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Integrated Supply Chain Performance Measurement Model for the Manufacturing Industry

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Abstract

This study investigated supply chain performance measurement for the manufacturing industry based on the primary and the secondary data and developed Integrated Supply Chain Performance Measurement (ISCPM) model through the supply chain performance attributes in the outlook of input-process-output considering the BSC and the SCOR model at three decisions levels. In the context of the current market dynamics and uncertainties, companies need to upgrade and prepare for resilient supply chain operations, identify the gaps in new normal especially after the pandemic COVID 19, and way forward to address how companies will be organized to handle the strategic supply chain issues and maneuver promptly to ensure a smooth and flawless operation which is extremely challenging in this unpredictable moment. The integrated model incorporates ten supply chain performance measurement attributes and thirty-six performance measurement indexes as supplier relationship management (SRM), internal supply chain management (ISCM), and customer relationship management (CRM). Finally, the ISCPM model reviews and appraise the operational performance of an organization.

Keywords

Integrated Supply Chain Performance Measurement (ISCPM), Performance Measurement Index (PMI), The Balanced Scorecard (BSC), SCOR

1. Introduction

Manufacturing organizations have perceived the benefits of effective SCM in day to day operations. Conversely, numerous organizations disregarded to generate enthralling performance and operational measures which are indispensable to

warrant a commendable and coordinated SCM (Molina-Besch, 2016). To realize the solitary of globalization and SCM objective, which is to indulge customers more rapidly and more effectively than other competitors, SCM necessities to participate in the nonstop execution of developmental strategies.

SCM is an integrated method in business from the suppliers of raw material, factories, inventory and delivering to the customers that ensures right product at an accurate price, is in an appropriate size, and at a right place that delivers the optimum lot size through proper distribution channel (Aleksandra et al., 2017). Practically, integrated SCM involves both logistics and strategic decisions for the sustainability of business operations. In other words, integrated SCM implies a concept to monitor all aspects of business operations and ensure value-adding activities through collaborative efforts both from manufacturers and logistics providers.

Top Management of the manufacturing companies has been studying innovative methods to attain competitive leverage where integrated SCM is reflected as an effective strategic approach to enhance competitive advantage in this modern era of intense global competition. Business dynamic forces have been transformed that put the arm on the legislative requirements to measure the performance of the manufacturing industry where companies have been witnessing to unlock the tools that can assess the supply chain performance measurement (SCPM) commendable (Kurien & Qureshi, 2018).

The justification of this study is to assess the literature on supply chain performance measurement (SCPM) in the manufacturing industry to capture existing practices, distinguish gaps and recommend forthcoming investigation itineraries. The study also recommends an Integrated Supply Chain Performance Measurement (ISCPM) model in the manufacturing industry.

This study consists of seven sections—1) introduction, 2) literature reviews, 3) supply chain performance measurement, 4) research methodology, 5) conceptual framework, 6) discussions, and 7) conclusion. In the literature review, the study investigated different supply chain performance measurement model frameworks and highlighted the appreciation and criticism made by the research scholars over the period.

The focus was given to the BSC model and the SCOR model which have been widely accepted and adopted. In section 5, the study illustrated the conceptual framework, and section 5.1 illustrated the step-by-step Integrated Supply Chain Performance Measurement (ISCPM) model development. In section 6, ten supply chain performance measurement attributes and thirty-six performance measurement indexes were elaborated in **Table 1** to **Table 10**. Finally, the conclusion, recommendation and future research scope were also discussed in section 7 and sub section 7.1.

2. Literature Review

There is an urgency for a comprehensive direction for the researchers to evaluate

supply chain performance measurement (SCPM) for the manufacturing industry that addresses supply chain performance measurement (SCPM) attributes and performance measurement index from cost and non-cost perspective, evaluate on strategic, functional or emphasis on operational levels in order to evaluate the bottom-line impacts of an organization (Kumar et al., 2020).

As of now, the supply chain performance measurement (SCPM) is evaluated into a financial and non-financial measurement system. Business enterprises witnessed a paradigm transformation to evaluate SCPM, where Global companies adopted either Supply Chain Operations Reference (SCOR) model or Balanced Scorecard (BSC) model.

Despite an incredible appreciation of the Balanced Scorecard model (BSC) in the corporate to evaluate supply chain performance measurement (SCPM), the model has found multifold constraints (Kottala & Herbert, 2019). As time passes by, it becomes more noticeable—the model did not think through leadership or capacity building to assess its performance, it is also considered as an observing and monitoring apparatus instead of a development apparatus and inclined towards strategic level as opposed to planning or operational level.

The BSC model does not deliver appropriate direction to run a business, replicate the market competition, formulate a mathematical or logical association, and it is also challenging to make a comparison within and across a firm (Kurien & Qureshi, 2018).

This BSC model is not operational for a small organization as it involves know-how of managerial capacities, the relationship of a cause and effect to select the best measure of performance has not also been considered in this model where it predominantly discharges internal corporate perspective (Taghipour et al., 2015).

External influences such as risk, government regulations, uncertainty, collaborations, sustainability, and continuous improvement are not also considered in this BSC model, where it also overlooks environmental, social and sustainability factors and completely miscarries to classify buyer and supplier relationship, supplier network and strategy factors, to address employee motivation, employee engagement, team building, agility factors in a dynamic environment, resilient factors, and finally future business opportunities were not considered in this model (Hussain et al., 2019).

In contrast, the SCOR model was formulated to provide a business to enhance its efficiency with a vision to regulate the supply chain performance measurement (SCPM) and investigate as a point of reference for enterprises and inter-link the financial statement. The SCOR model also miscarries to anticipate the global outlook on market uncertainty and business risk.

Multifold issues such as sustainability, visibility, and IT-related upgradations were not also shielded within the SCOR model, training and development, capacity building, a collaboration of inter and intra organizational or functional activities are not also reflected (Shokouhyar et al., 2020).

3. Supply Chain Performance Measurement

Supply chain performance measurement (SCPM) supports the decision—making process through a holistic approach. It assists an organization meaningfully, where top-level executives are enthusiastic about understanding the bottom-line impacts of an organization and performance measurement parameters reflects from procurement, manufacturing, warehouse, distribution, customer service as well as financial aspects of an organization (Kumar et al., 2020). Ideally, the performance measurement model should consider quantitative as well as qualitative approach and have the capacity to apply different measuring tools.

Furthermore, the performance measurement parameters should come together in agreement with certain features like comprehensiveness, universal acceptability, and steadiness (Hussain et al., 2019).

Researchers reported that accurate measurement of performance could be beneficial to businesses in order to formulate, implement and control organizational strategy, where stated that employee motivation and organizational culture retention are also impactful in this performance measurement. Kaplan and Norton (1992) pronounced the Balanced Scorecard (BSC) model as an authoritative performance measurement instrument, and it allows administrators to detect a composed understanding, where the researchers recommended four basic perceptions that administrators should observe and follow—financial, customer feedback, internal business processes & innovation and learning perceptions.

The author demonstrated how SCM structure is connected in a balanced scorecard model; the BSC model is dominant in delivering managers with a comprehensive image of business performance.

Nevertheless, it undergoes two elementary restraints. First, it is a top-down tactic. Hence, it is not participative and might miscarry to perceive prevailing collaborations between different procedure metrics (Kaplan & Norton, 1992).

The SCOR model was formulated by the SC Council (SCC) to support businesses to enhance the effectiveness of their SCs and to deliver a process-based approach to SCM, where the SCOR model carries a common process-oriented language in communicating among its SC associates in Plan, Source, Make and Deliver, where SCOR model designate, measure and estimate any SC configuration (Phan et al., 2019). There are twelve performance matrices as part of the SCOR Model to evaluate process performance: delivery reliability, flexibility, responsiveness, costs, and an asset to derive at a quantifiable SC performance measure

Alternatively, SCOR model does not contemplate on market uncertainty, where information visibility, IT-related issues, business sustainability, training and development, capacity building, etc. are also excluded in the scope of the SCOR model (Bhagwat & Sharma, 2007). No clear interaction of inter and intra organizational or functional activities are mentioned in the SCOR model (Miraz et al., 2016, 2017).

4. Research Methodology

The study applied an exploratory study method based on primary and secondary data. Review of journal papers on supply chain performance measurement was made. The target population in this study was Bangladesh manufacturing industry, which consists of twenty-four manufacturing sectors. Based on the analysis, twenty-four manufacturing sectors have around 7570 manufacturing companies. Therefore, the population size is 7570. From the 7570 lists of the respondent companies, 1832 individual company-have been chosen randomly and emails have been sent to the supply chain heads to respond.

An individual company's supply chain professional has been considered as the unit of analysis. This study applied simple random sampling and used the Taro Yamane table at ±7% precision level, and confidence level at 95% the sample size of this research is 199. In this study, the researcher composed 207 respondents from the manufacturing industry. Hence, 207 respondents are the sample size in this study. Apart from these, the study also explored secondary data from Emerald, IJSCM, IGI, Nova publishers etc.

5. Conceptual Framework

The study formulates Integrated Supply Chain Performance Measurement (ISCPM) model for the manufacturing industry, where the model coordinates and shares information up and down the process. To provide a theoretical structure, Figure 4 illustrates a comprehensive observation of the manufacturing operations process.

In this study, the author discussed supplied inputs like raw materials, where raw materials are transformed into finished products in the manufacturing premises, and finished products are being channeled out through the distribution up to the consumer in Figure 1.

This study identifies SC macro-environmental process, which describes supplier relationship management (SRM) as a supplier, internal supply chain management (ISCM) as a manufacturer and customer relationship management (CRM) as a customer referred from Figure 2.

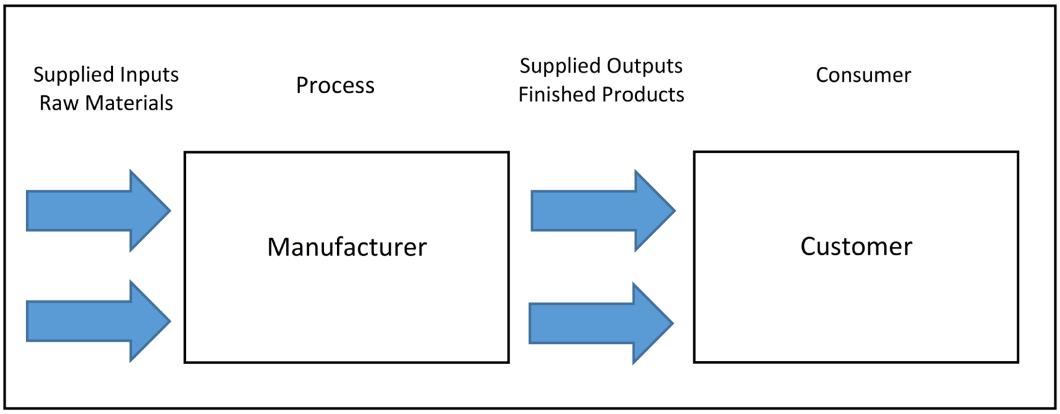

Figure 1. A holistic view of the manufacturing operations.

Three decision levels are embedded in SRM, ISCM, and CRM; as illustrated in Figure 3, the ISCPM model has three decisions: strategic, planning, and operational.

The strategies for overall business operations are formulated at a strategic level from controlling to overseeing for SRM, ISCM and, CRM. They are referred to corporate-level executives who give complex decisions that require strategic direction, long-term commitments and planning for one year and beyond. The decisions eventually drive the firm to a sustainable position. Mid-level management belongs to the planning level and executes the firm's plans as per the policy designed by the senior management where a decision needs less than a one-year horizon. This is appropriate for SRM, ISCM, and CRM. At the operational level, bottom line executives focus mostly on controlling and directing on a regular basis and measure plan versus actual applicable for SRM, ISCM, and CRM.

ISCPM Model Development

This exploratory study in Figure 4 classifies the SCOR model—input, process, and output model; with strategic, planning and operational level decisions into each stage of SRM, ISCM, and CRM. In addition to that, the six drivers of the manufacturing industry are beefed-up in order to formulate an SCM strategy either at responsive or an efficient level. And then, the concept is infiltrated and attached to the framework. The balanced scorecard (BSC) model is amalgamated

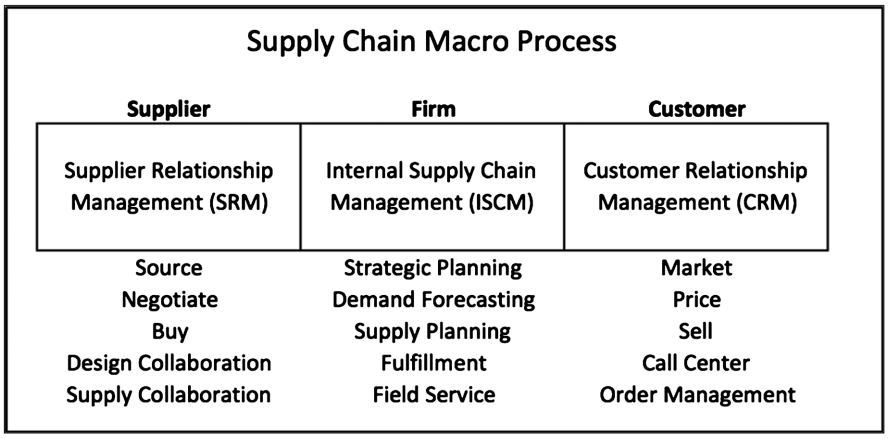

Figure 2. A simplified view of the SC macro-environmental.

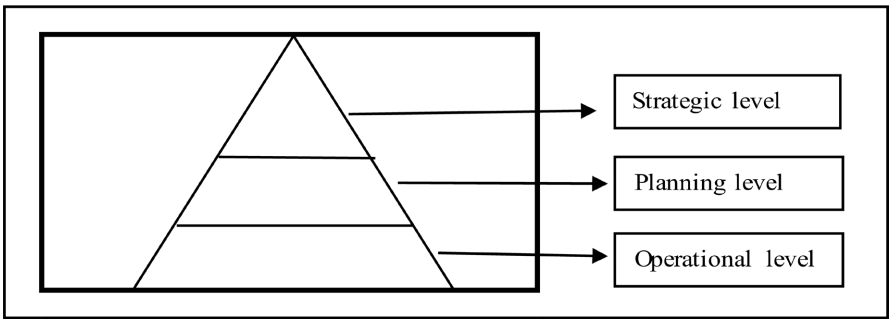

Figure 3. Three-decision levels in ISCPM model.

were financial, process, learning & development, and finally, customer-centric issues are to be considered.

This study in Figure 5 classifies a complete Integrated Supply Chain Performance Measurement (ISCPM) model with 10 performance measurement attributes and 36 performance measurement index.

The researcher in Figure 5, classified that Supplier Relationship Management (SRM) at a strategic level consists of Financial Health (FH), Resilience (RE), and Sustainability (SS). The Supplier Relationship Management (SRM) at a planning level consists of Collaboration (CL), Continuous Improvement (CI), Velocity (VC), and Work People Health (WPH). And finally, the Supplier Relationship Management (SRM) at an operational level consists of Reliability (RL), Visibility (VS), Service Excellence (SE). Similarly, Internal Supply Chain Management (ISCM) and Customer Relationship Management (CRM) have been classified.

The researcher exhibits the ISCPM model, where the researcher classifies that an organization is ultimately responsible for its four stakeholders: shareholder, customer, people, nature, and community.

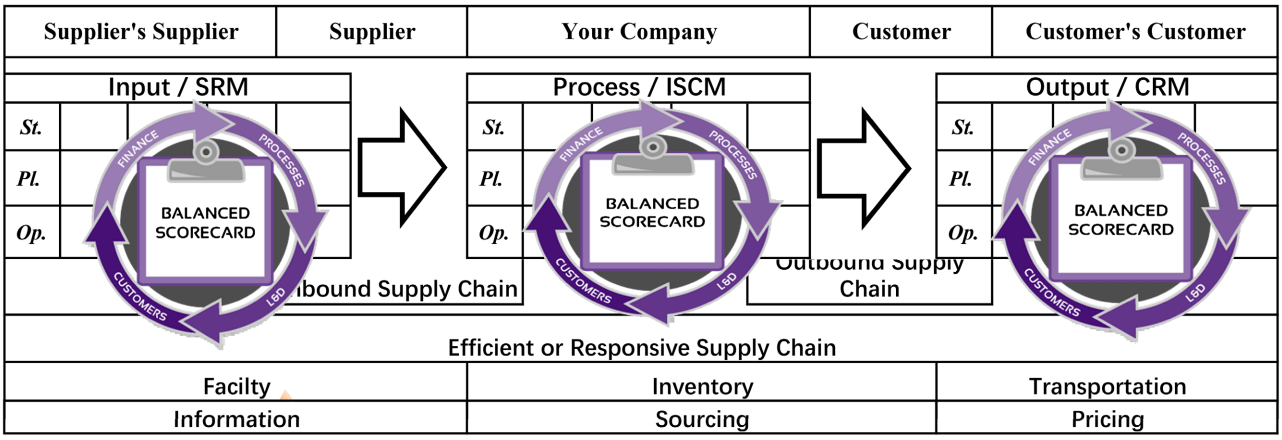

Figure 4. ISCPM model development (Saleheen & Habib, 2022a).

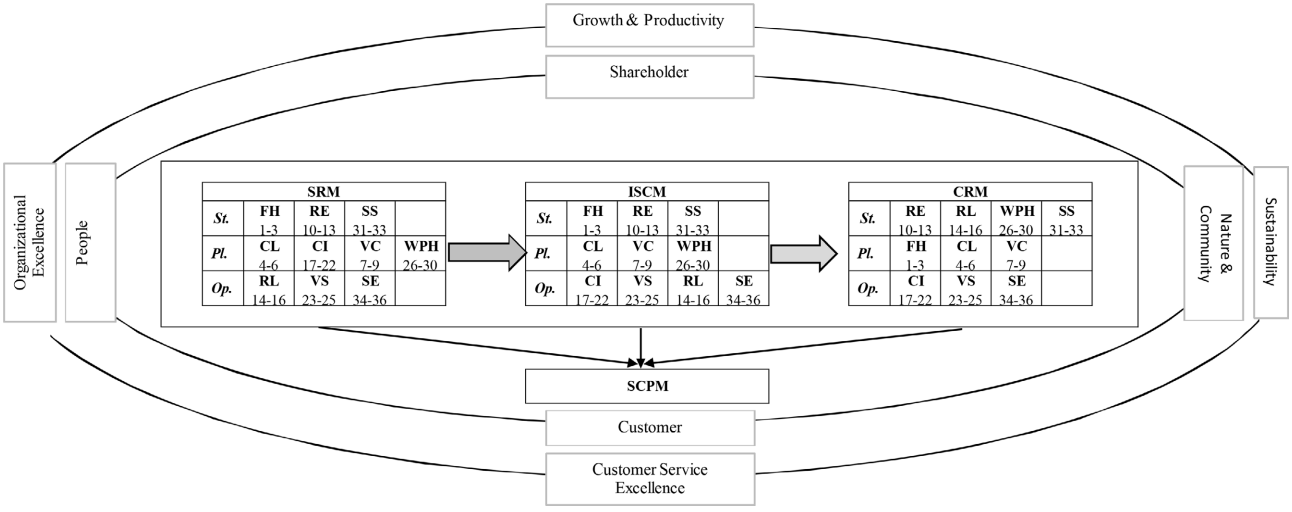

Figure 5. Integrated Supply Chain Performance Measurement (ISCPM) model (Saleheen & Habib, 2022c).

The first and foremost responsibility of an organization is to serve its shareholders' interests through continuous growth and profitability.

The shareholders are better served when an organization has the highest focus to serve its customers through ensuring customer service excellence. The shareholders and customers could be made satisfied when the people of the organization perform satisfactorily through ensuring organizational excellence. The last and most important for an organization is to be responsible for their stakeholder who is nature and community. An organization should be responsible for its nature and its community in order to ensure that it is not engaging itself into any harmful activities through pollution of air, soil or releasing toxic gas or substances to nature. Not only that, but an organization also has responsivity towards its people, its community through the eradication of poverty. Therefore, when a firm's performance is balanced to its four stakeholders, then and only true sustainability is achieved (Saleheen et al., 2018, 2019).

6. Discussion

The researcher in **Figure 5**, classified that Supplier Relationship Management (SRM) at a strategic level consists of Financial Health (FH) are Economic Performance, Cost, and Budget Variance; Resilience (RE) are Global Risk, Enterprise Risk, Human Capital & Management Risk, and Supplier Risk; and Sustainability (SS) are Sustainability to Nature, Sustainability to Community, and Application of Green Supply Chain. Similarly, Supplier Relationship Management (SRM) at a planning level consists of Collaboration (CL) are Inventory, Planning Variance, and Partnership; Continuous Improvement (CI) are Culture for TQM, Culture for Continuous Improvement, Application of 5S, Application of Lean, Application of Total Productive Maintenance; Velocity (VC) are Capacity Flexibility, Speed, Flexibility Consistency; Work People Health (WPH) are Leadership, Ethics, Integrity & Compliance, Talent Attraction and Retention, Health & Safety, Culture, Value and Employee Engagement. And finally, Supplier Relationship Management (SRM) at an operational level consists of Reliability (RL) Be on Time, Be on Specifications, Be on Utilization; Visibility (VS) are Integration, Traceability, and ERP Transactions; and Service Excellence (SE) are Innovation in Technology, Customer Satisfaction, and Service Facilities & Technical Skills (Saleheen et al., 2019; Saleheen & Habib, 2022b, 2022d, 2022e).

Attribute 1 in **Table 1** is denoted as Financial Health (FH). The Financial Health (FH) in the supply chain (SC) diagnoses and tries to understand how an organization is performing financially and eventually it connects the company's topline and bottom-line performance. The performance measurement index (PMI) is further segregated into FH1, FH2, and FH3, which are Economic Performance, Cost, and Budget Variance.

Attribute 2 in **Table 2**, is denoted as Collaboration (CL). The Collaboration (CL) in supply chain diagnoses and tries to understand how does the organization maintains the stakeholder relationship. The relationship spans from the

upstream to the downstream, internal as well as external. The performance measurement index (PMI) is further segregated into CL4, CL5, and CL6, which are Inventory, Planning Variance, and Partnership.

Attribute 3, in Table 3 is denoted as Velocity (VC). Velocity (VC) in supply chain diagnoses and tries to understand how long does an organization takes to respond to the market changes. The performance measurement index (PMI) is further segregated into VC 7, VC 8, and VC 9, which are Capacity Flexibility, Speed, and Flexibility Consistency

Attribute 4, in Table 4 is denoted as Resilience (RE). Resilience (RE) in supply chain diagnoses and tries to understand how does an organization predicts future changes. The performance measurement index (PMI) is further segregated

Table 1. Financial Health (FH).

Attribute 01	Performance Measurement Index (PMI)		Reference
Financial Health (FH)	Economic Performance FH1	Sales, Gross Margin, EBITA, Net Profit, Market Capitalization, Total Assets, Total Liability, Cash to Cash Cycle Time, Net Working Capital, Contribution to National Exchequer and Total CSR	(Alora & Barua, 2019; Kurien & Qureshi, 2018)
	Cost FH2	COGS, Operating Cost, Total SCM Cost, Logistics Cost	(Alora & Barua, 2019; Kurien & Qureshi, 2018)
	Budget Variance FH3	Budget Variance in Customs Duty, Customs, Penalty, C & F Cost, Demurrage, Handing Damage, Cost of Production/Unit, Annual Wastage, Delivery Cost/Trip etc.	(Alora & Barua, 2019; Kurien & Qureshi, 2018)

Table 2. Collaboration (CL).

Attribute 02	Performance Measurement Index (PMI)		Reference
Collaboration (CL)	Inventory CL4	Inventory Holding Days, Ageing & Turnover	(Panahifar et al., 2018; Garay-Rondero et al., 2019)
	Planning Variance CL5	Production, Distribution, Forecast, Supply Chain Cycle Time	(Panahifar et al., 2018; Garay-Rondero et al., 2019)
	Partnership CL6	Supplier & Buyer Trust Level, Joint Problem Solving Initiative, Training, Continuous Improvement Goal Setting, Information Sharing on Production Plan, Inventory and Forecasting	(Panahifar et al., 2018; Garay-Rondero et al., 2019)

Table 3. Velocity (VC).

Attribute 03	Performance Measurement Index (PMI)		Reference
Velocity (VC)	Capacity Flexibility VC7	Finance, Production, Storage, Transportation, Material Equipment's, Cold Chain, Technology, IT Integration	(Kurien & Qureshi, 2018; Sreedharan et al., 2019)
	Speed VC8	Manufacturing Time/Unit, No of Delivery Per Week, Loading/Unload Time, Goods Handling Volume (Storage, Service), Urgent Response Time	(Kurien & Qureshi, 2018; Sreedharan et al., 2019)
	Flexibility Consistency VC9	Preventive & Scheduled Maintenance, Buffer Spares Parts, Line Balancing, Total Down Time	(Kurien & Qureshi, 2018; Sreedharan et al., 2019)

Table 4. Resilience (RE).

Attribute 04	Performance Measurement Index (PMI)		Reference
Resilience (RE)	Global Risk RE10	Environmental, Political, Economic, Technological, Government, Legal, Ethical Business, Terrorism	(Panova & Hilletofth, 2018; Chen, 2018)
	Enterprise Risk RE11	Planning to Payment, Alternate Sourcing, Security Program, Theft, Sabotage, Counterfeit	(Panova & Hilletofth, 2018; Chen, 2018)
	Human Capital and Management Risk RE12	Critical resource issues, risk and trends of demographic skills, appropriate work force and skills	(Panova & Hilletofth, 2018; Chen, 2018)
	Supplier Risk RE13	Documentation of Supplier Contract Terms, Scope, Credit, Service, Specifications, Penalty, Litigations, Appraisal, Checklist for Commercial Documents (To avoid customs penalty)	(Panova & Hilletofth, 2018; Chen, 2018)

Table 5. Reliability (RL).

Attribute 05	Performance Measurement Index (PMI)		Reference
Reliability (RL)	Be on Time RL 14	On Time Arrival, Delivery, (RM, FG, Transport), Receive & Submission of PI, LC, Document, Customs Clearance, Freight Forwarder etc. and Product Fill Rate	(Garay-Rondero et al., 2019; Zhang, 2017)
	Be on Specifications RL 15	Goods Receiving as Per Specifications, % Delivery Rejects, % Return, Time to Respond Urgent Calls	(Garay-Rondero et al., 2019; Zhang, 2017)
	Be on Utilization RL 16	Raw Material Consumption Ratio, Machine Utilization Ratio, Delivery Fill Rate, Field Failure Ratio	(Garay-Rondero et al., 2019; Zhang, 2017)

into RE10, RE11, RE12, and RE 13 which are Global Risk, Enterprise Risk, Human Capital & Management Risk, and Supplier Selection & Appraisal.

Attribute 5, in Table 5 is denoted as Reliability (RL). Reliability (RL) in supply chain diagnoses and tries to understand how reliable is the supply, process, and distribution of an organization. The performance measurement index (PMI) is further segregated into RL 14, RL 15, and RL 16 which are Be on Time, Be on Specifications and Be on Utilization. Be on Time deals with On-Time Arrival, Delivery, (RM, FG, Transport), Receive & Submission of PI, LC, Document, Customs Clearance, Freight Forwarder, etc., and Product Fill Rate.

Attribute 6, in Table 6 is denoted as Continuous Improvement (CI). Continuous Improvement (CI) in supply chain diagnoses and tries to understand the ongoing activities to make the company remain competitive. The performance measurement index (PMI) is further segregated into CI 17, CI 18, CI 19, CI 20, CI 21, and CI 22 which are Process Standardization, Culture for TQM, Culture for Continuous Improvement, Application for 5S, Application of Lean, and Application of Total Productive Maintenance.

Attribute 7, in Table 7 is denoted as Visibility (VS). Visibility (VS) in supply chain diagnoses and tries to understand the level of traceability of the organizational activities. The performance measurement index (PMI) is further segregated into VS 23, VS 24, and VS 25, which are Integration, Traceability, and ERP

Table 6. Continuous Improvement (CI).

Attribute 06	Performance Measurement Index (PMI)		Reference
Continuous Improvement (CI)	Process Standardization	SOP, Quality Management Systems, Environmental Management Systems, Occupational Health and Safety Management Systems, Energy Management System, Information Security Management, Certification on Asset Management, Anti Bribery Certification, Data Protection Certification, Certification: Food Safety, Six Sigma, Lean, Kaizen, Kanban etc.	(Kumar et al., 2020; Sreedharan et al., 2019)
	Culture for TQM	i) Top management commitment, (ii) employee involvement, (iii) customer focus, (iv) facts based management, (v) process monitoring & control, (vi) incentive and recognition, (vii) continuous improvement orientations, (viii) quality performance, (ix) service culture	(Kumar et al., 2020; Sreedharan et al., 2019)
	Culture for Continuous Improvement	(i) Organizational direction and CI goals, (ii) balanced innovation and improvement plan, (iii) constant change culture, (iii) standardized process, (iv) standardized improvement method, (v) training and career path, (vi) information & technical support	(Kumar et al., 2020; Sreedharan et al., 2019)
	Application of 5S	(i) Sort, (ii) Straighten, (iii) Shine, (iv) Standardize, (v) Sustain	(Kumar et al., 2020; Sreedharan et al., 2019)
	Application of Lean	(i) Over production, (ii) Inventory, (iii) Motion, (iv) Transport, (v) Process, (vi) Defects, (vii) Waiting times	(Kumar et al., 2020; Sreedharan et al., 2019)
	Application of Total Productive Maintenance	(i) Focused improvement, (ii) autonomous maintenance, (iii) planned maintenance, (iv) quality maintenance, (v) cost deployment, (vi) Training & Education, (vii) Safety, Health & Equipment and (vii) Early Equipment Maintenance including all buffer stock of parts.	(Kumar et al., 2020; Sreedharan et al., 2019)

Table 7. Visibility (VS).

Attribute 07	Performance Measurement Index (PMI)		Reference
Visibility (VS)	Integration VS 23	Assessment and integration for in transit, production, on hand and SC cost visibility	(Sundram et al., 2018; Kumar et al., 2020)
	Traceability VS 24	Product traceability and quality information from planning to payment	(Sundram et al., 2018; Kumar et al., 2020)
	ERP Transactions VS 25	All SC requisition, purchase, distribution, payment through ERP	(Sundram et al., 2018; Kumar et al., 2020)

transactions. Integration deals with Assessment and integration for in transit, production, on hand, and SC cost visibility. Traceability deals with Product traceability and quality information from planning to payment, and ERP transactions deal with Product traceability and quality information from planning to payment.

Attribute 8, in Table 8 is denoted is denoted as Work People Health (WPH). Work Place Health (WPH) in supply chain diagnoses and tries to understand what are the ongoing company activities to achieve organizational excellence. The performance measurement index (PMI) is further segregated into WPH 26, WPH 27, WPH 28, WPH 29, and WPH 30 which are Leadership, (Ethics, Inte-

grity, & Compliance), Talent Attraction & Retention, Health & Safety, and Culture, Value and Employee Engagement.

Attribute 9, in Table 9 is denoted as Sustainability (SS). Sustainability (SS) in supply chain diagnoses and tries to understand what are the organizational activities for the people and planet. The performance measurement index (PMI) is further segregated into SS 31, SS 32, and SS 33 which are Sustainability to Nature, Sustainability to Community, and Application of Green Supply Chain (SC) (Miraz et al., 2022).

Table 8. Work Place Health (WPH).

Attribute 08	Performance Measurement Index (PMI)		Reference
Work Place Health (WPH)	Leadership WPH 26	Written Vision & Mission, Objective, KPI, Performance Appraisal Process, Transformational Leadership capabilities, Data Analytics, Strategic Plan, Sustainable Business Policy	(Sabiu, 2019; Kumar & Goswami, 2019; Tuniet et al., 2018)
	Ethics, Integrity & Compliance WPH 27	Anti-corruption/bribery policy, ethical procurement policy, supplier ethical code of conduct	(Sabiu, 2019; Kumar & Goswami, 2019; Tuniet et al., 2018)
	Talent Attraction and Retention WPH 28	Diversity and equal opportunity, fair market salary and benefits, performance based reward policy, career development plan, capacity building initiative and succession plan, monitor employee turnover	(Sabiu, 2019; Kumar & Goswami, 2019; Tuniet et al., 2018)
	Health & Safety WPH 29	Occupational health and safety practice, safety audits, safety performance assessment and report	(Sabiu, 2019; Kumar & Goswami, 2019; Tuniet et al., 2018)
	Culture, Value and Employee Engagement WPH 30	Organizational written values, defined job classifications and decision making authorities, employee respect, positive change and healthy cultural environment, labor/management relations, unscheduled employee absenteeism	(Sabiu, 2019; Kumar & Goswami, 2019; Tuniet et al., 2018)

Table 9. Sustainability (SS)

Attribute 09	Performance Measurement Index (PMI)		Reference
Sustainability (SS)	Sustainability to Nature: SS 31	Activities on Environmental Impact on Clean Energy & Conversion, Activities on GHG Emission (CO2 e/Ton of Production), Activities on Air Emission, Activities on Biodiversity, Activities on Waste Management, Environmental Compliance Policy aligning with UN Sustainable Development Goal	(Kumar & Goswami, 2019; Shokri Kahi et al., 2017)
	Sustainability to Community SS 32	Corporate Social Responsibility (CSR) aligning with UN Sustainable Development Goal	(Kumar & Goswami, 2019; Shokri Kahi et al., 2017)
	Application of Green SC SS 33	Green procurement, green product development, green logistics	(Kumar & Goswami, 2019; Shokri Kahi et al., 2017)

Attribute 10, in Table 10 is denoted as Service Excellence (SE). Service Excellence (SE) in supply chain diagnoses and tries to understand what are the company activities to achieve customer service excellence. The performance mea

Table 10. Service Excellence (SE).

Attribute 10	Performance Measurement Index (PMI)		Reference
Service Excellence (SE)	Customer Satisfaction SE 34	Application of Artificial Intelligence, Application of Industry 4.0, Application of Industrial Internet of Things (IIoT), any new innovation to improve product quality through technology	(Kumar et al., 2020; Ghadge et al., 2020)
	Customer Satisfaction SE 35	Overall service rating, Field Failure Ratio (FFR), Lead time from complain and problem solving, Sales people friendliness and professionalism, Environment neatness and comfort for service center, Call center feedback clarity, Accessibility of call center, online payment facility etc.	(Kumar et al., 2020; Ghadge et al., 2020)
	Service Facilities & Technical Skills SE 36	Team skills, technical facilities	(Kumar et al., 2020; Ghadge et al., 2020)

surement index (PMI) is further segregated into SE 34, SE 35, and SE 36 which are Innovation in Technology, Customer Satisfaction, and Service Facilities & Technical Skills. Innovation in Technology deals with Application of Artificial Intelligence, Application of Industry 4.0, Application of Industrial Internet of Things (IIoT), any innovation to improve product quality through technology.

7. Conclusion

The researcher exhibits the ISCPM model, where the researcher classifies that an organization is ultimately responsible for its four stakeholders: shareholder, customer, people, nature, and community. The first and foremost responsibility of an organization is to serve its shareholders' interests through continuous growth and profitability. The shareholders are better served when an organization has the highest focus to serve its customers through ensuring customer service excellence. The shareholders and customers could be made satisfied when the people of the organization perform satisfactorily through ensuring organizational excellence. The last and most important for an organization is to be responsible for their stakeholder who is nature and community. An organization should be responsible for its nature and its community in order to ensure that it is not engaging itself into any harmful activities through pollution of air, soil or releasing toxic gas or substances to nature. Not only that, but an organization also has responsivity towards its people, its community through the eradication of poverty. Therefore, when a firm's performance is balanced with its four stakeholders, then and only true sustainability is achieved.

Recommendation and Future Research

This ISCPM model has been prepared based on twenty-four manufacturing industry sectors and validated empirically. This model can measure supply chain performance measurement holistically where the stakeholders such as shareholders, customers, people, nature, & community can be better served with the appropriate strategies to review and appraise their performance toward fulfillment of the ultimate goals. However, it is suggested to implement this in real-life ap-

plications, particularly in the manufacturing industry.

The limitation of this study is that this model did not consider the service industry like hotel & tourism, education, and hospital sectors which are also very much important. Also, this model has not been validated and tested in real-life applications in the industry. Therefore, this would also be a potential future study for the researchers.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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