Assessing the Effect of Supply Chain Integration Levels on the Performance of Indian Logistics Companies

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Abstract

An organization's performance can be improved and its competitive advantage can be increased by supply chain cooperation. Supply Chain Integration (SCI) has an impact on businesses' success. The impact of supply chain level integration on organisational performance at Indian logistics companies in Pune, Maharashtra, India, is examined and studied in this article. Therefore, the objectives of the study were to research the SCI levels, to outline various performance indicators for Pune Logistics Companies, to evaluate how SCI levels affect Pune Logistics Companies' performance and to elucidate the factors affecting Pune Logistics Companies' supply chain integration. Data were gathered from 150 randomly chosen logistics organisations in Pune using a survey questionnaire that was created using proven measurement scales from prior research. Secondary data was gathered from a wide range of sources, including books, papers, periodicals, journals, websites, industry reports, government publications, etc. This study offers Indian logistics companies in Pune, Maharashtra, India, some excellent advice that might be applied to other industries and policy-making processes. Finally, by supplying some future research, the work will advance the scientific community.

Keywords: Supply Chain Integration (SCI), Indian Logistics Companies, Performance

1.   Introduction

India is one of the nations with the quickest rates of economic growth in the world, creating a highly desirable market for globalisation. Indian businesses have been compelled to venture outside of their comfort zones due to a rise in foreign investments, infrastructure bottlenecks, shortened product life cycles, and the proliferation of product variety. They must decide which suppliers, customers, and logistics service providers to collaborate with in the supply chain, foster trust between them, and develop an appropriate performance evaluation system. With an emphasis on Indian logistics companies, we provide an overview of Supply Chain Integration (SCI) levels as they stand right now in this article.

1.1 Background and Context

In order to enhance the long-term performance of the businesses and the SC as a whole, supply chain management, or SCM, refers to the flow of materials, products, information, and money both within a specific company and across businesses, from suppliers to manufacturers to customers (Mentzer, 2001). One of the most crucial components of supply chain management (SCM) is supply chain integration (SCI), and research on its benefits and enablers has been done

in great detail (Zhao et al., 2011; Flynn et al., 2010). Furthermore, according to Frohlich and Westbrook (2001; Van Der Vaart and Van Donk, 2008), SCI is the extent to which a business can strategically collaborate with its supply chain partners and cooperatively manage intra- and interorganizational processes to achieve effective and efficient flows of goods, services, information, money, and decisions to provide the maximum value to the end user at low costs and fast speeds.

To convey the raw materials and completed goods to fulfil customer demand in today's globalised world of severe market dynamism, producers need equipment, transportation services, documentation services, and customs clearance services. Businesses rely on logistics service providers to handle the actual physical movements of goods and services to the final consumer in order to meet these needs (Joppachan Zacharias and S. Boopathy, 2022). Manufacturers have improved their internal operations and integrated their supply chain partners into their current supply chain network as a result of the growing market competitiveness (N. Fabbe-Costes and C. Roussat, 2011). By definition, logistics integration is a part of the supply chain that works with customs and transportation service providers to move items from the manufacturer to the final consumer. For these supply chain channels to operate successfully, there needs to be a greater degree of cooperation and coordination between the parties (G. A. D. S. Junior et al., 2003). Based on their involvement in the overall logistics activities of the supply chain, the logistics service providers are primarily divided into the following categories: shipping lines, freight forwarders, transport operators, terminal operators, and customs house agents.

1.2 Problem Statement

The purpose of this study is to investigate how SCI levels in Pune, Maharashtra, India, affect organisational performance. Due to its impact on an organization's survival, stability, and advancement, SCI and organisational performance are becoming more and more important topics these days. Examining how SCI affects a company's success is therefore crucial for both academics and organisations. Investigating the impact of SCI levels on organisational performance at Indian logistics companies is what this study may be viewed as. The performance of Indian Logistics Companies will therefore be improved by having sufficient understanding of the SCI in organisational performance. The research's findings are important for academics, decision-makers, and logistical firms, among other businesses. The study's issue statement would therefore be "Assessing the Effect of Supply Chain Integration Levels on the Performance of Indian Logistics Companies."

1.3 Purpose of the Study

In the current competitive global commerce environment, manufacturers are partnering with logistics service providers to ensure that their final products reach their intended consumers. This research aims to develop a new conceptual framework and identify the factors contributing to enhanced logistics integration among logistics service providers in order to help manufacturing firms execute their international logistics activities smoothly and efficiently and gain a competitive advantage in the market. The goal is to sustain in the competitive market while addressing logistical challenges. The manufacturers are under pressure to integrate their operations with logistics service providers due to expanding competition and client demands. Costs are reduced and customer service is significantly improved thanks to this integration (O. E. Williamson, 2008). The importance of logistics service providers in supply chain integration is increasing as the organisational supply chain expands and changes (Y. R. Perdana et al., 2019). Research indicates that the performance of an organisation is impacted by Supply Chain

Integration (SCI) (Prajogo & Olhager, 2012; Ralston et al., 2015; Prajogo et al., 2016). This suggests that its importance should be taken into account when analysing the effects of supply chain integration levels on organisational performance. For this reason, this study examines the influence of SCI on organisational performance at Indian logistics companies, with a focus on Pune.

1.4 Objectives of the Study

The following are study‑s specific objectives:

1.   To research the SCI levels for Indian Logistics Companies, with a focus on Pune.
2.   To outline various performance metrics for logistics companies in India, with special reference to Pune
3.   To evaluate how SCI levels affect Pune Logistics Companies' performance
4.   To elucidate the factors affecting Pune Logistics Companies' supply chain integration

1.5 Research Hypotheses

A testable and provisional assertion regarding a problem's solution is referred to as a hypothesis. A Null Hypothesis (H_0) means ↑hypothesis of no effect.↓ Null Hypothesis is one in which the researcher states that there is no difference between the variables of the study. An Alternative Hypothesis (H_a or H_1) states research prediction of an effect or relationship. It is contradictory to the null hypothesis. Based on the currently available literature, the following hypothesis was formed for the current study:

H_0: *↑Supply chain integration levels do not have significant effect on performance of Indian Logistics Companies of Pune↓*

H_1: *↑Supply chain integration levels do have significant effect on performance of Indian Logistics Companies of Pune↓*

2.   Literature Review

SCI and corporate performance were characterised in a variety of ways by different publications, and each description was tailored to the study's concept, business, and research goal. SCI is about coordination, cooperation, and teamwork across different supply chain participants, which improves an organization's performance. The concepts of SCI and company performance, as well as their relationship, will be covered in the accompanying segment.

2.1 Overview of Supply Chain Integration

Since the application of supply chain management (SCM) requires the integration of processes from sourcing, to production, and to distribution across the supply chain (Figure 1), integration is now widely accepted as the key idea of successful SCM (Cooper et al., 1997; Mentzer et al., 2001). The concept of supply chain integration is broad and includes both supplier and customer integration, as well as the core idea of internal integration. Zhao et al. (2011); Flynn et al. (2010). According to Tank, Keller, and Daugherty (2001), supply chain management is centred on integration, collaboration, and coordination throughout the value chain. The ideas of cooperation, shared decision-making, transparent communication, a common vision, shared technology, and a high degree of trust between the producer and their clients are the foundation of supply chain integration. (2010) Flynn et al. The goal of SCI is to provide the client with the most value at the lowest possible cost in the shortest amount of time, through the accurate, timely, and seamless flow of information, money, and procedures. Bowersox and associates, 1999. Additionally, according to Frohlich and Westbrook (2001; Van Der Vaart and Van Donk, 2008), SCI is the

extent to which a business can strategically work with its SC partners and cooperatively manage intra- and inter-organizational processes to achieve effective and efficient flows of goods, services, information, money, and decisions to provide the maximum value to the end customer at low costs and fast speeds.

Figure 1: Diagram of Supply Chain Integration
Source: Dima (February, 2012). Diagram of Supply Chain Integration
https://www.alamy.com/diagram-of-supply-chain-integration-image386227159.html

2.2 Levels of supply Chain Integration
According to Alfalla-Luque et al. (2012), there are three levels or facilitators of supply chain integration:

2.2.1 Information Integration
Every corporate organisation needs information integration as a strategic element of supply chain integration to ensure seamless operations. Cooper and others, 1997). In their 2011 study, Raja Guru and Matanda examined how interorganizational compatibility affected supply chain capabilities, taking into account the mediating role that inter-organization information system integration plays. They underlined how crucial information system integration is for SC partners to reduce inventory costs and lessen the possibility of obstacles to improved performance. Technology greatly enhances a company's supply chain agility, enabling it to better adapt to changes in the market through the timely, adequate, and accurate flow of information between supply chain partners. This, in turn, has a positive impact on the company's sales, market share, profitability, ability to carry out planned initiatives, and customer satisfaction (DeGroote and Marx, 2013).

2.2.2 Coordination and Resource Sharing
Mangan et al. (2008) state that whereas collaboration is the long-term development of a connection between supply chain partners, supply chain integration is the alignment and linkage of business operations. According to Flynn et al. (2010), supply chain integration is a building block made up of technical infrastructure, shared information, high levels of coordination, cooperative communication, and a common vision between manufacturers and distributors. According to studies on cooperative relationships between buyers and sellers in the dairy industry, adopting process technologies, exchanging information, and having an effective logistics system are what make the milk supply chain competitive (Moori, Lima, and Menezes, 2012). Sawik (2013) conducted study on the difficult choices made in supply chains when there is a possibility of disruption. Close collaboration is required when making integrated decisions about supplier selection and order scheduling in the event of natural disasters or other disruption concerns. In

the end, this will enhance performance in the event of interruption hazards. In his thesis on logistics and supply chain management, Junqueria (2010) provided governance theory for improved supply chain management. He also discussed how supply chain management practises have a big impact on how well dairy farmers and their suppliers integrate with the company and how they foster a high degree of mutual trust and cooperation.

2.2.3 Organisational Relationship Linkage

In-depth study on supply chain integration in the Chinese manufacturing sector was conducted by Flynn, Huo, and Zhao (2010), who also developed an internal and external integration model. The degree to which departments and functions within an organisation collaborate closely is known as internal integration, whereas external organisation fosters close strategic ties with suppliers and customers. In the framework of supply chain integration study, Van Hoek (1998) examined the factors of internal and external integration. It became clear that one of the most important steps for reaching the SCI stage and reaping the benefits in the form of improved organisational performance is internal integration across all functional domains.

According to Chan et al. (2012)'s work on SCI and performance assessment, accomplishing business goals and obtaining the appropriate level of customer satisfaction require a deeper comprehension of and ongoing improvement in internal and external business processes. In the current globalisation era, supply chain connections and practises need to be integrated and aligned with business strategy in order to achieve the ultimate goals of customer happiness and value addition to the company's value delivery network. Three primary types of SC integration♠interorganizational collaboration, intraorganizational process integration, and operational excellence♠were examined (Morash and Clinton, 1998).

2.3 Performance Metrics in Logistics Industry

According to Neely et al. (1995), the term "metric" relates to the definition of the measure, the method of computation, the person performing the calculation, and the source of the data. Quantitative measurements known as logistics metrics are used to monitor certain procedures inside the logistics framework. The metric(s) used to measure performance determine which design of a logistics system, or component(s) thereof, performs best. A system that performs exceptionally well in one metric might not perform as well in another. But the goal is to create a system that, for the majority of the chosen measures, either meets or surpasses expectations. Logistics metrics differ according to the system's boundary (the different functional areas that are included, like production, distribution, inbound transportation, storage, vendor selection, etc.), the system's functional requirements, the various areas, and the capacity to define and quantify them. Therefore, defining the system that has to be monitored and its components is the first stage in constructing the metrics. Finding the system's functional needs or expectations is the second phase. Finding metrics that can be used to quantitatively quantify the functional needs is the third phase (Kasilingam, R.G., 1998).

The application of novel, developing measures classified into five categories♠external, consumer, value-based competition, network performance, and intellectual capital♠is recommended by Basu (2001). According to Stewart (1995), businesses that have excelled their rivals are superior in four crucial operational domains: (1) asset management; (2) flexibility and responsiveness; (3) delivery performance; and (4) logistical costs. Based on a survey of 22 organisations' SC systems, Spekman et al. (1998) came to the conclusion that SC partners do not have the same understanding of or response to the same set of metrics. They assert that purchasers still place a higher value on the cost-saving features of SCMs than on their ability to increase revenue.

Beamon (1999) concentrated on the key performance indicators, like time, output, resource usage, and flexibility, in order to give new corporate contexts a framework for creating more intricate performance measurements and metrics. In order to compare the competitiveness of particular organisations, Bagchi (1996) defined the metrics of a SC in four categories: time, quality, cost, efficiency, and diagnostic measure. Resources, output, and flexibility are the three categories of PMs that have been highlighted as essential elements of any supply chain PMS. According to De Toni and Tonchia (2001), more creative non-cost metrics including time, quality, and flexibility should be kept outside from conventional PM models.

Many businesses overlook the significance of taking a balanced approach to project management. Financial performance metrics are useful for making strategic decisions, while nonfinancial metrics are more appropriate for managing day-to-day manufacturing and distribution activities (Maskell 1989). The relationship between performance measurement and best practises was explained by Morita and Flynn (1997). McIntyre et al. (1998) developed a metric to forecast future performance and tried to assess the environmental performance of an integrated supply chain at Xerox, UK. They came to the conclusion that the environment may be optimised in relation to other SC KPIs if an environmental performance indicator was made available. A paradigm for evaluating qualitative performance in SCs was created by Van Hoek (1998) (Bechtel and Jayaram 1997). The effects of nonfinancial PMs in compensation contracts on both present and future performance were studied by Said et al. (2003). Different organisations have different strategic intentions, contextual and environmental elements, and as a result, the performance consequences of adopting appropriate nonfinancial indicators vary.

2.4 Previous Studies and Findings

Table 1: Review of Literature on Assessing the Effect of Supply Chain Integration Levels on the Performance of Indian Logistics Companies

Sr. No.	Findings	Author and Reference
1	It has been observed that supply chain operational performances and logistics integration capability are significantly influenced by the logistics process and operations, information and communication integration, value-added services provided by logistics service providers, and logistics practises.	Joppachan Zacharias, and Dr. S Boopathy (2022)
2	An organization's performance can be improved and its competitive advantage can be increased by supply chain cooperation. The performance of an organization is impacted by supply chain integration (SCI). This research investigates the effects of supply chain integration (SCI) on organizational performance at Micro, Small, and Medium Enterprises (MSMEs) in Madurai District, Tamilnadu, India. It also evaluates the impact of SCI on organizational performance.	Subburaj Alagarsamy and Sangeeta Mehrolia (2020)
3	Supply chain orientation (SCO), supply chain integration (SCI), and supply chain performance (SCP) are positively correlated in Indian manufacturing and supply chains.	Dhaigude, A.S., Kapoor, R., Gupta, N. and Padhi, S.S. (2021)

|		
	Furthermore, when SCI is employed as a mediating variable, the direct influence of SCO on SCP decreases. Under the theoretical frameworks of relational view (RV) and knowledge-based view (KBV), this study additionally notes the beneficial effects of: i) SCO on SCP; ii) SCI on SCP; and iii) the finding of SCI's mediating role on SCP.	
4	The goal of this study is to compile and evaluate the body of published research on the subject of supply chain integration levels and how different levels of integration affect chain performance. The study's notable list of dimensions, performance outcomes, contingent variables, theoretical frameworks, and industries that have been given consideration for SCI research within the specified time range is produced by the study's results.	Nadir Munir Hassan and Muhammad Nauman Abbasi (2021)
5	The author of this paper provided an overview of supply chain management (SCM) and logistics practises as they exist now from an Indian perspective. The writers concentrated on the roles of information and communications technologies (ICT), transportation and logistics, facilities network architecture, supply chain structure, and cooperation and partnerships. The writers examined and evaluated current SCM and logistics procedures to identify new trends and areas for concern. The study provided insights on the practises that Indian enterprises and their supply chains need to focus on, as well as how far they have progressed in addressing significant logistics and supply chain issues.	Shilpi Chakravarty (2016)

2.5 Research gap: There is a dearth of empirical data regarding the simultaneous influence of varying SCI levels on various forms of firm performance. Some studies (Das et al., 2006; Koufteros et al., 2007) only discuss the effects of internal integration on performance, while others (Pagell, 2004; Swink and Song, 2007) elaborate on the exclusive roles of supplier integration (SI) or customer integration (CI) in improving performance when SI or CI is considered separately. Only transaction cost theory or no theory at all is used in the majority of earlier research that examine the connection between SCI and performance. There aren't many studies that look at this link from an organisational capability (OC) standpoint. Few studies on SCI have been carried out in India, despite the country emerging as a global hub for manufacturing and its significance in SCs (Jiang, 2002). (Zhao et al., 2007). This study will investigate the impact of SCI levels on firm performance using data gathered from Indian logistic enterprises.

3.   Theoretical Framework

The literature reviews mentioned above served as the foundation for the development of the SCI and company performance framework. Mostly from Subburaj Alagarsamy and Sangeeta Mehrolia

(2020): Effects of supply chain integration on firm's performance: A study on micro, small, and medium companies in India, the current conceptual model was altered and adapted.

3.1 Conceptual Model
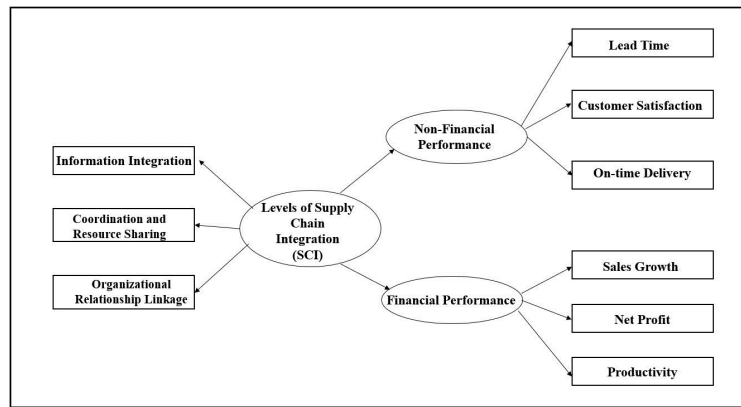
Figure 2: Conceptual Model of the Relationships between Supply Chain Integration Levels and Performance

3.2 Justification of the Framework

According to this study, supply chain collaboration (SCI) is the process by which supply chain companies collaborate within and between different levels of management to achieve an efficient flow of goods, services, and information that offers the highest level of value to the customer at the right place at a reasonable cost (Rosenzweig et al., 2003; Zelbst et al., 2009). Utilising a survey of the literature, Luque, Lopez, and Dey (2012) developed a framework for supply chain integration and determined that the three primary pillars of SCI are organisational relationship linking, coordination and resource sharing, and information integration. It is not only a method or approach; organisational culture must be ingrained with it as well. Therefore, in order to improve organisational performance in terms of operations and business growth, organisations must foster a strong culture of internal and external collaboration with supply chain partners.

According to Leuschner, Rogers, and Charvet (2013), there is a favourable correlation between SCI—which includes relational, operational, and information integration—and company performance. Research has been conducted on supply chain procedures and how they affect consumer satisfaction in the developing world's pharmaceutical sector. According to Haque and Islam (2013), it was found that SC practises are supported by three key pillars: organisational culture (OC), logistical design and IT infrastructure, and cooperation and information exchange. Each of these pillars has a major impact on customer satisfaction.

4.   Research Methodology

The methodologies utilised to measure the research variable, the procedures taken for data collecting and measurement, comprehensive information on data collection and sampling strategies are all included in this section of the study.

4.1 Data Collection

During the study both primary and secondary sources of data were utilised.

Primary Data: These are the data that are collected for the first time by an investigator for a specific purpose. A well-designed and well-structured survey questionnaire was made to collect

the primary data for this quantitative investigation and distributed via email and social media. During the study interview technique was also used to compile the data.

Secondary Data: Secondary are the data that are sourced from someplace that has originally collected it. A variety of books, articles, magazines, journals, websites, industry reports, Government publications, etc. were used to gather secondary data.

4.2 Sampling Techniques and Sample Size

The primary data were collected from 150 respondents via random sampling.

4.3 Variables and Measurements

Variables: D'Amato (1970) stated that any measurable attribute of object, things or beings is called variable. The independent variable is deliberately manipulated to invoke a change in the dependent variable. It is that factor which is measured and manipulated or selected by the experimenter to determine its relationship to an observed event. The dependent variables are those which are observed to change in response to the independent variables. The dependent variables on the other hand usually can be directly controlled. Variables used under study are as follows:

IV (Independent Variables): Supply Chain Integration Levels (Information integration, Coordination and resource sharing and Organizational relationship linkage)

DV (Dependent Variable): Performance of Pune Logistics Companies

Measurement: A nominal scale was employed throughout the study. In nominal, the numbers were employed as labels to classify or identify the items. On a nominal scale, non-numeric variables, or numbers with no value, were dealt with. The questionnaire used a Likert scale. The questionnaire is divided into several components that assess the effect of the supply chain integration and the demographic profile of respondents.

4.4 Data Analysis Techniques

Regression Analysis: Regression analysis is a way of mathematically differentiating variables that have an impact. Multivariate regression is a technique that estimates a single regression model with more than one outcome variable. When there is more than one predictor variable, the model is a multivariate multiple regression. It tries to find out a formula that can explain how factors in variables respond simultaneously to changes in others.

Descriptive Statistics: In general, descriptive statistics are particular methods that are used to efficiently, logically, and meaningfully calculate, characterise, and summarise research data that has been gathered (Vetter TR, 2013). Statistical tools including percentages, tabular and graphical methods were used to analyse the data. The information was gathered, examined, and totalled using Microsoft Excel. Pie charts and bar charts were used to display the data.

Hypothesis Testing: An Analysis of Variance, or ANOVA for short, is a statistical test that's used to compare the means of more than two groups. One independent variable is used in a one-way ANOVA and two independent variables are used in a two-way ANOVA.

5. Data Analysis and Results

Data analysis and results are discussed as under:

5.1 Presentation of Descriptive Statistics

Table 1: Table showing Demographic Variables of the Respondents

Demographic Variables		No. of Respondents	Percentage
Gender	Female	25	17%
	Male	125	83%
Designation	General Manager	3	2%
	Department Head	41	27%
	Manager	36	24%
	Senior Executive	53	35%
	Junior Executive	18	12%
Length of Service	Less than 2 years	56	37%
	2-5 years	57	38%
	6-10 years	27	18%
	More than 10 years	11	7%

Table 1 shows that there were 83% male respondents and 25% female respondents. Majority of 35% of respondents were Senior Executives followed by 27% as Department Head. Only 2% of the respondents were General manager. Highly 38% of the respondents had length of service 2 to 5 years. Just 7% of the respondents had length of service more than 10 years.
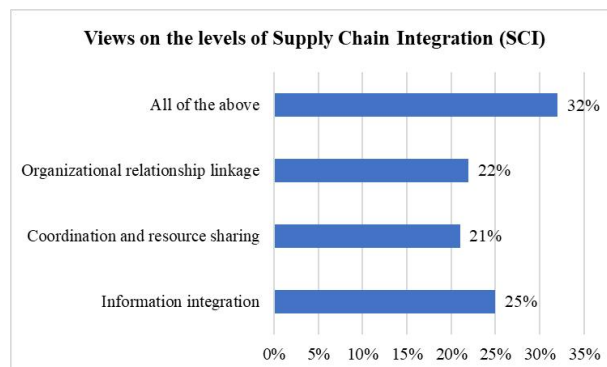
1)   Do you aware about the levels of Supply Chain Integration (SCI) in your company?
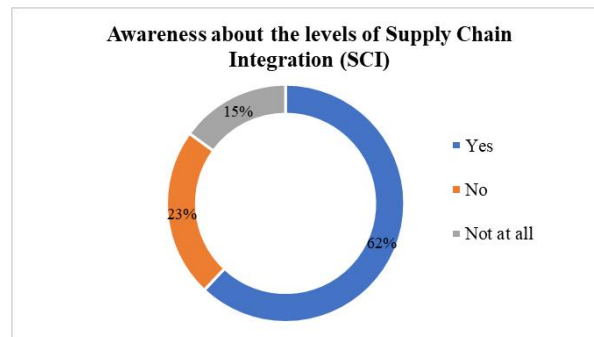
Figure 3: Figure is showing awareness about the levels of Supply Chain Integration (SCI)

As shown in Figure 3, majority of 62% of the respondents were aware about the levels of Supply Chain Integration (SCI). While 15% of them were not at all aware about the levels of Supply Chain Integration (SCI).

2)   What are the levels of Supply Chain Integration in your company?

Figure 4: Figure is showing levels of Supply Chain Integration (SCI)

Figure 4 depicts that the highest 32% of the respondents said that their logistic company had all three levels of SCI namely Information integration, Coordination and resource sharing and Organizational relationship linkage. 25% and 21% of respondents said that their logistic company had only Information integration and Coordination and resource sharing respectively.

3)   What logistics performance metrics are used in your company?
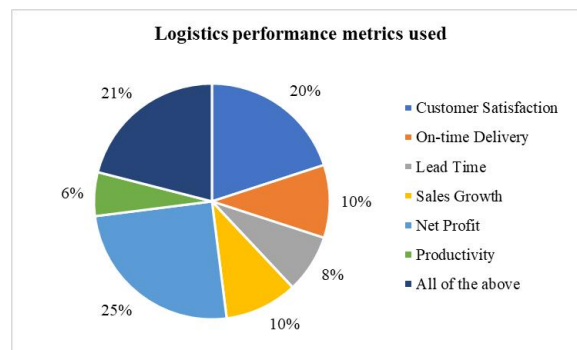
Figure 5: Figure is showing logistics performance metrics used

Figure 5 illustrates that majority of 25% of the respondents considered that net profit is the logistics performance metrics used. 21% of the respondents said that Customer Satisfaction, On-time Delivery, Lead Time, Sales Growth, Net Profit, Productivity were all of the logistics performance metrics used in their company. 21% believed that customer satisfaction was the logistics performance metrics used in their company.

4)   What factors influence supply chain integration in your logistic company?
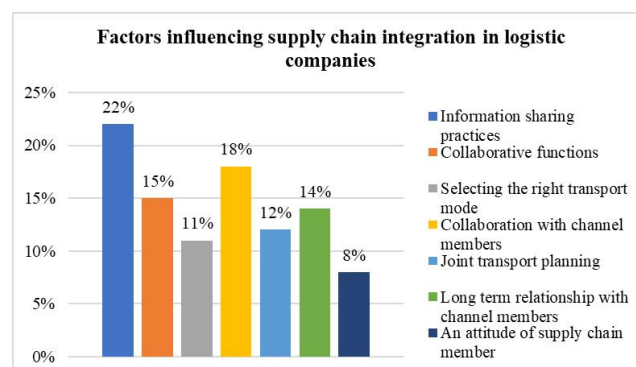
Figure 6: Figure is showing factors influencing supply chain integration in logistic companies

As displayed in Figure 6, factors influencing supply chain integration in logistic companies was Information sharing practices as said by 22% of the respondents. 18% of the respondents believed that collaboration with channel members was that factor. Merely 8% of the respondents

considered that an attitude of supply chain member was the factor influencing supply chain integration in logistic companies.

5.2 Regression Analysis Results

The relationship between the dependent and independent variables was investigated using multivariate regression analysis, which was also utilised to evaluate the study hypothesis. The study's results showed a positive relationship between the dependent variable (Performance of Pune Logistics Companies) and the independent variables (Information integration, Coordination and resource sharing and Organizational relationship linkage). The results of regression model are as follows:

Table 2: Table showing Linear Multivariate Regression Model

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	.050[a]	0.003	-0.004	8.27856

Predictors: (Constant), VAR (Information integration, Coordination and resource sharing and Organizational relationship linkage)
Dependent variable (a): VAR (Performance of Pune Logistics Companies)

Interpretation

In Table 2, it is revealed that multiple correlation coefficient (R) is 0.050 and coefficient of determination (R Square) is 0.003. The model explains 0.3% of the variation in the dependent variable of Performance of Pune Logistics Companies. The standard error of estimate is 8.27856 shows the approximate size of the prediction errors. In our study, Se = 8.28 tells us that actual scores of Performances of Pune Logistics Companies are typically within about 8.28 from the predicted scores, in the sense of a standard deviation. The significant value of SCI levels variables is 0.000, which is less than 0.05 and R has a determined positive value, indicating a strong and distinct correlation between dependent variable and independent variables proving the validity of the hypothesis.

5.3 Testing of Hypotheses

Table 3: ANOVA Table

Model	Sum of Squares	Df	Mean Square	F	Sig
Regression	581.996	2	290.998	0.597	.552[b]
Residual	74112.675	152	487.583		
Total	74694.671	154			

a. Dependent Variable: VAR (Performance of Pune Logistics Companies)
b. Predictors: (Constant), VAR (Information integration, Coordination and resource sharing and Organizational relationship linkage)

Interpretation

In Table 3, it is revealed that the overall model is significantly useful in explanation of Performance of Pune Logistics Companies, $F_{(2, 152)} = 0.597$, Where $p < .05$. Therefore, based upon the values taken out it is inferred that SCI level variables have significant impact on the Performance of Pune Logistics Companies. The multivariate regression model's level of variation is examined using an ANOVA table which confirms the importance of SCI levels in building a positive Performance of Pune Logistics Companies.

6.   Discussion

In order to meet customer demand, logistics companies play a critical role in the movement of goods and services from a point of origin to a destination. The supply chain distribution cycle's competitiveness and operational efficiency both benefit from higher SCI levels.   According to our research, SCI levels are essential for businesses to maintain SC operational performances.

6.1 Interpretation of Results

In the study there were 83% male respondents and 25% female respondents. Majority of 35% of respondents were Senior Executives followed by 27% as Department Head. Only 2% of the respondents were General manager. Highly 38% of the respondents had length of service 2 to 5 years. Just 7% of the respondents had length of service more than 10 years. Majority of 62% of the respondents were aware about the levels of Supply Chain Integration (SCI). While 15% of them were not at all aware about the levels of Supply Chain Integration (SCI). The highest 32% of the respondents said that their logistic company had all three levels of SCI namely Information integration, Coordination and resource sharing and Organizational relationship linkage. 25% and 21% of respondents said that their logistic company had only Information integration and Coordination and resource sharing respectively. Majority of 25% of the respondents considered that net profit is the logistics performance metrics used. 21% of the respondents said that Customer Satisfaction, On-time Delivery, Lead Time, Sales Growth, Net Profit, Productivity were all of the logistics performance metrics used in their company. 21% believed that customer satisfaction was the logistics performance metrics used in their company. Factors influencing supply chain integration in logistic companies was Information sharing practices as said by 22% of the respondents. 18% of the respondents believed that collaboration with channel members was that factor. Merely 8% of the respondents considered that an attitude of supply chain member was the factor influencing supply chain integration in logistic companies.

It is revealed in the study that multiple correlation coefficient (R) is 0.050 and coefficient of determination (R Square) is 0.003. The model explains 0.3% of the variation in the dependent variable of Performance of Pune Logistics Companies. The standard error of estimate is 8.27856 shows the approximate size of the prediction errors. In our study, Se = 8.28 tells us that actual scores of Performances of Pune Logistics Companies are typically within about 8.28 from the predicted scores, in the sense of a standard deviation. The significant value of SCI levels variables is 0.000, which is less than 0.05 and R has a determined positive value, indicating a strong and distinct correlation between dependent variable and independent variables proving the validity of the hypothesis. It is discovered that the overall model is significantly useful in explanation of Performance of Pune Logistics Companies, $F_{(2, 152)} = 0.597$, Where $p < .05$. Therefore, based upon the values taken out it is inferred that SCI level variables have significant impact on the Performance of Pune Logistics Companies. The multivariate regression model's level of variation is examined using an ANOVA table which confirms the importance of SCI levels in building a positive Performance of Pune Logistics Companies.

6.2 Comparison with Previous Studies

The result is consistent with research by Stank et al. (2001), Zhao et al. (2008), Kim (2009), Yu et al. (2013), and others, indicating that supply chain methods influence competitive advantage in a favourable way. Supplier participation significantly and favourably impacts product innovation and significantly boosts a company's return on investment. The great majority of earlier research, such as Wong et al. (2011), Prajogo, and Olhager (2012), which showed a positive correlation between SCI assessments and financial and non-financial performance measurements, is consistent with our results. Additionally, it was demonstrated by Huo (2012), Mellat-Parast, and Spillan (2014), and others that integration could be closely linked to an organization's total success, mainly through its effects on profitability, productivity, and customer satisfaction. According to Zhang and Huo (2012), supply chain integration is significantly impacted by trust between customers and suppliers.

Cadden, Marshall, and Cao (2012) expounded on how supply chain partners collaborate towards long-term goals and pool resources, including assets, knowledge, and capabilities, to provide superior performance and a competitive edge. According to Kaynak and Hartley's (2008) research, supplier quality and customer focus are the two main focuses of quality management practises in the supply chain management (SCM) domain. The firm's quality, financial, market, and inventory management performance all improve as a result of improved quality management practises, both internally and externally within the supply chain. In order to improve the operational performance of the organisation, Kannana and Tan (2005) focused on three areas: supply chain management, quality control, and just-in-time. Mei and Zhang (2011) created a theoretical framework to look into how supply chain agility affects the performance of manufacturers. The antecedents of SC agility are technical elements (IT capabilities) and coordinated resource sharing (information sharing, work collaboration, trust, etc.), which result in cost efficiency that acts as a mediator between higher performance and cost savings.

6.3 Implications for the Industry

To achieve good company performance, businesses must build strong relationships, exchange information, and coordinate activities with external supply chain partners as well as within internal functions. Corporations should carefully create internal and external integrative SC levels to meet environment criteria, as competition has shifted from corporations to supply chains (SCs). An industry's logistics and supply chain's primary metrics should be chosen with the organization's goals and objectives, business model, market dynamics, and technology capabilities in mind. For instance, the performance of auto companies depends on forecasting accuracy (as a make-to-stock system), which necessitates monitoring forecasting accuracy. The inventory turnover may be used as a gauge for predicting accuracy.

6.4 Limitations of the Study

Following is a few of the limitations of the study that were highlighted and noted:

1.   If it had been possible, the study might have been conducted in a different state and city with a different culture. But the chosen market orientation made it possible to speak with the informants in person.
2.   Because of the time constraints, the study can only use a small sample size, which could slightly distort the results. Additionally, the research results may have been constrained by the selection of solely Logistics Companies.
3.   Due to a fixed budget, limited time, and other resources, the research had to be limited to Logistics Companies in Pune.
4.   The researcher's lack of experience in this area of interviewing may have an impact on the data collection and, in turn, the conclusions because semi-structured interviewing strongly relies on the interviewer to obtain the important information.
5.   Only one researcher had access to the tools for both data collection and analysis. The study process most likely reflected the researcher's personal beliefs and attitudes.

6.5 Suggestions for Future Research

Since there aren't many studies on actor (partner) integration in terms of SC, this one will serve as a foundation for future research in this area. According to the study, in order to finish doing comparative research on various logistic firms in India, one should first consider the findings and, if feasible, focus on the differences while providing the relevant interpretations. Even though all SCI aspects and levels have been accurately included, it may still be possible to add more elements, such as the ability to change a variable to an intermediate value, such as the impact of the surrounding environment. It is also possible to incorporate other logistic performance measures, such as the percentage of transaction processing failures, the percentage of loss or damage during storage, and so on. To evaluate the progress made possible by the application of supply chain integration, a comparable issue on a related industry has to be restudied over a certain period of time. Directing concurrent investigations from vendors and consumers is advised.

7. Conclusion

This study looked at how SCI levels affected the operational results of a logistics company. Our research indicates that a firm's financial and non-financial performance is significantly impacted by SCI levels.   Through efficient integration of logistics into interorganizational processes spanning supply chain and logistical activities, businesses could improve their performance. SCI is the engine that propels a company's supply chain practises competitiveness. For this reason, in order to sustain their operational excellence, businesses should match their supply chain and logistics practises with improved logistics integration protocols.

7.1 Summary of Findings

In the study majority of male respondents were Senior Executives had length of service 2 to 5 years. Majority were aware about the levels of Supply Chain Integration (SCI). The logistic companies had all three levels of SCI namely Information integration, Coordination and resource sharing and Organizational relationship linkage. Customer Satisfaction, On-time Delivery, Lead Time, Sales Growth, Net Profit, Productivity were all of the logistics performance metrics used in their companies. Most factors influencing supply chain integration in logistic companies were Information sharing practices and collaboration with channel members was that factor.

It is revealed in the study that there is strong and distinct correlation between dependent variable and independent variables proving the validity of the hypothesis. It is discovered that the overall model is significantly useful in explanation of Performance of Pune Logistics Companies. Therefore, it is inferred that SCI level variables have significant impact on the Performance of Pune Logistics Companies. The multivariate regression model's level of variation is examined using an ANOVA table which confirms the importance of SCI levels in building a positive Performance of Pune Logistics Companies.

7.2 Practical Implications

This supply chain integration research offers a method that works in every sector of the economy. It stands for a methodical, systematic approach to business that involves lead times, quality improvements, and cost reductions. There was no research done on supply chain integration project expenses. The advantages must to be weighed against the price of determining if such advancements are economically feasible. The idea of SCI levels with an emphasis on enhancing customer value can improve strategic alliances between the SCI and overall performance of the company. For supply chain architectures to effectively accomplish end goals, businesses should endeavour to incorporate SCI levels.

7.3 Contributions to the Field

The study's findings will help managers and practitioners make better supply chain and logistics decisions by making more effective use of their resources. This study expanded on our understanding of the individual effects of SCI levels on financial and non-financial performance by adopting a SCI level perspective to examine the direct relationship between SCI levels (Information integration, Coordination and resource sharing, and Organisational relationship linkage) and performance. These discoveries broaden and enhance the body of knowledge that is currently available in the fields of operations management and organisational theory. The discipline of operations management and organisational theory both benefit theoretically from this research. An effort is made to close the knowledge gap between the literature on organisational theory and operations management by doing this. Through an analysis of the mediating function of SCI, this study discovered that more organic structures demonstrated higher levels of SCI and, as a result, higher levels of operational performance in the volatile and uncertain logistic business. This work advances the field of operations management by offering a more thorough taxonomy of SCI through the conceptualization of SCI components. It was stated that growing explanations and dimensions were used to categorise most of the research that was already done on SCI. Several authors, including He et al. (2014), Devaraj et al. (2007), and Danese and Romano (2011), have defined supply chain integration (SCI) as the integration of suppliers and customers, excluding internal integration.

8.   Recommendations

The following subheadings are included in this section:

8.1 Recommendations for Logistics Companies in India

Businesses should be aware that strategies like cooperative decision-making, planned coordination, and teamwork with logistical suppliers and other supply chain participants in the

distribution network will result in the acquisition of additional capabilities. Given that logistics service providers provide the foundation of leading companies in the operations sector, it is imperative that they acknowledge the factors and aspects that enhance logistical integration capacity inside the supply chain. The study emphasised the significance of integrating logistics at every stage of the supply chain. In the logistics sector, SCI has the most power to provide a broad range of tools and services, including inbound and outbound logistics, to its clients. Managing interdependencies and integrating SC activities are aided by logistics integration. By offering logistics services, integration between focal organisations and logistics service providers helps to solve dependence issues. According to the survey, enterprises should focus on collaborating with SC partners as a crucial approach to improve the calibre of their decision-making abilities and service delivery. To stay true to their business plan, supply chain and logistics managers should focus on logistical integration.

8.2 Policy Implications
Sustainable supply chain management is made possible through customer-driven operations, which are enhanced by logistic services. The integration of online and physical processes and transactions will persist in international trade. SCI must now focus on intellectual inputs like knowledge and personal interaction in order to be improved. Process integration is more apparent to customers than it is to suppliers. Adopting sustainable supply chain management will assist a company because SCI promotes firm performance. Stated differently, SCI makes businesses more competitive. Improving communication and collaboration with suppliers and customers is essential for increasing operational effectiveness and financial success. When it comes to the actual content of integration, the direct effects of customer and supplier system/process integration on operational performance warrant greater attention. When it comes to the actual content of integration, this is vital. The financial success of a company is indirectly impacted by the integration of supplier systems and procedures. Consequently, logistics companies should integrate the systems and processes of their clients if they wish to improve their financial performance. While customer procedures have both direct and indirect consequences, customer system integration has instant effects. Through the use of SCI, increasing investments in logistic services will help to increase business efficiency. Encourage staff involvement and the generation of creative ideas in order to attain SCI and enhance business performance.

8.3 Managerial Implications
The study's main managerial implication is that businesses should purposefully create several SCI levels in order to attain various business performance goals. It will be challenging for businesses to share or exchange information and collaborate with their clients or suppliers if they have low SCI levels, which can be caused by issues with internal data integration, a lack of communication between departments, infighting within the organisation, or other issues. Businesses won't have many opportunities to communicate their production plans to suppliers or customers without the use of integrative data management. Because they have a direct impact on business performance, companies need to pay attention to customer relationship management, strategic alliances with customers, information sharing and communication with customers, and process coordination with customers. Establishing supplier relationship management, strategic alliances, information exchange, collaboration, and joint design with suppliers are all important for businesses. Businesses should create all three types of levels if there are no resource

constraints because they will only perform at their best when all three are adequately established. Managers are facing increasing complexity and difficulty in managing supply networks. To improve business performance, managers should manage their SCs using a comprehensive SCI perspective.

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