Deferment and Supply Chain Resilience of Courier Firms in Rivers State

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Abstract
The study investigated the relationship between deferment and supply chain resilience of courier service firms in Rivers State. The study adopted the cross-sectional survey research design. The population of this study comprised all the 237 courier service firms registered with the courier regulatory department of the Nigerian postal service (NIPOST 2009). The Taro Yamane formula was used to determine an appropriate sample size for the study; the sample size for the study was one hundred and forty-nine (149) respondents. The hypotheses were tested using the Pearson Product Moment Correlation Coefficient with the aid of the Statistical Tool for Social Science (SPSS Version 22). The study revealed that postponement has positive and very strong relationship with supply chain resilience in the courier service firms in Rivers State. The study recommends that management of courier firms ensure to deploy should be a key aspect of the business as the constant engaging of the customers foster customer willingness to repeat the purchase of the service, remain committed to the brand and ultimately become loyal customers.

Keywords*: Postponement, Supply chain resilience, flexibility, Agility*

Introduction

Deferment, in the context of courier firms and supply chain resilience, refers to the act of postponing or delaying certain processes or shipments in response to unforeseen disruptions or challenges in the supply chain. Supply chain resilience is the ability of a courier firm or any organization to withstand and recover from disruptions while maintaining essential functions and customer service levels. In the context of courier firms, supply chain resilience is crucial because

they rely on efficient and timely movement of goods from one location to another. Any disruption in the supply chain can lead to delays in deliveries, increased costs, and dissatisfied customers.

The courier business of the twenty-first century are highly competitive, and establishing, maintaining and growing a courier business in today's dynamic business environment is demanding. Bola- Balogun, Mba and Omoniyi (2021) noted that courier firms are firms that carry out "door-to-door time-sensitive and secured service and includes delivery of documents parcel, merchandise, cargo whose total weight is not less than 0.5 KG and not more than 50KG." The courier firms incorporate a standard operation procedure that prioritizes speed and safety covering the entire process from receiving consignments, packing feasibility, manifesting, labelling, trace and tracking up to delivering the consignment to the addressee. The courier firms offer delivery services for mail, parcels and bulk deliveries, locally and internationally. This type of business constitutes a lot of risk, for channel members; the task can be even more challenging for channel participants as they do not have direct control over the competitive business that contribute to the growth risk of their businesses. Perhaps, channel participants need to achieve the full scalability of their products or services in other to attain supply chain resilience. More so, these channel participant's experience significant risks in carrying out their functions yet the sector is increasing (Kaingu, 2016).

The courier firms in Rivers State operate as government corporations, franchises, independents, or multinationals. More so, there are need to improve the level of service quality in most of these courier firms. However, the courier firms are confronted with various operational challenges (Didia & Nwokah, 2015); in business and the management style that the firms is applying in delivering of the services in order to be resilient. The word "resilience" originally came from materials science, referring to the ability of a system to convalesce its initial state after undergoing an elastic deformation without any changes in its nature (Ponomarov & Holcomb, 2009). More so, supply chain is itself a relatively new addition to the lexicon of marketing and management, first used in the early 1980s when writers coined the phrase to describe an emerging management discipline (Helen, 2004). This discipline was in responses to changes in prevailing trends in business strategy, which in turn demanded that internal functional self- interests be put aside to achieve a greater good — a more efficient organisation, creating and delivering better value to customers and shareholders (Christopher & Peck, 2004).

Thus, resilience within organizations and throughout supply chains recognizes both the capability to absorb shocks in the form of intense events and the adaptive capability to adjust to new conditions (Brusset & Teller, 2017). Though research about supply chain resilience is all-embracing, most studies are general, conceptual, theoretical and normative and only few studies provide set of specific strategies to improve supply chain resilience in a specialized industry (Tukamuhabwa, Stevenson, Busby, & Zorzini, 2015). Thus, supply chain resilience is the adaptive capability of the supply chain to prepare for unexpected events, respond to disruptions, and recover from them by maintaining continuity of operations at the desired level of connectedness and organize over configuration and task (Ponomarov & Holcomb, 2009). More so, supply chain resilience can help to reduce and overcome exposure to risks through developing strategies that

enable the supply chain to recover to its original functional state following a disruption (Juttner & Maklan, 2011).
Therefore, courier firms can use supply chain resilience to prevent and manage risk in case it occurs. Every activity that a supply chain conducts has inherent risk that an unexpected disruption can occur. Risk and uncertainty influence many channel participants decisions, especially those in tumultuous channels with tentative pay-offs. More so, involves managing the vulnerability and volatility of the processes to help create conducive environment for courier firms. Therefore Supply chain resilience deals with multiple types of risks at multiple stages of the risk management process at the supply chain unit of analysis (Ponomarov & Holcomb, 2009). Because resilience is one of the core elements of supply chain risk management this perspective must also be examined to determine how it should be incorporated into the resilience conceptual framework. In order to enable each channel partner's success, effective channel management from the channel organization is essential for channel members.

Therefore, by delaying or postponing these changes, differentiation could increase. The reasons underlying the use of postponement and how to implement it successfully have been of great interest to many researchers (Appelqvist & Gubi, 2005). Management began to understand the value of deferment when the production philosophy changed from mass production to mass customization. Some researchers believe that postponement is mainly a pragmatic means to move towards mass customization (Feitzinger & lee, 1997)
Postponement may be defined as a dimension of sequence and timing based on the concept of substitutability (Bucklin, 1965). Delaying activities in time enables companies to learn from the behaviour of the demand and other environmental factors (Aviv & Fdergruen, 2001). It introduces time buffers at those points where the lack of information might destroy the synchronised flow (Yang, Yang, & Wijngaard, 2006). Apparently, it provides more time for those processes which require further information. Consequently, it opens up more opportunities for postponement applications, since a company may make up a delay in he speed of one of the supply chain areas by improving the others (Yang, Yang, " & Wijngaard, 2006). A main distinctive principle of postponement is to obtain more actual information in order to define and translate the customer's needs into a concrete product or service specification.

Despite the conceptual underpinnings of postponement, its applications are still not as widespread as expected (Yang, Yang, & Wijngaard, 2006). Waller et al. (2000) argue that, as an inter-organisational concept, deferment has received little attention. Deferment, once only a strategy for differentiating a product, has matured into a way of global thinking in product design, production, logistics and marketing (Van Hoek, 2001). Deferment can improve the utilization of capacity through the effective re-allocation of assets or resources to the appropriation locations in the supply chain. Too often the implementation of postponement requires certain levels of capacity and resources to be reserved for those activities that benefit most from the additional information gained by the delay (Yang, Yang, & Wijngaard, 2006). Skipworth and Harrison (2004) argue that the capability of the postponed transformation process to respond to high demand variability requires excess capacity and high throughput efficiency. Apparently, it requires creating and maintaining slack resources, thus placing enormous demands on capacity planning.

Numerous scholarly efforts focused on different aspects of postponement (Alderson, 1950; Bucklin, 1965; Pagh & Cooper, 1998; Yang, Yang, & Wijngaard, 2006; Yeung, Selen, Deming, & Mm, 2017). Literature is abounding with studies aimed at linking aspects of postponement, speculation and functional spin off. Thus, Jafari (2014) examined postponement and logistics flexibility in retailing. Pagh and Cooper (1998) investigated supply chain deferment and speculation strategies: How to choose the right strategy in San Cornelio and Bucklin (1965) examined postponement, speculation and the structure of distribution channels. Yang, Yang, & Wijngaard (2006) examined postponement: An inter-organisational. Yeung, Selen, Deming, and Mm (2017) examined postponement strategy from a supply chain perspective: Cases from the pearl River Delta. Consequently, none of these studies provided took a holistic view of postponement, in relation to supply chain resilience. Hence, the focus of the current study is to review literature on postponement and supply chain resilience of courier firms in Rivers State, using flexibility and agility as metrics of supply chain resilience.

Study Variable and Conceptual Framework

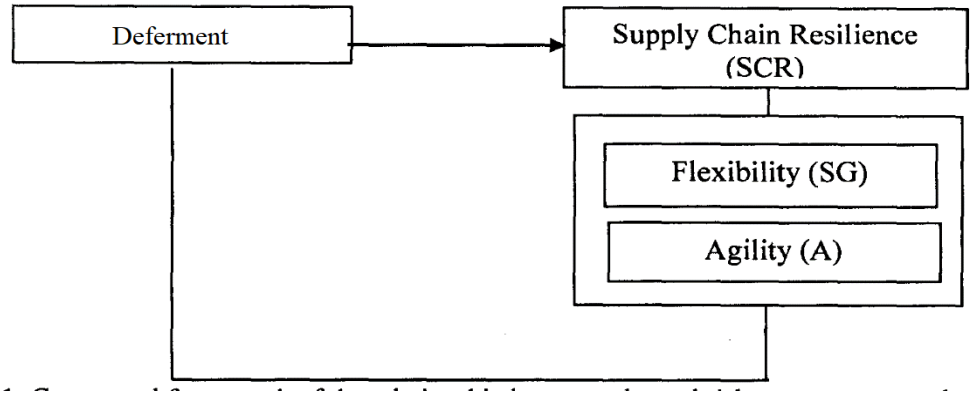

Figure 1: Conceptual framework of the relationship between channel risk management and supply chain resilience courier firms in Rivers State.
Source: Adopted from Ahmed, M.A. (2020).Supply chain risk management and the role of organisation culture: Evidence from Libyan ports. Thesis, University of Salford, Salford, UK.

The following null hypotheses were formulated to guide the study:
$H0_1$: There is no significant relationship between postponement and flexibility
$H0_2$: There is no significant relationship between postponement and agility

Literature Review/Theoretical Foundation of the Study
The enhancement of scientific understanding through organized framework that explains and predicts phenomena is the subject of a theory (Hunt, 2002). This perspective of theory accentuates the essential of expatiation in science (Hunt, Arnett, & Madhavaram, 2005). The function of science is to explain phenomena. Thus, Hempel (1996) maintain that the philosophy of science views scientific explanations as scientific answers to 'why' questions. The reason for anchoring this study on theories therefore, is to provide structure that can at least explain why proactiveness and organizational resilience may be related. Therefore, this study is anchored the resource based

theory (Barney, 1991), The reason for anchoring this study on theories therefore, is to provide structure that can at least explain why P and SCR may be related. Therefore, this study is anchored on resource based theory (Barney, 1991), and the structural contingency theory (Woodward, 1965) These theories are relevant in explaining channel risk management have been used by previous researchers of P and SCR (Donaldson, 1996).

Structural Contingency Theory

The structural contingency theory is one of the baseline theories that underpin this study. The structural contingency theory perspective originated from the work of, Woodward (1965), which explores the need for organisations to have a structure, a plan(s), and this structure guides the organisation changes when necessary. The theory states that, there is no one best organizational structure; rather, the appropriate organizational structure depends on the contingencies facing the organization. It assumes that the organisation should have a plan B. It points out that the organisational structure should be adaptable to each business and that each business must make moves to ensure it is operating the most efficient structure to support the business, and that individual organization adapt to its environments in respective of the contingencies.

This study presumes that managers select the contingency factors - uncertainty, strategy, size, technology and collaboration to address the effect on the environment. These contingency factors improve organisational resilience. However, these contingency factors dictate the structure that the organisation would maintain. If there is any misfit in the contingency factor, there is a tendency for the organisation to undergo a structural change all over again. The structural contingency theory could be used to specify which structures fit with which environmentally produced contingencies and thus, produce a fit between organization and environment. For instance, a diversified organisation needs a divisional structure to be in fit; if a diversified organisation retains a functional structure it is in misfit (Donaldson, 2001). Structural contingency theory focuses on discovering what constellations of organizational factors contribute to organizational survival and success.

Furthermore, organizations can only be resilient if they can fit their structure to the contingency factors and thus to the environment (Donaldson, 1996). The theory assumes that there cannot be any single organizational structures that can assure organizational resilience. In view of this structural contingency theory was adopted as management and organisational theory to underpin this study.

The Concept of Deferment

Postponement was first discussed in a seminal article by Alderson (1950).Deferment is a dimension of sequence and timing based on the concept of substitutability (Bucklin, 1965). Several scholars and supply chain pundits have argued that postponement is a multifaceted concept (Waller et al., 2000; Yang, Yang, & Wijngaard, 2006; Yang &Yang, 2009). Aviv and Federgrue (2001) noted that deferment is delaying activities in time that enables companies to learn from the behaviour of the demand and other environmental factors. It introduces time buffers at those points where the lack of information might destroy the synchronised flow of the channel (Yang, Yang, & Wijngaard, 2006). Apparently, it provides more time for those processes which require further information. Consequently, it opens up more opportunities for postponement applications, since a

company may make up a delay in the speed of one of the supply chain areas by improving the others (Yang &Yang, 2009; Yang, Yang, & Wijngaard, 2006). A main distinctive principle of postponement is to obtain more actual information in order to define and translate the customer's needs into a concrete product or service specification. That is deferment may given the opportunity to change the configuration of one product at the last possible moment in case of disruptions in supply of a component (Yang &Yang, 2009).

According to Van Hoek (2001) postponement is an organizational concept whereby some of the activities in the supply chain are not performed until customer orders are received. Deferment has evolved to cover areas in addition to distribution, and researchers have explored several subtypes of the earlier types introduced by Alderson (1950). However, Zinn and Bowersox (1988), developed form postponement, along with time postponement. Pagh and Cooper (1998) noted that form postponement holds that the final formation or manufacturing of products (labeling, packaging, assembly, or even design) could be delayed until a better demand or market information is gained, or even until customer orders are placed. Time-delay ways Postponement is about delaying processing or distributing activities (e.g. as to the form and/or the place of goods) until precise customer order information becomes available (Yang &Yang, 2009). Deferment has proven to help supply chains to deal with market demands in terms of quality, delivery, pricing, and variety.

Extending this to a supply chain, deferment could shift the risk to the most appropriate player in the supply chain to reduce the overall risk. In practical terms, this has been facilitated by a trend in a postponement initiative towards the use of third-party providers for final customized activities (Yang & Burns, 2003). Cox and Goodman (1956) refer to postponement as deferring each successive narrowing commitment in marketing channels as long as possible so as to reduce the likelihood and the cost of mistaken commitments. However, the principle of deferment is not "an answer to all planning problems in marketing (Alderson,1950). Deferment is cost effective whenever the reduced inventory carrying costs associated with the centralization of inventories exceed the additional cost of transportation, order processing, and lost potential sales. Postponement is regarded as an operational and organizational concept that is used to achieve customization (Van Hoek, 1998a).

Yang, Yang, & Wijngaard, (2006) empirically tested four kinds of deferment strategies (labeling, packing, assembling and manufacturing) and identify the following factors as important determinants of postponement practice: experience in implementing a particular postponement strategy; customization; modularity in construction; product value and product life cycle. Numerous scholarly efforts focused on different aspects of deferment (Alderson, 1950; Bucklin, 1965; Pagh & Cooper, 1998; Yang, Yang, & Wijngaard, 2006). Literature is abounding with studies aimed at linking aspects of postponement, speculation and functional spin off. Thus, Jafari (2014) examined postponement and logistics flexibility in retailing. Pagh and Cooper (1998) investigated supply chain postponement and speculation strategies: How to choose the right strategy in San Cornelio.

The Concept of Supply Chain Resilience

Supply chain resilience is currently considered a critical component of supply chain risk management (Ponomarov & Holcomb 2009). Research specifically on the concept of Supply chain resilience can be traced back to the early 2000s when the earliest definitions were coined. In the area of SCM, resilience is a new concept that has emerged in this field in recent years. Multiple definitions of supply chain resilience already exist in the literature (Ouabouch, 2015). Resilience could be defined as the capability of a substance to get back to its original state or form after deformation. Resilience the aptitude to bounce back from large-scale disruptions (Sheffi, 2008). Resilience refer to the capacity of a system to survive, acclimatize and produce in the face of tumultuous alteration. Several authors have commented on the multidisciplinary and multidimensional nature of resilience (Ponomarov & Holcomb 2009).

Resilience here is depicted as a process whereby a supply chain experiences a series of disruptive events and must make a series of flexibility and agility. Supply chain is a sequenced system of business partners involved in production processes that convert raw materials into finished goods or services in order to satisfy the consumers' demand. Ponomarov and Holcomb (2009) noted that supply chain resilience is the adaptive capability of the supply chain to plan for unexpected events, act in response to disruptions, and recover from them by maintaining continuity of operations at the desired level of connectedness and control over structure and function. A company can achieve resilience by establishing a resilient supply chain that can adapt to changes in the business environment. A resilient supply chain is necessary to assure permanence of operations, as noted by Hendricks et al. (2009).

Supply chain resilience refers to the adaptive capability of a supply chain to prepare for and/or respond to disruptions, to make a timely and cost effective recovery, and therefore progress to a post-disruption state of operations — ideally, a better state than prior to the disruption (Tukamuhabwa, Stevenson, Busby, & Bell, 2015). Thus, above definition implies that SCRES can be assessed on four aspects — preparation for a disruptive event; response to an event; recovery from the event; and, growth/competitive advantage after the event. A resilient supply chain firm must develop resilience capabilities to react to the negative consequences of unexpected events and to return quickly to its original state (Barroso et al. 2015). More so, the strategies adopted should alleviate the negative effect of the determined risks, the ones that have high negative effect and chances (Ouabouch,2015). The resilience of a system involves its aptitude to use the lowest likely amount of resources during recovery processes. The system that invites the lower resilience costs will be considered the more resilient one.

The disturbance of physical and/or information flows between the supply chain members can create undesirable effects, such as the unavailability problems of products, delays in deliveries or lack of reactivity of the supply chain. Nevertheless, disruptions could be combated by organizations with better planning, strategies and operations even in the short run. After conducting a thorough research, the authors propose that a resilient supply chain could be developed by organizations, through planning and implementing lean production, six sigma practices, flexibility and a strong corporate culture. As a result, these organizations would have the

capabilities to speed up the process of bouncing back after deformation on any part along the supply chain.

Measures of Supply Chain Resilience

Arani, Mukulu, Waiganjo and Wambua (2016) adopted customer service, market share and profitability performance to operationalize supply chain resilience ES in manufacturing firms. Ma (2009), suggests that supply chain flexibility includes a different version of the four dimensions, namely supply, R&D, manufacturing and distribution. Karl, Micheluzzi, Leite, Pereira (2018). Considered supply chain resilience in terms of flexibility, and agility. Therefore, flexibility, and agility will be adapted for the purpose of this study.

Flexibility

Flexibility is the ability to respond to environmental changes. In the case of a product that depends on the manufacturing process, flexibility is the ability to change outputs in response to changes in demand. In the supply chain, flexibility in one element of the chain depends largely on the flexibility of the other elements from which the inventory flows. A flexible Supply Chain permits a company to survive disruptions and better respond to demand fluctuations (Ouabouch, 2015). Through flexible system optimization, a resilient supply network can be realised both effectively and efficiently (Fang et al.,2012). Flexibility is the organization's aptitude to meet up a growing variety of customer expectations without unwarranted costs, organizational disruptions or performance losses (Pettit et al., 2013). This element facilitates coordination processes and allows organizations to cope with high levels of uncertainties. Thus, a resilient supply chain can deal with unexpected disruptions and disasters by reaching a relevant level of flexibility. Flexibility is considered to be an important differentiator in the current market place. Supply chain flexibility is widely seen as one major response to the increasing uncertainty and competition in the marketplace. That is to say a firm with a flexible supply chain is likely to survive and grow its market share. Despite several evidences suggesting that performance improvements are related to SCM, managing supply chains today and practicing flexibility has become more difficult due to the fact that business environments are highly competitive, businesses are going more global, dynamic, and customer-driven.

Agility:

The ability of a supply chain to respond to short-term changes in demand or supply quickly and handle external disruptions smoothly (Lee, 2004). Thus, Sudden changes may be a harmful incident for a company and could be an opportunity for others (Sharifi & Zhang, 1999) as cited in Boubaker, Jemal, Sahin, and Dallery (2019).

Supply chain agility can be defined as the ability to respond rapidly to unpredictable changes in demand or supply. Many organisations are at risk because their response times to demand changes or supply disruption are too long. Agility is measured to be one of the fundamental characteristics needed for a supply chain to survive and thrive in an environment of turbulent and volatile markets. Agility has many dimensions and it relates as much to networks as it does to individual companies. Indeed, a key to agile response is the presence of agile partners upstream and downstream of the focal firm (Christopher & Peck, 2004). two key ingredients of agility are 'visibility' and 'velocity'. Agility is the continual readiness of an entity to rapidly or inherently, proactively or reactively, embrace change, through high quality, simplistic, economic components and relationships with its environment (Conboy & Fitzgerald, 2004).

Postponement and Supply Chain Resilience.

Empirical Review

There are replete studies that have explored factors that predict supply chain resilience some of these factors are flexibility and agility. The study found that a dynamic SC resilience capability-building process is an antecedent of SC performance. The study identified inventory management, visibility, predefined decision plan and diversification as dynamic SC resilience capabilities. Yang and Yang (2009) examined postponement in supply chain risk management: a complexity perspective. The study found a positive and significant relationship between the predictor variable and criterion variable.

Methodology

The study on deferment and supply chain resilience adopted the cross sectional survey research design. Data were collected through questionnaire drawn using a Likert's five-point scale, ranging from "strongly agree" to "strongly disagree". The predictor variable postponement was treated as a un-dimensional variable while, the criterion variable supply chain resilience has flexibility and agility as its measures. The population of this study comprises of all the 237 courier service firms registered with the courier regulatory department of the Nigerian postal service (NIPOST 2009). The sample size of this study was drawn from the two hundred and thirty-seven (237) registered courier firms in Nigeria. The sample size of this study was determined using the Taro Yamani (1967) formula. Thus, the respondents for study were one hundred and forty nine (149).The data generated from the survey was analyzed and interpreted into meaningful information using descriptive statistics. The hypotheses were tested using the Pearson Moment Correlation Coefficient with the aid of the Statistical Tool for Social Science (SPSS version 22).

Result and Discussion

Table 1: Description on levels of Relationship between Variables

Ranges of r with positive and negative	Description level relationship of r Sign values
+ .7 to 1.0	Very Strong
+ .6 to .69	Strong
+ .4 to .59	Moderate
+ .1 to .39	Weak

Source: Mangiofico (2016)

The positive (+) sign in the values of r implies a direct/positive relationship, whereas the negative (-) of r implies an indirect/negative or inverse relationship between the two variables. This section continues by testing the hypotheses raised in section one of this study with the aim of determining the strength and direction of the relationship (if any) amongst the predictor variables and the criterion variables.

Decision Rule

Reject the null hypothesis (H0) if PV < 0.05 for 2-tailed test and conclude that significant relationship exists.

Table 2: Correlation Analysis on Deferment and Flexibility

Correlation

			Postponement	Flexibility
Pearson Correlation r	Postponement	Correlation Coefficient	1.000	0.771**
		Sig (2-tailed)		.000
		N	104	104
	Flexibility	Correlation Coefficient	0.771**	1.000
		Sig. (2-tailed)	.000	
		N	104	104

** Correlation is significant at 0.01 level (2-tailed).
Source: (SPSS Output 2023)

Table 2 above shows that the Pearson Correlation Coefficient (r) = 0.771**, this value is high, implying that a very strong relationship exists between postponement and flexibility. The positive sign of the correlation coefficient indicates a positive relationship. That is to say that an increase in flexibility is associated with the adoption of postponement strategy in the studied courier service firms in Rivers State. As shown in Table 2, the probability value is (0.000).

Table 3: Correlation Analysis on Deferment and Agility

Correlation

			Postponement	Agility
Pearson Correlation r	Postponement	Correlation Coefficient	1.000	.857**
		Sig (2-tailed)		.000
		N	104	104
	Agility	Correlation Coefficient	.857**	1.000
		Sig. (2-tailed)	.000	
		N	104	104

** Correlation is significant at 0.01 level (2-tailed).
Source: (SPSS Output 2023)

Table 3 above shows that the Pearson Correlation Coefficient (r) = 0.857**, this value is high, implying that a very strong relationship exists between customized interaction and customer commitment. The positive sign of the correlation coefficient indicates a positive relationship. That is to say that an increase in agility is associated with the adoption of postponement strategy in the studied courier service firms in Rivers State. As shown in Table 3, the probability value is (0.000)

Discussion

The result from the study shows a strong relationship between deferment and supply chain resilience in the courier service firms in Rivers State. This position is validated by Yang and Yang (2009) who reported a positive and significant relationship between the postponement and supply chain risk management.

Conclusion

In view of the result obtain from our analysis this study concludes that that postponement has a strong relationship with supplier chain resilience .in the courier service firms in Rivers State.

Recommendations

The study therefore recommends that management of courier firms in Rivers State should work towards promoting deferment to improve their supply chain resilience. Also, the management of courier firms should incorporate good supply chain resilience habit that can win more customers in their marketing kits.

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