters*									
		1		*2*		*3*		*4*		*5*	
		F/NF	*R/NR*	*F/NF*	*R/NR*	*F/NF*	*R/NR*	*F/NF*	*R/NR*	*F/NF*	*R/NR*
Product development and design	Proper trade-off between product and organisation goals	N	Y	N	Y	N	N	N	N	N	N
	Proper trade-off between product variety and level of profits	Y	N	Y	Y	Y	Y	N	N	Y	N
	Reducing product costs	N	N	N	N	N	N	Y	N	N	N
	Value stream mapping	Y	N	Y	N	Y	N	Y	N	Y	N
	Reducing profit margins (in case of high sales)	Y	N	Y	N	Y	Y	N	N	Y	N
	Reducing new product development costs	N	N	N	N	N	N	N	N	N	N
Operations and administration	Manufacturing or organisational restructuring	Y	Y	N	Y	Y	N	N	N	Y	N
	Employee empowerment	N	N	N	N	N	N	N	N	N	N
	Statistical process control	N	N	N	N	N	N	N	N	N	N
	Supervisor training	N	N	N	N	N	N	Y	N	N	N
	Total productive maintenance	Y	Y	Y	N	Y	N	Y	N	Y	N
	Maintaining and improving stakeholder relationship	Y	N	Y	N	Y	N	Y	N	Y	N
	Benchmarking (process and employees)	Y	N	Y	N	Y	N	Y	N	Y	N
	Quick complaints processing	Y	N	Y	Y	N	N	Y	N	Y	N
	Customer education and training	N	Y	N	N	N	Y	N	N	N	N
	Employee identity and involvement – employee recognition	N	Y	Y	N	Y	N	Y	N	N	Y
	Job enrichment through kaizen	N	Y	N	N	N	N	Y	N	N	N

4.4 Survey findings, academic and industrial overlook and comparison

The survey findings, academic and industrial overlook, and comparison is compiled and merged. Table 5 and Table 6 represent the model. The abbreviations used in Figure 11 are given below:

1 Identified or not identified (I/NI): When referring to Level 1 of the model, it implies that the organisation has not identified the reason in Level 1 as a primary cause of poor performance or decline. Level 2 of the model implies that the organisation does not prioritise the strategy to eliminate the reason mentioned.

2 Recommended or not recommended (R/NR): Implies if the reason or strategy is recommended in the academic and industrial overlook or not. Recommended reasons have a greater effect on an organisation's performance than the not recommended causes for the cluster. Similarly, the recommended strategies have a greater impact on the given reason than the ones not recommended.

3 Yes (Y): Identified or recommended based on the column.

4 No (N): not identifies or not recommended based on the column.

The first column in Tables 5 and 6 are the IAs identified as areas of improvement. The second column in Table 5 comprises the Level 1 indices and in Table 6, it comprises the Level 2 indices.

4.4.1 Survey results and academic and industrial overlook for Level 1 of the model

Table 5 represents the compiled survey result and the academic and industrial overlook for the Level 1 model comprising the reasons for an organisation's decline.

4.4.2 Survey results and academic and industrial overlook for Level 2 of the model

Table 6 represents the compiled survey result and the academic and industrial overlook for the Level 2 of the model comprising the strategies to overcome the reasons in Level 1.

From the observations in Table 5 and Table 6, it can be inferred that every cluster has a few identified causes and follows certain improvement techniques. However, not all causes are identified, and not all improvement methods are followed. Better results can be expected by overcoming the remaining reasons and applying appropriate strategies as suggested by the model.

5 Discussion

Section 4 presented a clear idea of the IAs each cluster must improve. On a detailed level, a comparison methodology is needed to measure the performance of all the clusters. Moreover, this comparison methodology must be helpful to determine individual organisations' performance and suggest the practices necessary to increase their qualitative and quantitative performance. Turning to nature for finding a comparison

methodology, the after-effects of a cuckoo laying its eggs in another bird's nest seemed to be a similar methodology.

5.1 Comparison with organisation turnaround

A cuckoo generally lays its eggs in another bird's nest. This phenomenon is because it cannot make its own nest. Therefore, the first step taken by a cuckoo is searching for a suitable nest for laying its egg. Their ability to mimic the host bird's egg is a helpful characteristic in this case. Post searching, it lays its egg in the nest when the host is not around and ends its role in establishing future generations. The host finds an extra egg on returning to its nest, and here begins the comparison methodology. The host tends to compare all the eggs in its nest to determine the mimic. The comparison results in three alternatives.

The first alternative is when the host can neither differentiate the eggs nor remember the number of eggs in the nest. Therefore, the bird nurtures the egg as one of its own. Eventually, the cuckoo's egg hatches giving birth to a new baby cuckoo. The hatching results from the perfect camouflage of the cuckoo's egg.

In the second alternative, the host bird cannot differentiate between its eggs and the foreign egg. However, it knows that one of the eggs is not its own. Therefore, the host abandons its nest to make a new one elsewhere amidst the confusion. This decision is not healthy for both the bird's eggs and the cuckoo's egg. Minor imperfections in the cuckoo's camouflage or the inability of the host to identify its egg may be the cause.

In the third alternative, the host bird can recognise the cuckoo's egg due to defects in the camouflage of its egg. Therefore, the host bird kicks out the alien egg. In this alternative also cuckoo's egg does not hatch.

Relating the comparisons made by the host to the model discussed in Section 4, a few modifications are to be made:

- cuckoo is the organisation
- host nest is the researcher's survey document
- cuckoo eggs are the reasons and strategies being followed by the organisation
- the host is the researcher.

Organisations fill in the survey containing questions and details about their organisation's turnaround and performance improvement strategies. The researcher notes these reasons and strategies by highlighting them in their model. The researcher then compares the strategies and reasons with the academic and industrial overlook for similarities and differences. Based on this comparison, the organisation's performance can be measured into three categories.

The first category is the 'good' category. An organisation is good performing if the highlighted notes in the model and the academic and industrial overlook are similar. The firms in this category have either recognised the issues they are facing and have identified proper solutions to overcome them or have eliminated the cause with maximum impact by deploying the right strategies. Firms and clusters in this category must ensure the implementation of the identified strategies and then focus on other issues that are not listed in the overlook. The strategies to overcome these issues can be derived based on the basic model.

The second category is the 'moderate' category. An organisation is moderately performing if the highlighted notes of the model are not entirely similar and have moderate differences with those of the overlook. The firms under this category may have recognised a few issues and may have suitable solutions. However, some may also focus on non-trivial issues, not the root causes. The firms in this category are suggested to identify issues that significantly impact their performance, overcome them, and focus on non-trivial issues.

The third category is the 'bad' category. An organisation is poor performing if the notes from the survey significantly differ from those of the overlook. Firms may have not identified the IAs with significant impact on their performance and have not tried to overcome them. The firms and clusters in this region are suggested to understand the overlook and make suitable modifications for performance improvement.

With these modifications to the original nature-inspired methodology, the performance of the five clusters under scrutiny is measured.

5.2 Cluster performance measurement

The performance measurement is derived by comparing the survey notes and the academic and industrial overlook. The left column represents the practices being followed by the firm and recommended in the academic findings for the cluster. The column in the right represents the practices not being followed or not under consideration compared to academic findings.

5.2.1 Chemical manufacturing cluster performance measurement

Table 7 represents the comparison of the overlook and the survey notes obtained for the chemical manufacturing cluster.

Table 7 Comparison results for chemical manufacturing cluster

Good practices	*Bad practices*
• Throughput time (strategies)	• Throughput time (reason)
• R&D (reason and strategies)	• Forrester effect (reason and strategies)
• Customer knowledge (strategies)	• Customer knowledge (reason)
• Process planning (strategies)	• Supplier trust (reason and strategies)
• Employee morale (reason and strategies)	• Process planning (reason)
• Product life cycle vs. organisation goals (strategies)	• Product life cycle vs. organisation goals (reason)
• Decision-making (reason and strategies)	

In bad practices, throughput time (reason) implies that the chemical manufacturing cluster does not consider throughput time to impact their organisation on a greater scale. However, throughput time (strategies) in good practices implies that the strategies being followed to ensure lower throughput time comply with those in academic findings. Similarly, R&D (reason and strategies) in good practices implies that the cluster considers inefficient R&D to play a significant role in the declining performance of a firm and follows required strategies to overcome inefficient R&D as suggested in the

academic findings. Based on the comparison, the cluster's inability to identify the factors affecting its firms places it into the moderately performing group. Similarly, the good and bad practices for all the clusters under scrutiny are noted, and their performance is measured.

5.2.2 General manufacturing cluster performance measurement

Table 8 represents the comparison of the overlook and the survey notes obtained for the general manufacturing cluster.

Table 8 Comparison results for general manufacturing cluster

Good practices	*Bad practices*
• Throughput time (strategies) • Capital management (strategies) • Complex hierarchy (reason and strategy) • Employee morale (strategies) • Product variety vs. single product (reason and strategies) • Administrative issues (strategies) • Inventory management (reason) • Lead and replenishment time (reason and strategies) • Flexibility in customer demand (strategies)	• Throughput time (reason) • Proper capital management (reason) • Employee morale (reason) • Administrative issues (reason) • Inventory management (strategies) • Flexibility in customer demand (reason)

Based on the comparison, the cluster's ability to identify most of the factors affecting its firms and following practices to ensure performance improvement places the cluster into the good performing group.

5.2.3 Textile manufacturing cluster performance measurement

Table 9 represents the comparison of the overlook and the survey notes obtained for the textile manufacturing cluster.

Table 9 Comparison results for textile manufacturing cluster

Good practices	*Bad practices*
• Promotional effect (reason) • Complex hierarchy (reason and strategies) • Level of service (reason and strategies) • Human resources (reason)	• Capital management (reason and strategies) • Promotional effect (strategies) • Order-information-plan conversion (reason) • Involvement of employee (reason and strategies) • Human resources (strategies) • Supplier trust (reason and strategies) • Inventory management (reason and strategies) • Flexibility to customer demands (reason and strategies) • Product variety vs. single product (reason and strategies)

Based on the comparison, the cluster's inability to identify most of the factors affecting its firms and not following practices to ensure performance improvement places the cluster into the poor performing group.

5.2.4 Construction equipment manufacturing cluster performance measurement

Table 10 represents the comparison of the overlook and the survey notes obtained for the construction equipment manufacturing cluster.

Table 10 Comparison results for construction equipment manufacturing cluster

Good practices	*Bad practices*
• Promotional effect (strategies)	• Cash flow management (strategies)
• Cash flow management (reasons)	• Capital management (reasons)
• Capital management (strategies)	• R&D (reasons and strategies)
• Hierarchy levels (reasons and strategies)	• Low employee confidence (reasons)
• Employee confidence (strategies)	• Improper process planning (strategies)
• Human resources (strategies)	
• Inventory management (reasons and strategies)	
• Process planning (reasons)	

Based on the comparison, the cluster's inability to identify the factors affecting its firms and following practices to ensure performance improvement places it into the moderately performing group.

5.2.5 Power and steel manufacturing cluster performance measurement

Table 11 represents the comparison of the Overlook and the survey notes obtained for the Steel manufacturing cluster.

Table 11 Comparison results for steel manufacturing cluster

Good practices	*Bad practices*
• Capital management (strategies)	• Capital management (reason)
• Hierarchy levels (reason and strategies)	• Employee management (reason and strategies)
• Cash inflow management (reason and strategies)	
• Profit margin (reason and strategies)	
• Customer knowledge (reason and strategies)	
• Public relations (reason and strategies)	

Based on the comparison, the cluster's ability to identify the factors affecting its firms and following practices to ensure performance improvement places it into the good performing group.

The conversion of reasons and strategies from the bad-practices column to the good practices column must be the ultimate aim of declining firms to ensure they begin their journey against decline.

5.3 External factors

External factors are not in control of an organisation but lead to its downfall. Organisations must work to overcome these external factors to avoid unexpected decline. These external factors include but are not limited to:

1 government policies

2 environmental issues

3 epidemic outbreak

4 socio-economic changes

5 major technological updates.

Organisations can depend on risk management policies like disaster management to maintain a flexible supply base to overcome these factors. However, to be ready for the challenge, the following can be implemented:

1 Business intelligence (BI): BI is a set of processes, architectures, and technologies that convert raw data into meaningful information that drives profitable business actions. It is a suite of software and services to transform data into actionable intelligence and knowledge.

2 Proper research and development.

3 Networking and information sharing with supply chain partners.

4 Risk mitigation: Risk mitigation is a strategy to prepare and reduce the threats faced by an organisation. It takes steps to reduce the adverse effects of threats and disasters on business continuity (What is Risk Mitigation? Definition, Strategies and Planning, n.d.).

5 Risk acceptance: Risk acceptance or retention means accepting the identified risk and setting up an insurance fund or a loss fund from generated profits to overcome the losses (AccountingTools, n.d.).

The factors that affect an organisation's cost and revenue structure are challenging factors to watch. Factors like labour skill and availability, digitisation (Industry 4.0), power, and energy are a few factors that affect every organisation alike.

6 Conclusions

Turning around from the state of decline is not an easy task. It involves scrutiny of every IA with utmost integrity and clarity. Concluding the study, the following conclusions are obtained.

6.1 Study-based conclusions

Conclusions and observations based on the study are addressed below. These conclusions are a result of the performed study.

1 Textile manufacturing is a poor-performing industry given regular imports and high-end competition from various MNCs. Therefore, a definite need to improve quality and pricing schemes is necessary. Performance improvement with a customer-oriented supply chain is a powerful agent in ensuring so.

2 While the other clusters have performed well, there is a scope for improvement in certain areas. Inability to improve in such areas creates a higher risk for the organisations. To do so, firms must focus on converting the 'bad practices' into 'good practices' for improvement.

3 External factors are not under the control of organisations. However, the negative impacts of these factors can be subdued, and the positive effects can be intensified by effective and continuous research and development.

4 The academic and industrial overlook provides organisations with IAs to focus on initially. An approach suitable for benefits based on the organisational goals must be identified and deployed.

5 The clusters identified must comply with the academic and industrial overlook for improved performance and turnaround.

6.2 General conclusions

Conclusions concerning the general MSMEs are addressed below. These conclusions are derived after observations recorded on visiting various MSMEs for the study:

1 Poor performing clusters must ensure to bring in gradual changes.

2 Declining MSMEs must be ready to invest time and money in changing their practices and procedures for a sight of improvement in the firm's status.

3 MSMEs must focus on IAs that has a greater impact on their organisations rather than focusing on those that may not have a significant impact for a quantifiable impact.

4 Different methods of approach can be identified for the successful turnaround of firms. Identifying the right approach for getting out of the crisis is a must. Significant changes are only observed when the proper steps are taken.

5 Several papers for improving the performance of MSMEs, their developments, and performance improvements are available. However, organisations must take responsibility for going through the available papers for modifications in their processes and procedures.

6 Organisations can setup third-party task forces to enable an efficient and unbiased opinion on the firm's performance and measures to improve them.

6.3 Future scope

1 Level 1 and Level 2 of the model need constant updating based on the then manufacturing scenario.

2 Artificial intelligence and machine learning methodologies can be used to improve the model's contents, performance measurement analysis, and the quantitative analysis of each academic effect based on a greater number of academic and industrial experts.

3 A global model for the turnaround of declining organisations can be identified and developed.

4 The model must be implemented practically to determine its impact on the industry.

5 Chandran and Saleeshya (2020) suggest that lean initiatives impact the manufacturing sector and the services sector. Thus, the study can be extended from the manufacturing sector to the services sector.

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