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Analyzing the Enablers and Barriers in Procurement affecting Supply Chain Resilience

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Abstract:

Supply chain professionals are aware that the performance of any supply chain lies in their ability to effectively and consistently handle risks therefore; emerging the disciplines of risk management and supply chain management in an industry. This study highlights the importance of enablers and barriers in performing supply chain in a disruptive global event. And advances an interdisciplinary understanding of the concept resilience. Managers can take proactive steps to address and implement primary causal enables of risk mitigation into practice for reducing total risk impacts of the supply chain. The objective of this paper was to conceptualize the effect of enablers and barriers on the supply chain resilience. This paper provides guidance for companies seeking to supply chain resilience and identifies which enablers can support and which barriers to overcome. We conducted an observational cross-sectional study and applied a self-designed survey questionnaire to 358 participants to assist their knowledge and experience on the enablers and barriers that affect supply chain sourcing, keeping in view the concept of resilience. Th data was collected from supply chain departments of different industries i.e. government and private sectors. Among 358 participants, 82.1%were male and 17.4%were females among which 53.4% were aware about the importance of the supply chain resilience despite of working in supply chain department. It was found during the survey that the most important enabler which have profound effect on the supply chain resilience was Trust 63% and the barrier was Lack of knowledge 46.6% of the subject. We attempted our exceptional to capture all the possible enablers/barriers in this paper. However, as time will advance, alternatives will likely develop leaving space for their integration in the present system.

INTRODUCTION

Supply chain be the network of corporations that be engaged, throughout upstream (i.e. supply) and downstream (i.e. distribution) linkage, in the unusual processes that produce significance in the variety of product and services deliver to the final consumer. (1) In other words, the potential to design plans and prepare Supply Chain network proactively to predict for unpredicted disruptive (negative) procedures, retort adaptive to disruption whereas retaining control in excess of structure and process control and transcend to a post event robust situation of operations, if potential, more encouraging than the one-prior to the event, thus gaining competitive advantage. (2)

The model of Gallopin (2006) suggests the theoretical linkage between susceptibility and resilience. Within model, resilience is measured as a subset or thing of systems ability of reaction for influential how susceptible a gadget is. In addition, Pettits (2010) has validated throughout its empirical study that supply chain resilience increase as capabilities enhances and susceptibility decrease. (3) A complete consensus on definition of resilience not reached, but maximum researcher agrees that it's far involved with a supply chain's speediness, efficient response to, and improvement from a distraction –recovering to the preceding level or preferably, better level of operational performance. (4)

Resilience and susceptibility in the supply chain are concept confirming the execution and sustainability of the supply chain. And in today's uncertain and turbulent markets, managing the prevention of supply chain disturbances has gained significant interest in supply chain management. Even existing researches have featured the importance of Supply Chain Resilience to effectively survive disruptive effects. (5)

Today's business challenge is managing and reducing these risks by building more robust supply chains. These components that will be discussed help to analyze and overcome the non- value-added activating during the procurement process resulting increase in efficiency. After the observation of the whole procurement process, it includes various components which concludes to either Enablers or Barriers. Through these components; it has been found that the scope of improvement exists. This thesis will facilitate the company in improving the process of procurement and ultimately reducing the cost. In addition to this, the research will also determine the theory of supply chain resilience used by organizational leaders.

METHOD

A. **Setting –**

Supply Chain Departments of various industries.

B. *Duration of Study –*

3 months after approval of synopsis (2nd November till 20th December 2019).

C. **Study Design –**

Observational Cross-Sectional Study

D. **Sample Size –**

The literature searched on supply chain resilience consists mostly of systemic reviews, we were unable to calculate the sample size. The number of participants that were enrolled in 3 months duration were considered as our sample with 95% confidence interval (CI), 5% margin of inaccuracy and 0.05 level of significance.

E. **Sampling Technique –**

Convenient Sampling

F. **Inclusion Criteria –**

Participants working in Supply Chain Dept.

G. **Exclusion Criteria –**

1. Fresh Candidates (less than 3 months),

2. Retired Personnel, and

3. Depressed Workers

H. **Date Collection Procedure –**

A self-designed questionnaire was formed consisting of demographic data which includes age, gender, industry and designation followed by the questions to assess the knowledge of participants on the factors that are implicated in supply chain resilience consisting of enablers and barriers and categorizing them in to least important to most important. After extensive literature review, we found 26 enablers and 29 barriers which have profound impact on supply chain.

The enablers were Acquisition/Procurement, Agility (Velocity and acceleration), Financial strength, Increasing Redundancy, Collaboration, Coordination and Control, Alignment (Rules driven), Information sharing (transparency), Integration, Building Flexibility, Company's knowledge (knowledge back-up), Visibility, Trust (Reliable), Strategic sourcing/safety stock, Supply chain Designs (Re-engineering Supply chain), Recruiting future talent, Risk management (Situation awareness), Enabling technology (Process Improvement), Teamwork & collaboration, Initiative, Supply chain Designs (Re-engineering Supply chain), Recruiting future talent, Time management, Good judgement & Prioritization, Feedback acceptance and Continuous Improvement.

The barriers were Long lead times, Financial limitation, Lack of collaboration, Lack of capacity, Lack of coordination and control, Lack of control, Lack of Integration, Lack of Information, Lack of knowledge, Lack of flexibility, Lack of trust, Lack of visibility, Long distances, Network Complexity, Corruption (Procure to pay), Supplier unreliability, Flow of goods, Plant locations, Quality management, Product cost, Extreme Weather (natural disasters), Conflict, Political unrest (economic recession), Terrorism, Sudden demand shocks, Loss of critical supplier, Plant Incident (fire), Equipment failure and Human error.

The questionnaire was distributed among the participants after their verbal informed consent during their spare time by our data collector. Data collected systematically in a registry and analyzed. In addition, the study has been submitted for the approval by the local institutional review board.

RESULTS

The mean age of the participants was between 30 to 40 years as shown in table 1. Of them, n=294 (82.1%) were male and n=64 (17.4%) were females. Most of the participants have a middle- level designation i.e. 50.8%. Among the responders, n=191 (53.4%) have background knowledge of the supply chain resilience whereas only n=79 (22.1%) were not aware of it despite of working in supply chain dept. as shown in table 2 and 41.3% were linked with purchasing dept.

The participants were interviewed and as per their experience and knowledge, we found that the most important enablers that affect the resilience of supply chain in descending order were trust 63%, time management 61.5%, coordination and control 59.8%, continuous improvement 59.5% and risk management 57.5%, whereas the least affecting enabler was increase

redundancy 16.5%. Other enablers that were included teamwork & collaboration 55.3%, good judgments & prioritization 55.3%, information sharing (transparency) 51.4%, collaboration 50%, integration 35.5%, visibility 27.9%, enabling technology (Process Improvement) 31%, alignment (Rules driven) 31%, agility (Velocity and acceleration) 33.5%, building flexibility 26.5%, financial strength 45.5%, company's knowledge (knowledge back-up) 36.6%, strategic sourcing/safety stock 48.9%, supply chain Designs (Re- engineering Supply chain) 42.7%, recruiting future talent 48.6%, initiative 45.8%, supply chain Designs (Re-engineering Supply chain) 42.7%, recruiting future talent 48.6% and feedback acceptance 41.9% as shown in table 3.

The barriers that were found to affect the resilience in descending order were lack of knowledge 46.6%, corruption (procure to pay) 46.4%, product cost 43%, loss of critical supplier 42.5%, lack of information 42.2% financial weakness 41.6% and quality management 39.4%, whereas the least affecting barrier were lack of collaboration 15.6% and extreme weather 13.7%. The other barrier that were included Long lead times 37.4%, lack of capacity 22.3%, lack of and control coordination 29.6%, lack of Integration 33.8%, lack of flexibility 23.2%, lack of visibility 26.80%, lack of trust 32.4%, long distances 27.7%, network complexity26%, supplier unreliability 26.50%, flow of goods 26.3%, plant locations 24.3%, conflict 28.5%, political unrest (economic recession) 24%, terrorism 26.8%, sudden demand shocks 20.1%, plant Incident (fire) 27.9%, equipment failure 31.8% and human error 27.9% as shown in table 4.

DISCUSIONS

The term resilience has come to be a keyword with supply chain manager, researcher, and advisor. But what does resilience mean? Resilience is well-defined as the ability of system to adapt, survive and grow in face of change and indecision. (6) The resilient company is risk intelligent, flexible an agile. For companies, there are an infinite number of disruption scenarios, but only a finite wide variety of outcomes. Essentially, it doesn't matter if power failures, storms, hurricanes or terrorist attacks cause downtime. Causes count less than creating the agility and flexibility to mitigate risks and manage outcomes. (7) In contrast to resilience, risk is novel way of thoughts that cannot be implementing by means of an increase evolution of prior designs strategy. Nevertheless, neither resilience nor risk analysis unaccompanied are sufficient to mitigate the impacts of disaster. Both approaches should work in recital to be effectively protective of communities affected by failures. (8) The supply chain resilience

improves the capabilities increase and susceptibility decrease and asserts that increased resilience will allow supply chain to enhanced foresee, adapt and react to the fluctuating environment, thus enhancing performances. (9) Achieve resilience next to the supply chain calls for endeavor from inner action in the business and as of the wider network. While reasons from disruption may rise up from several detail of supply chain, it's found that disruption is more serious whilst they occur upstream in chain. For this purpose, procurement has become a severe business activity by being measured a boundary spanning purpose, where it is accountable for sourcing assessment and acts as bridge among internal and external organizations. (10)

Various collaborative tools emerged in the mid-1990s as potential enablers of supply chain integration. These tools aimed to augment trading partners' relationships, with a vital objective of enabling an indeed incorporated supply chain. (11) Our study concluded that the following enablers have profound effect on the supply chain resilience i.e: trust 63%, time management 61.5%, coordination and control 59.8%, continuous improvement 59.5% and risk management 57.5%, whereas contrast to a study which showed the important enablers were supplier risk assessments, data distribution in supply network, business with supplier and supply flexibility. (12)

Scholars consent that extreme barriers can obstruct cooperation, and often these barriers are deeply implanted in corporate culture. It was explicitly recognized that the role of these impede forces, which restrain vital alter and freeze an enterprise in its existing behavior. (13) In our study, lack of knowledge 46.6%, corruption (procure to pay) 46.4%, product cost 43%, loss of critical supplier 42.5%, lack of information 42.2% financial weakness 41.6% and quality management 39.4% were the important barriers confronting in supply chain, whereas in a study system design was found to be the most elementary barrier consuming the supreme drive control. (14) Another study showed that for the most part risks drive from the elements that were core to the supply chain, thus requiring robust supply chain cooperation whereas it was the least affecting barrier in our study.

While literature associated with supply chain disruption is enlightening, it has mainly centered on supply chain disruption from common or high-level outlook of experience (e.g. supply chain ambiguity, risk observations). In addition, though the most would concur that disruption are present in all supply chain, there is restricted extent of material on how to pact with them from rational viewpoint in together short term and long term. (15)

LIMITATIONS AND SUGGESTION FOR FUTURE RESEARCH

This study was a beginner step towards a more complex field of supply chain management and provides more room and open doors for more researches. We did literature review after which we come up with those enablers and barriers, but it was more of an interview-based survey rather its practical application and it true effect on supply chain resilience. Due to limitation of resources, we were unable to reach out the extensive literature and unable to cover all industries. There were also security concerns due to which high level designations were hard to approach hence, the results should not be generalized for all industries or all supply chains. Further studies can be conducted on the proposed enablers and barriers and their implementation in management areas. It should also examine the influence of other countries and culture on perceiving and managing their perceptions and practices. We propose the researchers, to conduct more of its kind to study it practical application at the ground areas.

CONCLUSION

Supply Chain are inherently risky, and uncertainty can appear in every feature of a decision in supply chain. A systemic approach is essential for effective decision making in context of supply chain resilience. To make certain that the risk management is given high priority in supply chain management, the team should know the enablers and disablers of the processes. Enablers are determined with their importance weights and the possible rating in making supply chain management implementation successful. These practices normally focus on reducing the probability or likelihood of risk occurrence and doing so can avoid unforeseen losses. Although, resilience may be understood as a challenge for professionals, advances in their routine processes but utilization of enablers that are directly applicable would help overcome barriers. The findings will assess in practical application with changes at the level of policy making. Similarly, organizations/ enterprises can utilize the proposed enablers during their decision-making process and take appropriate actions to avoid barriers before initiating any approach. Focused implementation of enablers will minimize barriers.

Supply Chain Depart

Table -1 Experiment Result

	Original Lena Image (PSNR)	Watermarked Lena Image (PSNR)
BJUT Watermark Image	33.1224	41.9946
Bobbol Watermark Image	33.1224	47.5911
DDNT Watermark Image	33.1224	45.8103

Table 1 show the highest signal to noise ratio of performance of our suggested method of watermarked appearance and original image with several watermark image, where our watermarked images peak signal to noise ratio has a enhanced performance than others.

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TABLES

A. **Table 1 – Descriptive Stats**

	N	Minimum	Maximum	Mean
Age	358	20-30 yrs	50 yrs and above	30-40 yrs
Valid N (listwise)	358			

B. **Table 2 – Do you know about Supply Chain Resilience?**

		Frequency	Percent	Valid Percent	Cumulative Percent
	Yes	191	53.4	53.4	53.4
	No	79	22.1	22.1	75.4
	Slightly	88	24.6	24.6	100.0
Valid	Total	358	100.0	100.0	

C. **Table 3 – Enablers**

Enablers (%)	Very Important	Important	Slight	Not
Agility (Velocity and acceleration)	33.50%	48.00%	13.10%	5.30%
Financial strength	45.50%	30.40%	11.50%	12.60%
Increasing Redundancy	16.50%	36.90%	38.30%	8.40%
Collaboration	50.00%	40.00%	4.20%	5.30%
Coordination and Control	59.80%	28.80%	7.00%	4.50%
Alignment (Rules driven)	31.00%	48.90%	19.30%	0.80%
Information sharing (transparency)	51.40%	33.20%	14.50%	0.80%
Integration	35.50%	55.00%	3.40%	6.10%
Building Flexibility	26.50%	48.00%	23.70%	1.70%
Company's knowledge (knowledge back-up)	36.60%	43.60%	19.80%	0.00%
Visibility	27.90%	52.80%	13.10%	6.10%
Trust (Reliable)	63.10%	18.70%	10.90%	7.30%
Strategic sourcing/safety stock	48.90%	25.10%	19.80%	6.10%

Supply chain Design (Supply chain re-engineering)	42.70%	32.70%	20.90 %	3.60 %
Recruiting future talent	48.60%	21.80%	27.90 %	1.70 %
Risk management (Situation awareness)	57.50%	26.80%	7.50 %	8.10 %
Enabling technology (Process Improvement)	31.00%	52.50%	9.20 %	7.30 %
Teamwork & collaboration	55.30%	33.20%	7.00 %	4.50 %
Initiative	45.80%	35.20%	18.20 %	0.80 %
Supply chain Design (Supply chain re-engineering)	42.70%	32.70%	20.90 %	3.60 %
Recruiting future talent	48.60%	21.80%	27.90 %	1.70 %
Time management	61.50%	24.60%	5.00 %	8.90 %
Good judgement & Prioritization	55.30%	32.40%	7.80 %	4.50 %
Feedback acceptance	41.90%	41.60%	9.50 %	7.00 %
Continuous Improvement	59.50%	29.30%	7.50 %	3.60 %

Table 4 – Barriers

Barriers (%)	Very Important	Important	Slight	Not
Long lead times	37.40%	46.10%	12.00%	4.50%
Financial weakness	41.60%	40.80%	7.80%	9.80%
Lack of capacity	22.30%	47.50%	24.90%	5.30%
Lack of collaboration	15.60%	57.50%	26.00%	0.80%
Lack of coordination and control	29.60%	51.10%	16.80%	2.50%
Lack of Information	42.20%	30.40%	17.60%	9.80%
Lack of Integration	33.80%	38.00%	24.00%	4.20%
Lack of flexibility	23.20%	45.30%	24.00%	7.50%
Lack of knowledge	46.60%	29.60%	15.10%	8.70%
Lack of visibility	26.80%	41.10%	21.50%	10.60%
Lack of trust	32.40%	43.30%	20.10%	4.20%
Long distances	27.70%	29.30%	22.90%	20.10%
Network Complexity	26.00%	39.40%	24.00%	10.60%
Corruption (Procure to pay)	46.40%	22.30%	20.70%	10.60%
Supplier unreliability	26.50%	54.20%	15.90%	3.40%
Flow of goods	26.30%	41.90%	26.00%	5.90%
Plant locations	24.30%	55.60%	18.40%	1.70%
Quality management	39.40%	50.30%	10.30%	0.00%
Product cost	43.00%	39.90%	12.60%	4.50%
Extreme Weather (natural	13.70%	53.40%	30.40%	2.50%

disasters)				
Conflict	28.50%	44.40%	20.90%	6.10%
Political unrest (economic recession)	24.00%	53.90%	15.90%	6.10%
Terrorism	26.80%	40.50%	23.50%	9.20%
Sudden demand shocks	20.10%	48.30%	25.40%	6.10%
Loss of critical supplier	42.50%	34.40%	20.70%	2.50%
Plant Incident (fire)	27.90%	38.00%	23.70%	10.30%
Equipment failure	31.80%	35.20%	26.80%	6.10%
Human error	27.90%	44.10%	23.70%	4.20%