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Plan of action required for the automobile sectors to deal with disruptions: A resources based and resource dependence view

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Abstract

Many industries were seriously impacted by the COVID-19 pandemic, and they're now attempting to restore. The automotive sector also has been adversely affected. There has been a drop in sales, a drop in manufacturing, a workforce shortage, a decrease in export markets, and a component scarcity. This study explores strategies for revitalizing the automotive supply chain (SC). A literature review was performed for this, and five strategies to help the automotive industries were outlined. This study uses the resource-based view (RBV) and resources dependence theory (RDT) to identify the strategy. In the automotive industry, a questionnaire is being formed for survey-based studies. Exploratory factor analysis and structural equation modelling are used to examine the data. The developed model fit the data well, and the hypothesis is accepted.

Subject Classification: *90B06, 90B50.*

Keywords: *COVID-19, Automobile sectors, Supply chain, Resource-based view (RBV) and resource dependence theory (RDT).*

1. Introduction

The COVID-19 (COV-19) was first distinguished in December 2019 in Wuhan and proclaimed a worldwide pandemic by the World Health Organization (WHO) on March 11, 2020 [1]. From that point, this pandemic has quickly spread from China to many nations on the globe. COV-19 has influenced many individuals, with many deaths worldwide [2]. Governments have progressively embraced some methodology to fight

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the pandemic, like asking people for social distancing from each other, wearing a mask while going out, imposing lockdown, and restricting interstate movements. But these restrictions had brought many negative impacts like less consumer spending, which impacted all the industries, disruptions in the global supply chain (SC), and international trade [3].

Technologies, especially information technologies with the digital revolution, can help SC resilience by responding promptly, accountability, and accessibility [4]. During the COVID-19 crisis, SC brittleness is more apparent due to the greater focus on expense assessments, with interruptions from substantial dispersed or volatility in supply [5]. Border restrictions, closures, and a lack of control exposed global SC vulnerabilities during the COVID-19 crisis. The resource-based view (RBV) is a management approach for establishing which strategic assets a business can use to obtain a long-term competitive edge. It claims that strategic and long competitive advantage is built on valuable, unique, and non-replaceable resources [6]. The capacity of companies to generate or obtain these assets influences performance and competitive nature. Resource dependency theory (RBT) is based on the notion that an association, such as a company, must interact in exchanges with other actors and institutions to acquire assets. Although such deals may be advantageous, they may also create undesirable interconnections [7].

Building a suitable SC network for COV-19 has received many researchers' attention [8]. A few experts have required an upgraded SC to manage the pandemic's unnecessary interruptions [9]. SC, including the ones from the industrial areas (for example: vehicle, hardware, drug and so on) and service areas (for example: aircraft, retail providers, transportations and so forth), have been considerably affected on account of their high reliance on China as most of the materials are being procured from China [10], [11], as the sea borders were closed, the movement of the materials for other countries was impossible. Due to low cost, many automobile companies procure materials and parts from China in India.

Many automobile companies in India practice just-in-time techniques in their plant, which means they had fewer inventories of raw materials. So, when the pandemic started, they were left with fewer stocks of raw materials for production in their units as the ports were shut down, and interstate movement was also restricted in some places [12]. This pandemic showed that the companies did not have flexible SC networks that could sustain any disruptions. This pandemic affected the automobile industry as people buy cars for many reasons. The reasons may be that the

individuals' income has dropped a lot and many people have lost their jobs [13]. The research questions that are being formulated are:

RQ1: How can the automotive industry revive the current situations they face?

RQ2: What strategies need to be implemented to handle future disruptions?

This study uses RBV and RDT to formulate a plan of action to help the automotive industry handle future disruptions. This research is conducted to study strategies to make the SC network flexible, sustaining disorders. Five strategies have been identified DC: Digital Connectivity; SCA: Supply Chain Automation; LS: Localization of Sourcing; ISCRM: Integrated Supply Chain Risk Management; SCC: Supply Chain Collaboration. The dependent variable is SASC: Strategies for the automotive supply chain.

The other research paper is divided into many sections as Section two contains a literature review, Section three of research methodology, Section four of data analysis, Section five of discussion, and Section six of conclusion.

2. Literature review

2.1 *Theoretical Underpinning*

RBV examines a firm's strategic resource's intra-organizational partnerships to clarify why and how some companies outperform one's opponents and gain a competitive edge. According to RBV, the more customer value-added an organisation offers over competitor companies, the greater its competitive advantage. RDT presumes that a firm's performance is affected by its environment and reinforces cross-organizational efforts to secure resources and reduce environmental risk. RDT identifies two primary organisation objectives: reducing their reliance on other institutions and raising the dependence of different groups on themselves. Theoretical lenses based on organizational capabilities have emerged as an essential business strategy.

In organisations for the natural surroundings, understanding capacity can assist in developing unmeasurable resources and increase dynamic organizational lessons. Relational power is designed to complement alliance associates' help in the plan to enlarge, modify, or create newly available resources. The tangible and intangible assets that enable

the manufacturing and delivery of products and services are a firm's resources. On the other hand, abilities refer to a company's approach to resource usage or how resources are combined with the business structure to achieve the desired effect. RBV is a theoretically - based way to explain how a company can gain a competitive advantage by systematically building, incorporating, and reconfiguring its unique resources into functionality.

2.2 *COVID-19 impact on the Automobile Sectors*

The effect of COV-19 on various business areas would vary because of the distinctions in demand and supply [14]. For example in service sectors, travel, would be the first to be influenced. But there was an increase in the demand for FMCG products, and the retail industry also showed profitable growth. We consequently expect the reaction methodologies to relieve SC changes brought about by the continuous pandemic would likewise be extraordinary [15]. The ramifications of the COV19 pandemic on manageable creation and utilization patterns would be qualified to note, and consequently, an impressive change is probably going to be found in the coming months and years. But the SC network showed low resilience during this pandemic and approx. 35% of the manufacturing industries reported a failure in SC networks [16]. The COV-19 pandemic has been perhaps the most extreme SC disruptor in history and will probably debilitate numerous organizations' SCs [17]. It had been anticipated that the economic impact brought about by COV-19 on the manufacturing area alone would nearly be triple [18].

The automobile business makes up the more significant part of the manufacturing area in a nation's economy. It contributes decidedly to the industry and is considered a leader conveyor and a helpful gauge quantifying the global economy's current abundance [19], [20]. For instance, the UK's yearly turnover of the automobile business is over £82bn, adding a vast £18.6bn to the economy while utilizing more than 823,000 workforces across the more extensive automobile sector. Significant automobile organizations have eliminated positions with diminishing deals, inferable from the continuous pandemic. The pandemic has brought influential automobile organizations' goals to a granulating stop [21]. The vehicle business has customarily assumed a persuasive job and gave exercises to a portion of different areas given their aggregated involvement with overseeing SC disturbances [22].

2.3 *Strategies for dealing with the COVID-19 pandemic in the supply chain of the automobile sectors*

The strategies to handle the SC risk for the automobile sectors and the development of hypothesis:

2.3.1. Digital Connectivity (DC)

The latest innovative technologies have brought many changes and revolutions in the digital field. These technologies can benefit SC with higher connectivity and accuracy [23], [24].

H1: DC will positively impact SASC.

2.3.2. Supply Chain Automation (SCA)

Refers to arranging physical and data work processes across SC to improve measures [25]. This suggests using advancements to limit reliance on people between firms [26].

H2: SCA will positively impact SASC.

2.3.3. Localization of Sourcing (LS)

Sourcing is confined inside a similar area to satisfy the nearby need and lessen SC mixes. Consequently, the disturbance danger could be contained inside the region, as there is no overflow of a danger occurrence starting with one district then onto the following [27].

H3: LS will positively impact SASC.

2.3.4. Integrated Supply Chain Risk Management (ISCRM)

The firm should work with all its SC accomplices (i.e., broadened coordination). Along these lines, the danger of the executive's endeavors could be rest on the firm, yet more towards the entire SC point of view [28].

H4: ISCRM will positively impact SASC.

2.3.5. Supply Chain Collaboration (SCC)

Firms at each level of SC should work intently together to meet shared destinations of anticipating, foreseeing, and forestalling likely dangers in SC [29].

H5: SCC will positively impact SASC.

3. Research Methodology

3.1 *Sampling*

This study was conducted in the Indian automobile sector. The respondents were working in various automobile companies. The automobile companies were searched online, and the HR managers were taught for the survey. The HR managers were asked to give a probable list of the eager respondents to participate in this study. The criteria set for the respondents were that the respondents need to work in the area of SC. The respondents were working in the position of SC managers, operation managers, purchase managers, plant managers, and store managers. A stratified random sampling method was used to decide the sample size [30]. The questionnaires were sent to 596 respondents, but only 354 respondents returned usable questionnaires, valid for analysis.

4. Data Analysis

4.1 *Reliability and Validity*

4.1.1 Cronbach's Alpha

To calculate the reliability test, Cronbach's alpha (α) value was used using the software of SPSS. The values are shown in Table I. The values are more significant than 0.70 introduces [31].

4.2 *Exploratory Factor Analysis*

After calculating the reliability test in the SPSS, we calculated the factor analysis, which helped group the items into meaningful factors [32]. We got 0.852 as the value of the KMO, which is higher than 0.60 [33]. Table I shows the importance of factor analysis performed. Eighteen total variables were grouped under five different components. Figure I shows the final model.

Table I

Cronbach's alpha, Composite reliability, Rotated Component Matrix

Latent Variable	Indicators	Cronbach's alpha (α)	Composite reliability (CR)	Rotated Component Matrix
DC	DC1	0.855	0.903	.845
	DC2			.759
	DC3			.841
	DC4			.893
SCA	SCA1	0.859	0.894	.792
	SCA2			.836
	SCA3			.840
	SCA4			.826
SCC	SCC1	0.858	0.895	.846
	SCC2			.842
	SCC3			.840
	SCC4			.768
ISCRM	ISCRM1	0.845	0.908	.854
	ISCRM2			.946
	ISCRM3			.822
LS	LS1	0.734	0.850	.862
	LS2			.868
	LS3			.688

4.3 *Construct Validity (CV)*

CV is how a test quantifies the conception or development expected to quantify. CV is generally tried by estimating the relationship in appraisals from a few scales. No cut-off characterizes CV [34].

4.3.1. Convergent validity

As per [35], AVE > 0.5 for the convergent validity. Table II represents AVE values for the constructs.

4.3.2 Divergent or Discriminant validity

[34] suggested that the construct's AVE should be more than the square of the correlation between that construct and the other constructs to evaluate this validity. Table II represents the values for construct correlation and AVE. As a result, divergent or discriminant validity is satisfied.

Table II

Construct correlation and AVE

	AVE	Variance Extracted Between Factors				
		DC	SCA	SCC	ISCRM	LS
DC	0.835	1				
SCA	0.824	0.687	1			
SCC	0.824	0.688	0.679	1		
ISCRM	0.874	0.730	0.721	0.721	1	
LS	0.806	0.673	0.664	0.664	0.707	1

4.4 *Structural Equation Modeling*

To test the hypothesis, SEM was used [36]. The goodness of fit indices was $\chi 2/df$ (CMIN/DF) = 2.704, RMSEA = 0.069, IFI = 0.921, CFI = 0.921, TLI = 0.906, PCFI = 0.733, PNFI = 0.740 and GFI = 0.883, which were within the threshold values. Table III shows the result of path analysis.

Table III

Path analysis result for the hypothesis

Parameters	Estimate	SE	CR	P	Hypotheses
SASC <--- SCC	0.459	0.066	6.947	0.00	Supported
SASC <--- SCA	0.451	0.061	7.434	0.00	Supported
SASC <--- DC	0.14	0.039	3.589	0.00	Supported
SASC <--- ISCRM	0.082	0.036	2.245	0.00	Supported
SASC <--- LS	0.258	0.060	4.306	0.00	Supported

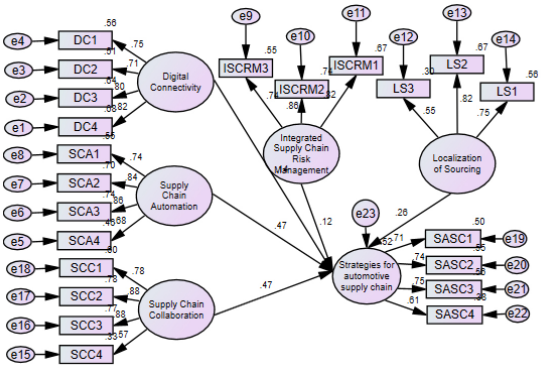

Figure I

Final measurement model

5. Discussion

Automobile sectors have been impacted very severely due to this pandemic [37]. It had impacted all stakeholders in the entire value chain in India. Supplier's side had a shortage of the component's parts and decreased exports. All the companies faced a labour shortage. There was a decrease in the sale of automobiles [38]. Dealers had a fewer footfall in the showroom due to pandemic and various restrictions. SC was worst affected even as China recovers; SC disruptions are likely to remain [39], [40]. So, it had become essential to implement a specific strategy in the SC area of automobile sectors. This research aims to identify the strategy that can be implemented in the SC of the automobile sector to come out from the situation of the COV-19 pandemic [41]. These strategies need to be implemented to revive SC in the automobile area. Digital channels need to be managed to sell [42]. SC networks need to be restored and automatic for better efficiency. Automotive sectors need to localize their products for faster delivery [43]. These will improve the SC networks to a great extent that got affected due to the pandemic. SCA stands for Supply Chain Automation. Building a strong relationship with the critical suppliers is necessary at every supply chain tier.

6. Conclusion

This research aims to determine the strategies to help the automotive sector revive itself from the pandemic. This strategy will help the SC network a lot in handling the disruptions. A literature review was performed to identify the strategy to revive SC in the automotive sectors for this research. Five independent variables and one dependent variable, were taken. A questionnaire was developed for a survey-based study in the automotive industry. This strategy can be implemented in the automotive sector to increase efficiency and operational excellence after the pandemic.

This research strategy can be further implemented in other sectors like the construction industry, hotel industry, and tourism. This research can also do in some other developing countries, which had been hit very severely due to the pandemic.

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