

Fostering Companies Planes to Avoid Disruption to their Supply Chain for Next Year

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Abstract-The purpose of this study is to determine the role of leveraging multiple transportation modes to improve the avoidance of disruption in supply chain, to regulate the role of using back-up carriers to improve the avoidance of disruption in supply chain, to regulate the role of utilizing Utilize Strategic Partner Carriers to improve the avoidance of disruption in supply chain and to regulate the role of shift freight to alternate ports to improve the avoidance of disruption in supply chain. Sample size was of 40. Population has been taken from the management dealing supply chain sector. In cross sectional study, 5-point Likert scale questionnaire has been used to obtain the response. Four factors have been played the role to improve the avoidance of disruption in supply chain sector. The leveraging of multiple transportation modes, use back-up carriers, utilize strategic partner carriers and shift freight to alternate ports. All these elements low the risk of disruption in supply chain management.

Keywords... *supply chain management, disruption, transportation, avoidance*

1. Introduction

Supply chains are getting to be bigger and more intricate with all-inclusive scattered parts. Viable chain of supply management in this condition has been a testing assignment making more troublesome as soon as chain of supply confront surprising disruptions. So, these supply-chain disruptions show in an assortment of structures including such precedents as transportation delays, port stoppages, mishaps and cataclysmic events, poor correspondence, part deficiencies, issues in quality, issues in operational and psychological warfare just to give some examples [1]. Supply-chain disruptions can be expensive [2] and if taken care of ineffectively may consequence in noteworthy delays in supply chain activating stock-outs, failure to take care of

client demand and increments in costs. Ref. [3] express that 'the supply arrange is inalienably defenseless against disruptions, and the disappointment of any one component in it could make the entire system come up short'. While numerous organizations did not have the size to amount the expense of supply-chain disruptions or crises, some work has been done here.

Ref. [3] present the outcomes from an organization study in the examination that gauges a \$50– 100 million cost affects for daily its source arrange had been disturbed. Ref. [4] records various precedents of calculable chain of supply disruptions counting the accompanying. General Motors, in 1996, encountered a eighteen days' work raid at a brake provider processing plant that lingered laborers at twenty six gathering plants along with an expected decrease in three-monthly gaining of \$900 million. Boeing experienced, in 1997, provider conveyance disappointment of near about two basic parts with an expected misfortune to the organization of \$2.6 billion. Ref. [5] examined the stock exchange response when firms openly declare they have been encountering supply chain disruptions that reason production or transportation delays. Aftereffects of the investigation of five hundred and nine supply chain issue declarations show that such declarations diminish investor esteem by 10.28%. Correspondingly, ref. [6] originate that the disruption effect on investor riches had been a shrill reduction of very nearly 8% and a recuperation time (if recuperation is conceivable) of fifty days in exchanging. Most importantly disruptions will probably contrarily influence performance may be wrecking to an organization that encounters an extreme disruption. So, this reality, in itself, outlines the significance of this zone and hence unquestionably merits critical consideration from supply-chain scientists.

There is convincing examination delineating the significance of adequately overseeing supply chain disruptions and also the absence of readiness of generally organizations. Ref. [7] express that just specifies a few basic issues with respect to the examination and relief of the hindering effect of chain of supply disruptions in a worldwide situation in view of an experimental investigation. What's more, in every zone, we present ebb and flow inquire about that may fill in as a beginning stage in additionally creating hypothesis and apparatuses in the region of management chain of supply disruption.

1.1 Objectives of the Study

1. To determine the role of leveraging multiple transportation modes to improve the avoidance of disruption in supply chain
2. To regulate the role of using back-up carriers to improve the avoidance of disruption in supply chain
3. To regulate the role of utilizing Utilize Strategic Partner Carriers to improve the avoidance of disruption in supply chain

To regulate the role of shift freight to alternate ports to improve the avoidance of disruption in supply chain.

2 Literature Review

2.1 Supply Chain disruption

Supply chain disruptions have been impromptu with unexpected occasions by upsetting the typical stream of products and resources inside a chain of supply [8],[5],[9] and, as a result, uncover firms inside supply chain to working and budgetary dangers [9]. The 2002 longshoreman association strike at a U.S. West Coast port, for instance, intruded on transshipments and conveyances to numerous U.S.-based firms, with port operations and calendars not coming back to ordinary until a half year after the strike had finished [10]. In like manner, in March, the lightning fastener that, collide with a Philips semiconductor plant in New Mexico, made a ten-minute blast that defiled a great many chips and, in this way, deferred conveyances to its two biggest clients— [11].

The organization should be take care hoping to deliver or to get products and resources is, in any case, never the whole story; troublesome occasions inside a chain of supply may similarly altogether with adversely move the cash related main concern for making influenced elements in the supply chain. Business on an open marketplace organization

somewhere in the range of five % and twenty-five % of Fortune five hundred organizations are set up to deal with disruptions or emergencies. So, this paper

encountering supply chain disruptions, for example, have detailed bad safeties conversation responses to statements of such troublesome times, with the greatness of the reduction in showcase capitalization being as huge as 10% [5]. Indeed, Ericsson detailed a \$400 million misfortune since it didn't get chip conveyances from the Philips plant in an auspicious way [11]. In spite of the fact that the genuine expenses of any chain of supply disruption can be hard to measure definitely, no less than one firm studied by [3] evaluated that the day by day cost effect of a disruption in its supply system to be in the area of \$50-\$100 million.

Since a chain of supply disruption may possibly become so hurtful with luxurious, there is as anyone could expect, an ongoing flood in plotting and productions—from specialists and scholastics and alike—about to supply chain disruptions and connected issues. For example, other than making order supply chain risks in numerous classes (in particular, two of which disruptions and delays, have been dependable with what one has branded as supply chain disruptions), [12] likewise distinguished drivers of the characteristic risk organizations and examined how risk restraint systems can diminish one sort of risk and yet increment another kind of risk. Ref. [9] another model, created theoretical structure including ten standards for overseeing dangers of supply chain disruptions.

Surviving examination, in this way, has not just affirmed the expensive idea of supply chain disruptions yet has likewise contributed applicable bits of knowledge relating to such related issues as supply chain risks [12], defenselessness [8], versatility [13], and business congruity arranging [14]. However, one issue remains moderately unexplored—to be specific, how and for what reason would one supply chain disruption be more serious than another? Formally, the seriousness of a supply chain disruption can be characterized as the quantity of substances (or hubs) inside a supply arrange whose capacity to dispatch or potentially get products and materials (i.e., outbound and inbound stream) has been hampered by an impromptu, unforeseen occasion. A more serious supply chain disruption would, in this way, have more extensive and monetarily wrecking sway inside a supply organize than one that is generally less extreme.

By presenting and looking for answers to this two-section inquire about inquiry, we contend, that supply

chain disruptions are unavoidable and, as an In this applied note, in this manner, to determine instructive bits of knowledge that would sharpen firms to particular factors that either add to or on the other hand hose the seriousness of a supply chain disruption. These elements could, thusly, be thought about when firms settle on choices with respect to regardless of whether to order or actualize particular operational and supply chain strategies, practices, and activities. Arrangements, practices, and activities that would naturally support the nearness of elements adding to the seriousness of a supply chain disruption can be maintained a strategic distance from, though those that would reduce supply chain disruption seriousness can be sought after.

2.2 Transportation Modes

Consistent examination of modular blend is basic to running a proficient and flexible transportation organize. Supply chain supervisors ought to examine their cargo organizes something like two times per year for improvement chances to guarantee all cargo is proceeding onward the most ideal mode conceivable [15]. Distinguishing and changing over sub-streamlined cargo to its most appropriate mode prompts cost funds, productivity gains and ensures against disruption [16]. On the off chance that you look to limit supply chain disruption, moving qualified cargo from the expressway to multi-purpose rail can be a ground-breaking answer for moderate risk and lower generally speaking transportation costs [17].

H1: there is a noteworthy connection between different transportation modes and avoidance supply chain disruption

2.3 Back-Up Carriers

The trucking industry will confront expanding headwinds in the coming months and years that could essentially affect the industry and influence over-the-street limit [18]. The driver lack is just deteriorating and pending directions could stimulate and compound the deficiency. Having an expansiveness of bearers to depend on can moderate the risks related with a solitary purpose of disappointment when the market shifts [19].

H2: there is a critical connection between utilizing back-up transporters and avoidance supply chain disruption

2.4 Strategic Partner Carriers

Coordination's is tied in with getting ready for the unforeseen. Any number of inward or outer elements

outcome, that all supply chains are naturally risky.

can upset a supply chain's productivity [20]. Having an emergency course of action set up before the pendulum swings protects systems from disruption. Using the key transportation associations of Intermodal Marketing Companies (IMCs), outsider coordination suppliers (3PLs) and multinational trucking suppliers and also creating solid associations with the railways, can enable shippers to remain on the ball and exploit the most proficient modes of transportation accessible [21].

H3: there is a noteworthy connection between using key accomplice transporters and avoidance supply chain disruption

2.5 Alternate Ports

After the port strikes of 2014, a few organizations moved cargo streams to different, alternate ports [19]. While the development of the Panama Canal isn't set to majorly affect high-esteem, time-delicate cargo, it could demonstrate useful for bring down esteem cargo with longer lead time. Investigating new channels and innovative appropriation strategies can be fiscally gainful [22]. The significance of joining flexibility in supply chain substances has been underlined in numerous examinations and the way an association handles disruption can significantly influence its picture and piece of the overall industry [23]. One exemplary model is the disruption looked by Ericsson when lightning struck Philip's semiconductor plant in New Mexico. Ericsson had utilized a solitary source provider procedure and was not able react adaptably to the stop in production of cell phone chips. Its piece of the overall industry endured subsequently [23]. Key instruments connected in supply chain disruptions are valuable for port management for a similar reason. As ports are progressively observed as basic hubs of worldwide supply chains, the profile of potential port-related risks which can prompt disruptions in the entire supply chain will turn out to be more complete because of the many-sided quality of port operations and management and in addition its cooperation with other supply chain players [24].

Striking instances of all around oversaw supply chain disruptions by associations suggest a few fundamental characteristics in powerful management of supply chain disruptions and the qualities incorporate responsiveness, adaptability, solid provider connections, association's capacity to impact request, promise to association and consistency in procedures and techniques [23]. The capacity to

recognize a disruption and set up coherence designs has likewise been underlined in examines. Scientists have recognized attributes of risk relief ways to deal with go up against the accompanying seven structures: (an) increment limit, (b) secure excess providers, (c) increment responsiveness, (d) increment stock, (e) increment adaptability, (f) pool or total interest and (g) increment capacity [25]. The adequacy of these methodologies comes down to taking out underlying drivers of the disruptions, which vary crosswise over associations and ventures. This is the place a port can contribute as it doesn't embrace industry-particular systems to decrease supply chain disruptions. The techniques that ports use can be as broad as to limit supply chain disruptions that range over an assortment of ventures.

In the midst of moving toward port security dangers as a potential hotspot for supply chain disruption from the coordination's and supply chain management point of view, one approach to build security guidelines in the oceanic system is to have ports and their partners anticipate results of identified vulnerabilities over the ports' inner and outside frameworks, in an incorporated communitarian exertion [24]. It is through a more elevated amount of cooperation that security can be implanted and guaranteed all through the chain. Something else, firms which quit security activities, for example, the Customs-Trade Partnership against Terrorism (C-PAT) may wind up with slower load preparing. In particular, an exact examination of the effect of ISPS Code, CSI and 24-hour lead on compartment terminal operations efficiencies has been conveyed out.19) The outcomes demonstrate that terminals actualizing 24-hour govern by and large have bring down productivity than those without the 24-hour control and the usage of CSI has encountered a gain in terminal proficiency while terminals without CSI execution have encountered a misfortune [25]. Then again, as elucidations of the ISPS Code change crosswise over ports, an assessment of productivity increases or misfortunes identifying with the execution of ISPS Code is dubious. By and by, the long-haul impact and advantages may legitimize the expenses of safety efforts. At last, a well-performing supply chain requires association and synchronization for the consistent stream of merchandise between each point to happen. This thus requests for safety efforts to be satisfied at all connections in the supply chains [26].

Game plans to moderate problematic impacts of unwanted occasions require the endeavors of inward port management and in addition coordinated effort or inclusion from outside gatherings. Something else,

the extent of activities and the degree of help to disruptions will be limited. The utilization of complex system hypothesis has been proposed in the examination and modeling of delivery systems with the end goal that an unfortunate occasion at a port can be reenacted to demonstrate the worldwide impact it has [26]. On the other hand, the Disruption Analysis Network (DA_NET) is another quantitative methodology which can be utilized to indicate spread of characteristics while estimating the effect on the framework. It enables its clients to all the more likely comprehend the span of troublesome occasions in a supply chain. Enhancement models can likewise be utilized to look at changed situations and severities of disruptions that made a redirection of vessels different ports in a system [26]. These seas centered models can be coordinated with those that review landside capacities with respect to a more comprehensive investigation. To relieve the effects of crashes inside port waters, a staggered model of impact risk has been proposed by analysts. The motivation behind this framework is to go about as a constant framework that enables pilots to do countermeasures as per the distinctive severities of perils worked out by the framework. In any case, a more elevated amount of correspondence as information sharing is required for the improvement of an enough powerful vessel rebuilding model.

In the light of changing job of ports and expanding extent of multi-purpose transportation administrations at ports, the idea of utilizing incorporated communities for Transshipment, Storage, Collection and Distribution (TSCD) of cargo has been recommended to enhance load taking care of proficiency inside the ports. Other than facilitating dangers of port clog, business openness will likewise be upgraded with the utilization of TSCD idea as advantages can be gotten from the physical closeness [23]. The call for comparative "port-driven coordination's" approach is evident in the United Kingdom through a few noteworthy organizations under the weight of flourishing payload volumes. Elective ways to deal with avoid port blockages are distinguishing substitute ports and making appropriate estimates that assistance create supply adjusts while administering traveling request and supply. Be that as it may, the port needs to think about the patterns in the industry, for example, the entries of bigger vessels and in addition the impacts from outer condition as they assume a job in influencing terminal performance and port change designs [26, 27, 28, 29, 30].

H4: there is a huge connection between move fear to

elective ports and avoidance supply chain disruption

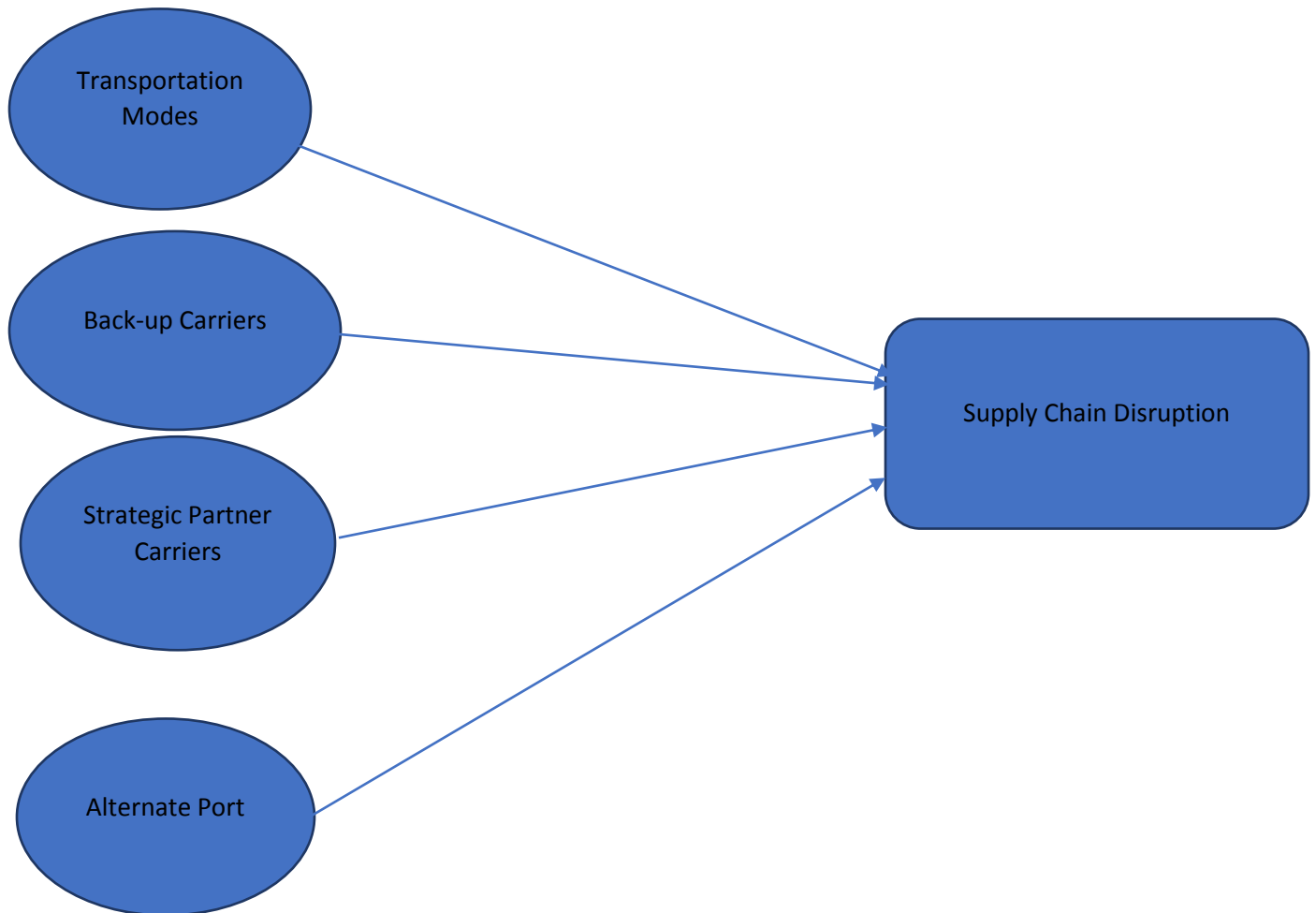


Figure 1. Theoretical Model

3. Methodology

The research strategy has been the most fundamental piece of study. The ideal of fitting system for the data investigation must be connected with the kind of the issue. This study is depended on quantitative research method. However, understanding with the idea of the examination, the cross-sectional outline has been assigned. A study has been directed to assemble the data from an Indonesian assembling industry. The 5-point Likert scale has been connected to assemble the data. Through email overview has favored, and polls has been disseminated to top management managing supply chain assignments. In addition, SmartPLS 3

(SEM) has been utilized to break down the data. However, the sample size has been assigned in light of for inferential insights. In this way, 40 sample sizes were picked. At first, the email IDs has been made by numerous e-strategic models.

4. Data Analysis

4.1 Measurement Model Assessment

SmartPLS 3 has been connected to inspect the estimation of the model. Factor inner consistency

process, AVE, Cronbach's alpha with the Composite unwavering quality have been estimated. Fig. 2 demonstrates the estimation model assessment. The consequences of estimation model assessment have been given in Table 2. The outcomes demonstrate that every one of the things had a factor stacking more than 0.70. No things having an incentive in the factor stacking beneath 0.70 however over 0.60.

Inside consistency has been achieved as the factor stacking is in excess of 0.50 affirming the convergent validity. AVE and Composite unwavering quality have likewise been more than attractive range 0.70 and 0.50, separately. The outer consistency, moreover, for the discriminant validity utilized the Fornell and Larcker criteria to support. Table 3 shows the aftereffects of discriminant validity.

Table 2: Cronbach's alpha Factor Loading, Composite reliability and average variance extracted

Construct	Cronbach Alpha	Composite reliability	AVE
Transportation Modes	0.872	0.782	0.645
Back-up Carriers	0.783	0.976	0.683
Strategic Partners Carriers	0.921	0.864	0.857
Alternate Ports	0.879	0.848	0.863
Supply Chain disruption	0.876		

Note: Transportation Modes, Back-up Carriers, Strategic Partners Carriers, Alternate Ports and Supply Chain disruption

Table 3: Discriminant Validity

	Transportation Modes	Back-up Carriers	Strategic Partners Carriers	Supply Chain disruption
Transportation Modes	0.893			
Back-up Carriers	0.654	0.851		
Strategic Partners Carriers	0.729	0.619	0.913	
Alternate Ports	0.712	0.740	0.826	0.816
Supply Chain disruption				

4.2 Structural Model Assessment

Table 4 exhibits the measurement model assessment puts direct effects. It comes to know that all the direct associations having t-value more than 1.96 at 0.05 level of significance. So, all the relations have been significant. Furthermore, β -value exhibits a positive

association. Therefore, all the hypotheses (H-1, H2, H3, H4) have been approved as shown in Table 4. Furthermore, Table 4 exhibits the size of effect (f^2). The recommendations of found that Transportation Modes, Back-up Carriers, Strategic Partners Carriers, Alternate Ports all variables have positive strong effect on Supply Chain disruption.

Table 4: Direct Result

Hypothesis	β -value	(STDEV)	T Statistics	P-Value	f^2	Decision
H1 TM->SCD	0.221	0.105	2.310	0.031	0.29	Accepted
H2 BC->SCD	0.232	0.047	4.101	0.000	0.24	Accepted
H3 SPC->SCD	0.213	0.079	11.011	0.014	0.21	Accepted
H4 AP->SCD	0.198	0.084	3.297	0.159	0.30	Accepted

4. Findings

The literature shows that there have been several variables prompting avoidance disruption in supply chain. Though, the most conclusive variables, Transportation Modes, Back-up Carriers, Strategic Partners Carriers, Alternate Ports. The t-value is greater than the standard value of 1.96 at 0.05 significant level is acceptable. Further, the path between TM and SCD ($\beta=0.221$, $t\text{-value}=2.310$, $p<0.05$), shows a positive significant relationship. Therefore, the current research originated a significant positive relationship between TM and SCD, supporting H1. It proves that increasing one variable would increase other variable towards the same direction.

Similarly, BC→SCD ($\beta=0.232$, $t\text{-value}=4.101$, $p<0.05$), values show a positive significant association between two variables, further β indicating that 24% contribution of BC. Therefore, there is a significant positive association between BC→SCD, therefore if support for H2. Therefore, it exhibits that increasing one variable would increase other variable towards the same direction.

Likewise, SPC→SCD ($\beta=0.213$, $t\text{-value}=11.011$, $p<0.05$), values show a positive significant association between two variables, further β indicating that 21% contribution of SPC. Therefore, there is a significant positive association between SPC→SCD, therefore if support for H3. Therefore, it exhibits that increasing one variable would increase other variable towards the same direction.

Similarly, AP→SCD ($\beta=0.198$, $t\text{-value}=3.297$, $p<0.05$), values show a positive significant association between two variables, further β indicating that 30% contribution of AP. Therefore, there is a significant positive association between AP→SCD, therefore if support for H4. Therefore, it exhibits that increasing one variable would increase other variable towards the same direction.

5. Conclusion

There have been many factors enhancing the avoidance of supply chain disruption. Since, supply chain was to some extent unavoidable before this. But these factors would be paved the way to mitigate the risk of disruption in supply chain management for the next year or for next demand. Leverage multiple transportation modes has been mounting the avoidance of disruption in supply chain management. Organization should possess multiple modes to continuous flow of supply. Organization should not

depend on one mode. She must weightage of multiple ways of transportation. Road and railway has been to be risky and expensive. So, organization should have new ways of flow of supply to improve avoidance of supply chain disruption for the next demand. Port modes is the best way to reduce cost and longer lead time. Utilizing the strategic transportation partnerships of Intermodal Marketing Companies (IMCs) organization should use this assistance and keep on board to mount in avoiding supply chain disruption.

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