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Global Value Chains' Disaggregation through Supply Chain Collaboration, Market Turbulence, and Performance Outcomes

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Abstract: This research examines supply chain collaboration effects on organizational performance in global value chain (GVC) infrastructure by focusing on GVC disaggregation, market turbulence, inequality, market globalization, product diversity, exploitation, and technological breakthroughs. The research strives to develop a better understanding of global value chains through relational view, behavioral, and contingency theories along with institutional and stakeholder theories of supply chains. Based on conflicting insights from these theories, this research investigates how relationships and operational outcomes of collaboration fare when market turbulence is present. Data is obtained and analyzed from focal firms that are engaged in doing business in emerging markets (e.g., India), and headquartered in the United States. We investigate relational outcomes (e.g., trust, credibility, mutual respect, and relationship commitment) among supply chain partners, and found that these relational outcomes result in better operational outcomes (e.g., profitability, market share increase, revenue generation, etc.). From managerial standpoint, supply chain managers should focus on relational outcomes that can strengthen operational outcomes in GVCs resulting in stronger organizational performance. The research offers valuable insights for theory and practice of global value chains by focusing on the GVC disaggregation through the measurement of market turbulence, playing a key role in the success of collaborative buyer–supplier relationships (with a focus on US companies doing business in India) leading to an overall improved firm performance.

Keywords: supply chain collaboration; organizational performance; market turbulence; global value chains; relational view; behavioral theory; contingency theory

Citation: Arora, A.; Arora, A.; Anyu, J.; McIntyre, J.R. Global Value Chains' Disaggregation through Supply Chain Collaboration, Market Turbulence, and Performance Outcomes. *Sustainability* **2021**, *13*, 4151. https://doi.org/10.3390/su13084151

Academic Editor: Helena Carvalho

Received: 1 February 2021
Accepted: 2 April 2021
Published: 8 April 2021

1. Introduction

Global supply chains are continually evolving and transforming the way emerging world economies do business with their developed counterparts, especially in the advancement of these value chains as "modes of production" [1]. Developing nations are joining forces with developed nations through these rapidly transforming global value chains (GVCs) without investing in building their own, thus saving time, money, and gaining access to technological innovations. With supply chains becoming big and complex in globalized world, it is important to work closely with supply chain partners [2–4]. The current COVID-19 pandemic crisis is a case in point where the global outbreak has crippled supply chains and GVCs. There are demand and supply ripples across global networks [5,6]. The bigger issue is whether our regular/traditional supply chain and GVC strategies be able to survive the COVID-19 disaster after life returns to normal [6].

Literature suggests that collaboration among supply chain partners positively impacts organizational performance [7]. For example, Wal-Mart and Procter and Gamble work closely with respect to pricing policies, forecasting, and electronic data exchange (EDI) interlinkages to ensure strategic advantage to both partners [8]. Additionally, supply chain research suggests that in today's hyper-connected world, the competition is not

just between organizations but also between supply chains [9]. Taking an example from business perspective, Apple's iPhone X had been much awaited by customers worldwide, and Apple was relying on rival Samsung Electronics to make the OLED screens for iPhone X. While there are mutual operational and relational benefits for both Apple and Samsung, Apple experienced delays in iPhone X due to many of its suppliers including Foxconn and Samsung [10]. This suggests that collaboration may impact operational and relational outcomes leading to an impact on organizational performance; and collaboration is critical for smooth functioning of inter-related and collaborative global supply chains [11]. We argue that collaboration levels among supply chain partners result in efficient supply chains, which further results in productivity and profitability (operational outcomes) along with trust, mutual respect, credibility, and commitment (relational outcomes) for supply chain collaborators in GVCs.

There is an ongoing debate about the development and advancement of global value chains (GVCs) by the developed world and its impact on the emerging economies that results in neglect of environmental conditions, environmental irresponsibility, vulnerability amongst employees, exploitative employment relations, increasing employment insecurities, declining wages and conditions, and ethical dilemmas [1,12–15]. The need for inter-organizational collaboration in today's interconnected global economy is paramount, and this need has given rise to global outsourcing. However, many uncertainties exist about collaborative advantage. The development and expansion of GVCs initiated by big multinationals in emerging economies have proven to be have both negative and positive impact. The negative impact of GVCs in developing economies can be seen through extended international exploitation and institutional failure [16,17]. On the other hand, the positive impact of GVCs can be seen through increased and widespread collaboration between developed and developing world economies, and this collaboration is more evident during market turbulence and uncertainties [18–25].

Supply chain and IB (International Business) researchers have studied the effects of supply chain collaboration and inter-firm relationships, and their findings have advanced our understanding of how firms collaborate and how collaboration impacts firm performance [11,23,26–29]. However, there seems to be limited research on the effect of supply chain collaboration on firm performance during uncertain market conditions in ever-growing presence and expansion of GVCs [1,30]. We address this major gap through our current research. Hence, the purpose of our research is to examine and test a supply chain collaboration-turbulence framework that measures supply chain collaboration and its impact on organizational performance with market turbulence as a moderator, showing how market turbulence affects collaboration level (between supply chain collaborators) and performance (operational and relational) outcomes impacting firm performance. We use conflicting theories of relational view, global value chain theory, contingency, and behavioral theories to test collaboration-turbulence framework for assessing the moderating impact of market turbulence on the level of supply chain collaboration and performance (relational and operational) outcomes.

Building on the theoretical arguments based on relational view, global value chain theory, contingency and behavioral theories, we develop and test our hypotheses using multinational companies (originating from developed economies and doing business in emerging economies) across industry sectors of aerospace, chemical, computer software, consulting services, consumer products, electronics, financial services, food/beverage/tobacco, industrial products, pharmaceuticals, health and beauty aids, transportation, and motor equipment industries. Our analyses using partial least squares (PLS) provide broad empirical support for our theoretical framework. Our findings highlight the importance of strong collaborations in global supply chains that can lead to better relational outcomes, which in turn lead to better operational outcomes throughout the value chain.

Our study makes several key theoretical contributions. First, we examine theories related to global value chain infrastructure, especially focusing on GVC disaggregation and market turbulence. Second, we extend the literature on GVC disaggregation at the firm

level, by offering a nuanced theoretical insight that the advantages of GVC disaggregation do not apply uniformly for supply chain collaboration and firm performance. Third, we propose the "Collaboration-Turbulence" framework exhibiting interrelationships among supply chain collaboration, operational and relational outcomes, and firm performance with a moderating variable of market turbulence in GVCs. Through a dataset of 113 multinational companies across varied industry sectors, we study the critical constructs of our conceptual framework. Overall, this research has the potential to help managers to work together with other companies and supply chain collaborators during market turbulence and uncertainties in GVCs. Furthermore, this research can guide future researchers and managers to avoid the negative pitfalls of GVC disaggregation through supply chain collaboration between developed and emerging economies leading to an environmental, social, and economical (or in other words, sustainable) supply chain management infrastructure.

2. Theoretical Background

2.1. Global Value Chain Theory

Value chain implies " . . . the full range of activities which are required to bring a product or service from conception, through the intermediary phase of production, delivery to final consumers, and final disposal after use" [31] (p. 4). The term "value chain" is "global" in context due to its impact on economies and societies existent in both developed and developing world [1]. Ref. [32] examined global supply chains and noted that " . . . sustainability concerns are being echoed not just in business organizations and their supply chains, but even beyond at broader levels of national governance" (p. 33). Sustainable supply chain management is defined as " . . . the management of material and information flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environment and social, and stakeholder requirements into account" [33] (p. 1545). Ref. [34] focused on global supply chains and three broad sustainability research agendas regarding GVCs: (1) cultural impacts and consequences for sustainability, (2) institutional drivers and internationalization for sustainability, and (3) knowledge sharing between emerging and developed markets for sustainability; thereby urging developed and emerging world economies to focus on strengthening GVCs in the context of institutions, internationalization and sustainable world development. Researchers have focused on global value chains with respect to supply chain management (SCM) strategies, SCM effectiveness, environmental and market uncertainty, and inter-organizational firm performance and competence [35–45]. GVCs can be strengthened through high (versus low) level of supply chain collaboration resulting in better inter-organizational synergies and improved firm performance [38]. GVCs can be made socially, economically, and environmentally responsible through institutional and stakeholder pressures driving the supply chain infrastructure [1,46–48].

2.2. Institutional and Stakeholder Theories

Formal and informal institutions exert pressure on firms to be responsible and follow principles of sustainable supply chain management globally. Formal institutions like governments, regulatory bodies, and non-governmental organizations (NGOs) can mandate firms to follow policies and norms that require them to focus on environmental and social (employees and consumers) responsibilities. Similarly, informal institutions can exert pressures on supply chains like adhering to cultural and environmental norms [1]. Supply chain practices focused on stakeholder perspectives result in better cash flows, better processes, availability of working capital, and better financial performance [30,48]. Institutional theory can be applied with stakeholder theory to make firms and global supply chains morally responsible for their behaviors in emerging world economies. Stakeholder theory deals with management of various groups, and has connections with corporate social responsibility (CSR) [49–53]. Extant research has found that there is a correlation between a firm's social and environmental reputation and firm performance [54]; and both institutional and stakeholder pressures help firms make their GVCs morally, socially,

economically, and environmentally responsible, thus linking companies' financial success and performance with the sophistication (and depth) of their supply chains [1,30,47,55–57].

2.3. GVC Disaggregation and Market Turbulence

Multinational companies from developed world often outsource a large part of their operations to emerging (low-wage) economies for reducing production costs and increasing profit margins [58]. In complex GVC scenarios, multinational firms have high demand on quality of final products while cutting costs on production (providing low wages and compensation to workers in emerging economies with bleak, unsafe working environments). For example, Apple has 349 suppliers in China and there are growing ethical concerns regarding the working conditions in factories of electronics manufacturer services (EMS) providers where Apple products (e.g., iPhones) are manufactured [1], showing a continuous disaggregation of GVC. Market turbulence helps in avoiding GVC disaggregation through behavioral and contingency theories of firm and increases firm competitiveness through better collaborative supply chain relationships as exemplified by relational view of the firm.

2.4. Relational View, Structural Contingency, and Behavioral Theories

Relational view researchers [55,59–63] argue that firms that invest in strategic relationships, knowledge, and resources with other firms perform better collectively due to inter-firm competitiveness; and that regardless of any (market or environmental) turbulence, sustained and long-term competitive advantage occur due to these inter-firm relationships between firms. What is not clear from the literature, however, is exactly how relationships provide a performance advantage **[44,64,65]**. Research suggest that relational advantage is gained because firms more freely trade information, personally invest more in the relationships, or invest in relation specific assets [66]. Other literature suggests that performance advantages from relationships come from the comparative advantages enjoyed when a firm engages in their own core competency, while their partners engage in a separate core competency [67]. In this paradigm, the relationship provides access to operational advantage which then provides a performance advantage, rather than the relationship providing a direct, strategic performance advantage [39,68–70].

Contingency theory examines how environmental uncertainty shapes organizations internally [18]. With predictable and stable market conditions, organizations can focus better (internally) with clear goals; while during turbulent and unstable environments, organizational structures are chaotic with informal and ambiguous goals. In addition to the question of how organizational supply chain relationships provide advantage, it is also unclear how robust relational advantage may be [71,72]. The behavioral theory of the firm [73] focuses on solving short-term organizational problems to reduce environmental uncertainty; and thereafter, controlling the industry environment through standardized operational plans and procedures, leading to a reduction in GVC disaggregation, and institutional and stakeholder pressures [30,49,57,74–76]. As an extension of the relational view and contingency theory of the firm, behavioral theory emphasizes on sustained competitive advantage for firms when firms can control their environment for better improved performance built through relationships with other firms.

The above discussion on global value chain theory along with relational view, behavioral and contingency theories, suggests a conflict between the effects of market (environmental) turbulence on the outcome of supply chain collaboration along with the dominance of sustained collaborative relationships despite the presence of any environmental uncertainty. For purpose of this research, we define supply chain collaboration as a supply chain management strategy leading to several relational activities. In this context, supply chain collaboration is envisioned as developing and implementing joint decisions between firms related to their supply chains with common goals for coordination and cooperation, portraying trust, displaying credibility, and committing to relationships for multinational firms doing business in emerging economies (e.g., India) with headquarters in developed

countries (e.g., the United States). All these collaborative behaviors require firms to exchange information, strategy, ideas, and implement joint decisions in their supply chains for inter-firm competitive advantage.

3. Conceptual Framework

Utilizing relational view, GVC theory, and behavioral and contingency theories, Figure 1 highlights a Collaboration-Turbulence framework that is modified and adapted from supply chain collaboration performance conceptual framework [11] with our addition and focus on market turbulence in global value chains. The framework (refer to Figure 1) exhibits interrelationships among supply chain collaboration, operational and relational outcomes, and firm performance with a moderating variable of market turbulence, which includes elements of global value chains and CSR initiatives.

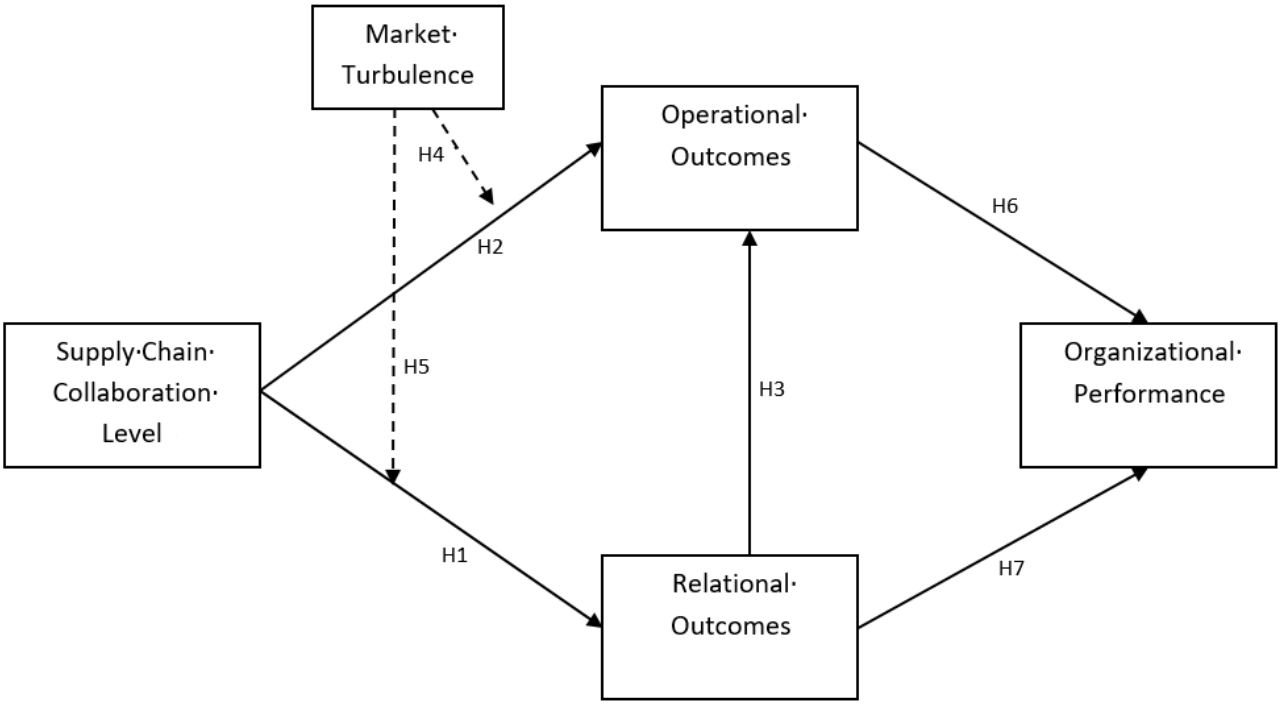

Figure 1. Collaboration-Turbulence Model: A Conceptual Framework of Collaboration and Outcomes in Global Value (Supply) Chains (Modified and Adapted from Zacharia, Nix, and Lusch 2009).

Relational outcomes exhibit credibility, trust, and commitment amongst the firms collaborating in GVC initiatives. *Trust* indicates the quality of inter-organizational (inter-firm and intra-firm) relationships in GVC infrastructure [26,77], and trust predicts how different collaborating firms will relate fairly with each other in a reliable manner and not opportunistically [36]. *Credibility* highlights the levels and magnitude of commitment among the collaborating firms [78] in a GVC infrastructure. *Communication* between and among firms is most important for *relationship commitment* and building long lasting inter-organizational relationships and strengthening collaboration. Thus:

Hypothesis 1 (**H1**). *When firms exhibit higher collaboration levels among each other, better relational outcomes are achieved.*

Operational outcomes is a mix of several factors: quality, cost, improved customer service, and better value to customers. For higher collaboration among firms, better operational linkages and information exchange regarding products and processes is needed [79]. *Product/Process information exchange* includes information on forecasting costs, new product development (NPD), and proprietary information that will help collaborating firms to improve

product facilities and overall quality resulting in effective and efficient NPD [80]. *Operational linkages* occur through procedures, systems and routines resulting in a smooth functioning and flow of information, goods and services. Industrial Marketing and Purchasing (IMP) group refers to "operational linkages" as "technical bonds" [81]. Some of the examples of operational linkages are automated warehousing, rapid logistics, Just-in-time logistics, flexible manufacturing, e-procurement, and EDI (electronic data interchange) [82]. Thus:

Hypothesis 2 (**H2**). *When firms exhibit higher collaboration levels among each other, better operational outcomes are achieved*.

Higher collaboration levels between and among collaborating firms will build trust and credibility between partners resulting in stronger relational outcomes; thereby impacting profitability, better customer service, and overall, better operational outcomes [11,26]. Therefore:

Hypothesis 3 (**H3**). *Stronger relational outcomes will result in better operational outcomes among the collaborating firms*.

Market turbulence is an external environmental factor that strongly relates to both relational and operational outcomes among collaborating firms in GVC infrastructure [83]. Market turbulence is depicted through changes in customer preferences over time [84]. Market turbulence emphasizes on market uncertainties due to changes in buyers' preferences that further impact relational and operational outcomes, and how these uncertainties impact managerial perceptions and decision making of collaborating firms [18–20]. In collaborative supply chains, environmental beliefs, and perceptions are important for inter-organizational relationships [21] since "the environment is those parts of the external information flow that the firm enacts through attention and belief" [85] (p. 682).

Market turbulence and uncertainties are highlighted in the current context of Coronavirus (COVID-19) global pandemic. According to an April 2020 report, 94% of Fortune 1000 companies are experiencing disruptions because of COVID-19, while 75% have been negatively impacted due to COVID-19 [86]. This crisis has shocked global supply chains and has highlighted the vulnerability and fragility of the GVC infrastructure. According to behavioral theory, organizational memory is critical for firms' operations in GVCs [73,87]. Market turbulence and environmental uncertainties helps in regulating GVC infrastructure and avoiding its disaggregation as uncertainty reflects the "essence of the administrative process" [88] (p. 159). As market turbulence increases, the rate of change of environmental uncertainty increases among the collaborating firms, and these changing dynamics will result in better operational outcomes for all partners in GVC infrastructure as the collaborating firms will strive to retain their competitive advantage. For example, when the COVID-19 crisis started in early 2020 worldwide, global breweries started producing disinfectants from residual products and individuals across the world volunteered to produce face masks from textile leftovers for hospitals and care facilities resulting in supply chain resiliency toward the COVID-19 crisis. Overcoming complexities in turbulent environments often result in positive operational outcomes for GVCs. Therefore:

Hypothesis 4 (**H4**). *As Market turbulence increases, the relationship between supply chain collaboration and operational outcomes is strengthened*.

High market turbulence "leads to externally induced changes that are obscure to administrators and difficult to plan" [89] (p. 69). Global value chain and structural contingency theories suggest that the value of a resource depends on the context within which it is deployed [18]. Market uncertainties may be detrimental to firm competencies that reflect partnering firms' values and beliefs [90]. COVID-19 global pandemic has brought in examples of distrust among consumers worldwide. Natural disasters (wildfires, hurricanes, and floods) are known to create havoc on world economies resulting in rampant

unemployment and downturn in economic activity [91] and reduce consumer trust and organizational credibility through changes in utilitarian and hedonic consumer buying behavior both during and after the event [66]. Market turbulence may negatively impact trust and credibility among collaborating firms in GVC infrastructure. Thus:

Hypothesis 5 (**H5**). *As Market turbulence increases, the relationship between supply chain collaboration and relational outcomes is weakened*.

Organizational Performance is a factor of financial and market performance of the firm. When firms collaborate with each other in GVCs, they obtain stronger operational results (e.g., high profit margins, strong productivity levels, and better customer value) than they would while working/operating alone. With high operational outcomes, relational outcomes (e.g., trust, relationship commitment, and credibility) improve, and this further improves overall profitability and market share for collaborating firms. Therefore:

Hypothesis 6 (**H6**). *Better operational outcomes result in stronger firm performance (better market and financial performance of the firm)*.

Organizational performance becomes stronger with higher coordination and collaboration levels between firms [92,93]. Ref. [94] examined collaboration levels between and among firms and established that firm performance is impacted by internal collaboration and trust resulting in better customer service performance [95]. Thus:

Hypothesis 7 (**H7**). *Better relational outcomes result in stronger firm performance (better market and financial performance of the firm)*.

As GVCs become more complex, firms display higher levels of interdependence. The resulting competitive advantage for collaborating firms gets deeply integrated and embedded in one another. In GVC infrastructure, firms collaborate at higher levels of collaboration to further appropriate value from each other. This kind of high collaboration among GVC partnering firms result in better relational and operational outcomes, resulting in stronger organizational performance. During market turbulence and uncertainties, stronger collaboration among firms may result in positive operational outcomes needed for avoiding GVC disaggregation; however, during these turbulent environments, the relationship between supply chain collaboration and relational outcomes is weakened for collaborating firms in GVC infrastructure. Appendix A examines the study's constructs along with their measures and sources.

4. Research Design and Methodology

4.1. Survey Instrument

In order to design and validate an appropriate survey instrument, we undertook an extensive review of literature to identify scales used in past research. Established scales were either adopted or adapted to measure supply chain collaboration, market turbulence, operational outcomes, relational outcomes, and organizational performance, as a part of the Collaboration-Turbulence conceptual framework. To maximize response rates and improve the validity and quality, a survey research instrument following the total design method [96] was developed. All constructs and scales used in the research along with their sources are listed in Appendix A.

4.2. Content Validity

Content validity is qualitative in nature where the professionals and/or experts analyze whether the measures in the questionnaire fully represent the domain which is being investigated [97]. Our survey questionnaire was reviewed by three industry professionals who were directly involved in leading supply chain collaboration efforts in their firm. supply chain managers with direct experience in a collaboration effort for

any ambiguities and suggestions to improve the survey instrument. Additionally, eleven experts/scholars from academia also reviewed the survey instrument to check for structure, clarity, ambiguity, and representativeness. Based on the cumulative feedback, the survey instrument was modified before final distribution to respondents.

4.3. Data Collection

To test the proposed hypotheses, a web-based survey method was used to collect the data. Apart from being comparable in quality to mail surveys, web surveys have several advantages like quicker response, higher response rates, and the added ability to collect valuable information about the respondents' survey completion process [98]. Given a general trend toward seeking faster information at a lower cost, web surveys appear to have promise for meeting these requirements without relying on traditional paper-based methods' incumbent times and costs [98]. The sampling method used was "snowball" or hierarchical sampling approach, where the participants were first contacted and asked to identify prospective respondents for the sample. Snowball sampling uses a procedure in which initial respondents are selected and additional respondents are then obtained from referrals or by other information provided by the initial respondents [99,100]. The research team was highly involved in managing the origination and progress of the sample. It was ensured that the chain of referrals was within limitations that are relevant to the research. The snowball approach was deemed most appropriate given the inherent difficulty of identifying managers involved directly in collaborations efforts with suppliers or vendors. This approach can collect data in a more rapid and efficient way than conventional survey methods [101]. The sample includes multinational companies and government organizations originating from the United States of America (developed economy) and doing business in India (emerging economy) across varying industry sectors of aerospace, chemical, computer software, consulting services, consumer products, electronics, financial services, food/beverage/tobacco, industrial products, pharmaceuticals, health and beauty aids, transportation, and motor equipment industries. Almost half (49%) of our respondents worked in the government sector. It was deemed important to include respondents from the government since the government plays an important role in promoting and implementing policies and programs that foster the competitiveness of U.S. supply chains in various industry sectors through the Office of Supply Chain, Professional and Business Services (https://www.trade.gov/about-us/office-supply-chain-professional-and-business-services) (accessed on 20 March 2021). The title of respondents included CEO, president, director, manager, supervisor, consultant, and analyst working for these US based multinational corporations and positioned in India. Almost half (46%) of the respondents had dual titles working in the capacity of advisory committees of the government plus an industry/academic affiliation. The final sample consisted of 113 responses. Table 1 lists the demographics of all respondents in the sample which represented a wide range of industries. Moreover, firm revenues were well represented, with about one fourth of all respondents reporting revenues more than $1 billion, while approximately another one third represented firms with revenues of less than $3 million. Thus, the sample represented a diverse size of firms and helped in increasing the generalizability of results. We checked for any variation of results with three sub-samples of data consisting of firms with revenues greater than $1 billion, less than $20 million, and in between. We found no statistically significant differences in the results. Wave-analysis approach was employed to test for non-response bias [102] by comparing the early vs. late waves to respondents. The *t*-tests yielded no statistically significant differences between the early (70 responses) and late (43 responses) groups, suggesting that non-response bias is not a problem.

Table 1. Demographics of Respondents for US Based Companies doing business in India.

	Percentage of Respondents (for US Based Multinationals Stationed in India)
Position within the firm	
CEO/President	1%
VP	1%
Director	7%
Manager	23%
Supervisor	7%
Consultant/Analyst	12%
Buyer	2%
Other	46%
Annual revenue	
$3 billion and above	11%
$1 billion to less than $3 billion	13%
$500 million to less than $1 billion	4%
$100 million to less than $500 million	6%
$20 million to less than $100 million	11%
$3 million to less than $20 million	23%
Less than $3 million	33%
Industry sector	
Aerospace	1%
Chemicals	2%
Computer Software	8%
Consulting Services	7%
Consumer Products	1%
Electronics/Computers	5%
Financial Services	7%
Food/Beverage/Tobacco	4%
Industrial Products	1%
Pharmaceuticals/Health and Beauty aids	14%
Transportation/Motor equipment	1%
Others	49%

4.4. Measures

All five constructs in the conceptual model constitute latent variables requiring indirect measurement [103,104]. As the constructs in our research reflect (i.e., cause) their indicators, they were specified to be reflective [105,106]. All indicators were selected based on an extensive literature review as well as evidence from academicians and practitioners. Since it is hard to obtain a firm's objective financial data [67], this research relies mainly on subjective measures of firm performance, like many other SCM research [107–109]. We collected data regarding executives' perceptions of their firms' performance in the different dimensions. A 5-point Likert scale ranging between "strongly agree" and "strongly disagree" was used to measure the items. We conducted Harman's single-factor test [110,111] to allay concerns of common method variance. In the exploratory factor analysis, the first factor explained 12% of the variance and the last factor explained 5% of the variance out of a total of 10 factors. No single factor accounted for majority of the variance. Hence, it was safe to assume that common method variance was not of any significant concern in our study [110].

4.5. Analytical Procedure

We validated our measures and tested our hypothetical model using partial least squares (PLS), and more specifically SmartPLS version 3.0 [112]. Partial Least Squares—Structural Equation Modeling (PLS-SEM) was deemed appropriate for our research which focuses on exploration, theory development, and prediction [113]. PLS is a SEM tool that employs a fixed point or component-based least squares estimation procedure to obtain parameter estimates. PLS uses a series of interdependent OLS (Ordinary Least Squares) regressions to minimize residual variances, placing minimal demands on data in terms of measurement scales, sample size, and distributional assumptions [114–116]. Therefore, it is preferable to approaches that employ covariance-based maximum likelihood methods (e.g., Lisrel, EQS, etc.) in examining data where the sample size is relatively small [117]. A fundamental distinction CB-SEM and PLS-SEM is that the former is based on the common factor model, while the latter is based on the composite factor model [113,118]. With the composite factor model the constructs and their scores are represented by the total variance in the indicators, not just common variance as in the case with CB-SEM [113,118]. PLS is also

a conservative modeling approach that tends to underestimate rather than overestimate path coefficients [119], reducing the likelihood of Type 1 errors in hypothesis testing [117]. The focus of PLS-SEM is on optimizing prediction of the endogenous constructs and not on goodness of fit (GOF), as in the case of CB-SEM. Further, PLS-SEM is a variance-based approach, and the analysis does not depend on covariance matrix. Therefore, a Chi-square type of GOF analysis is not required or possible with PLS-SEM. PLS-SEM has greater flexibility in modeling situations where it is difficult to meet rigorous assumptions, such as a normal distribution and homoscedasticity, that are typically required with more traditional multivariate statistics [113,120].

We employed a bootstrapping procedure with 500 randomized samples taken from the original sample [121] to test for indicator reliability. The results of the analysis are shown in Table 2. All estimates of outer loadings exceed the minimum recommended value of 0.7 and exhibit sufficient *t*-values. Convergent validity of all constructs was also assessed. Since all loadings were greater than 0.7, it implies that all indicators share more variance with their constructs than with error variances [114]. Cronbach's alpha value (α) and composite reliability (CR) values were also assessed to establish construct reliability. As per Table 2, the α values for all constructs are above the cut-off value of 0.7 [122,123]. Same applies to all CR values which were greater than the recommended value of 0.6 [121,124]. As per Table 2, the AVE values are above the recommended value of 0.5 [121,125], thus establishing convergent validity. Discriminant validity was also evaluated. Correlations between the latent variables and the square root of AVE on the diagonal are shown in Table 3. As can be seen, the square root of AVE is greater than the correlation among the latent variable scores in all cases, we can conclude that none of the constructs share more variance with another construct, thus establishing discriminant validity [121,125]. Blindfolding procedure with an omission distance of 5 [121] was applied to test the model's prediction relevance. All resulting Q^2 values are larger than zero, indicating sufficient predictive power of the structural model [126–128].

Table 2. Overview of indicators and measures of reliability and validity.

	Constructs and Indicators	Outer Loadings	
		Point Estimation	*t*-Value
	Supply chain collaboration level (α = 0.79, AVE = 0.61, CR = 0.86)		
CL_1	Made joint decisions	0.694	8.088
CL_2	Shared a lot of information	0.779	13.545
CL_3	Openness in thinking and discovering new knowledge	0.834	25.258
CL_4	Improve joint performance	0.817	10.915
	Operational outcomes (α = 0.85, AVE = 0.64, CR = 0.90)		
OO_1	Lower costs	0.604	5.685
OO_2	Improved quality	0.831	20.864
OO_3	Better customer service	0.921	50.291
OO_4	Quicker project results	0.794	15.383
OO_5	Reduced cycle time or lead time	0.801	8.590
	Relational outcomes (α = 0.91, AVE = 0.79, CR = 0.94)		
RO_1	Increased appreciation for partner	0.851	19.027
RO_2	Increased respect for skills and capabilities of partner	0.933	49.546
RO_3	Increased overall respect for partner	0.918	33.299
RO_4	commitment to work together in the future	0.855	12.333
	Market turbulence (α = 0.80, AVE = 0.61, CR = 0.86)		
MT_1	Changing product preferences of customers	0.789	6.103
MT_2	Customers looking for new products all the time	0.831	6.414
MT_3	Demand for our products from new customers	0.804	7.804
MT_4	New customers have needs that are different from existing customers	0.705	6.973
	Firm performance (α = 0.91, AVE = 0.79, CR = 0.94)		
FP_1	Average return on investment	0.927	25.062
FP_2	Profit growth	0.801	8.780
MP_1	Average market share growth	0.919	15.817
MP_2	Average sales volume growth	0.892	14.612
	Interactive terms		
	Collaboration * Market turbulence (α = 0.90, AVE = 0.19, CR = 0.63)		
	Collaboration * Market turbulence (α = 0.90, AVE = 0.25, CR = 0.75)		

Note: α—Cronbach's alpha; AVE—average variance explained; CR—composite reliability; *—interaction term.

Table 3. Correlations between constructs.

Construct	CL	OO	RO	MT	FP
SC collaboration level (CL)	**0.78**				
Operational outcomes (OO)	0.60	**0.80**			
Relational outcomes (RO)	0.69	0.73	**0.90**		
Market Turbulence (MT)	0.29	0.42	0.31	**0.78**	
Firm performance (FP)	0.36	0.38	0.30	0.44	**0.90**

Note: Square root of AVE on diagonal in bold face.

4.6. Results of Analysis

The results from the evaluation of the structural model are reported in Table 4. According to [114], the R^2 values of the endogenous latent variables, operational outcomes (R^2 = 0.604) and relational outcomes (R^2 = 0.557), are substantial, while the R^2 value of organizational performance (R^2 = 0.140) is weak to moderate from a statistical point of view. In our specific context, however, an R^2 of 0.140 can be considered quite substantial, because there are other SCM strategies and practices (e.g., flexibility, integration, purchasing or manufacturing management), which certainly impact the firm performance, but are not included in our model. Overall, the results of our analysis indicate a good model fit with substantial effects and predictive power. The significance of the relationships among the latent variables was tested using the associated *t*-statistics obtained from PLS bootstrapping. As can be seen from the results reported in Table 4, four of the seven hypotheses can be confirmed, of which H1 and H3 are significant at the 0.01 level, H4 and H6 are significant at the 0.05 level.

Table 4. Path coefficients and R^2 of structural model.

Constructs and Indicators	Path Coefficients		Hypotheses	
	Point Estimate	*t*-Value		
RO (R^2 = 0.557)				
CL	0.645	7.74	H1	Supported
CL * MT	0.080	0.90	H5	Rejected
OO (R^2 = 0.604)				
CL	0.116	0.83	H2	Rejected
CL * MT	0.198	2.37	H4	Supported
RO	0.575	4.74	H3	Supported
FP (R^2 = 0.140)				
OO	0.323	2.14	H6	Supported
RO	0.067	0.39	H7	Rejected

5. Managerial Implications

The results indicate that relational outcomes mediate the relationship between collaboration and operational outcomes, especially when multinational companies from developed economies (e.g., the United States, in the present study) are involved in doing business in emerging markets' context (e.g., multinational firms operating and doing business in India, in the present study). The level of collaboration between firms does not have any significant direct effect on operational performance. This result is insightful for managers as it suggests that in collaborative supply chain relationships, managers should focus their efforts on relational outcomes as these are directly affected by collaboration efforts in GVCs. Better relational outcomes will result in better operational outcomes. Further, it is the operational outcomes, and not the relational outcomes, that influence the firm performance. Therefore, managers at the decision-making level in partnering firms should focus on the relational outcomes of the collaborative relationships among firms because if the relational outcomes are strong, GVCs are strengthened through better operational outcomes leading to better firm performance.

Furthermore, the results indicate that market turbulence may not have any effect on the link between collaboration and relational outcomes. This finding suggests that relational view is more dominant than structural contingency theory for strong GVCs. According to the results, the level of market uncertainty will not affect the firm performance if the collaborative relationship between firms is strong, thus avoiding GVC disaggregation. Another interesting finding of this research suggests that uncertain market conditions may contribute positively to operational outcomes of collaborative efforts between partnering firms. In turbulent market conditions, collaborating firms will try to operate more efficiently by reducing operating costs in GVCs and be more effective by providing better quality and improved value to their customers to retain their consumer base. This downstream, consumer-directed impact on a firm's operational performance strengthens global value chains through market uncertainties and turbulence in collaborative relationships [70].

Knowledge and capabilities of collaborating firms are instrumental in developing effective solutions for their supply chains [11]. Firms need to commit time and effort in collaborative initiatives with a focus on emerging markets. As [1] noted that formal and informal institutions relay stakeholder concerns, and GVC disaggregation can be reduced through checks and balances regulated by institutions and stakeholders in both developed and emerging economies. Level of collaboration among firms, institutions (NGOs, media, organized labor and interest groups, etc.), and stakeholders can strengthen value chains globally through proper governance. On the flip side, if governance mechanism is weakened, as in the case of Chinese labor laws and Apple Inc.; enforcement loopholes, insufficient worker protection, and governance gaps (non-enforcement of stricter laws by the Chinese government) result in widespread GVC disaggregation [1]. Previous research [44,56,75,76] suggest that collaborative partnerships among firms, institutions, and NGOs can result in better stakeholder management and strong cooperative behavior amongst partnering firms throughout GVCs operating in both developed and emerging markets.

The need for collaboration is important in the context of service environment too. Strong collaborations lead to better relational outcomes which in turn lead to better operational outcomes throughout the value chain. The focal firm must ensure higher financial performance (revenues/profits) for all collaborating companies operating in both developed and emerging parts of the world resulting in a win–win situation.

6. Conclusions

This research provides important insights on successful buyer–supplier collaborative efforts to improve firm performance in global value chains of multinational organizations headquartered in developed countries and having long and complicated supply chains in emerging countries. As the Indian market is constantly evolving due to globalization, the findings of this study assist the US based global companies in doing business with emerging economies and coping with the dynamic uncertainties of the market demand [70]. Our research investigates the relationship between collaboration level, and relational and operational outcomes, along with the impact of market turbulence on the firm performance. The institutional and stakeholder pressures of GVC theory in addition to relational view strengthens GVCs by regulating firms' infrastructure through cooperative behavior amongst collaborating firms.

As with every research method, this research has its limitations too. The survey data were collected from single respondents within focal firms only. Because it is cost prohibitive and time consuming, it was not possible to collect data from supply chain partner companies of focal firms located in other parts of the world. Therefore, if resources permit, it is suggested to broaden the survey to include the supply chain partners involved in the collaboration globally. This research also did not examine objective financial data to verify improvements in firm performance. Further research is needed to cross-examine the reported results related to collaboration efforts by partnering firms of the supply chain. This would entail examining the financial data of both focal as well as collaborating firms to verify the results.

Another interesting area of future research may focus on service vs. manufacturing supply chains. It would be beneficial to managers and researchers compare firm performance of different industries and their supply chains This research validated the hypothesized relationships between level of collaboration, improved relational and operational outcomes, and business performance. The inclusion of market turbulence in the model improved operational outcomes but did not seem to affect relational outcomes. Future research should also consider the regulatory (and co-regulatory) factors as a resultant of multi-stakeholder initiatives and concerns [1], which may lead to successful collaboration between firms in global value chains.

Author Contributions: Introduction, A.A. (Amit Arora), A.A. (Anshu Arora) and J.M.; Literature Review, A.A. (Amit Arora) and J.A.; Methodology, A.A. (Amit Arora); Conceptual Framework, A.A. (Anshu Arora); Hypotheses, A.A. (Anshu Arora); Conclusions and Implications, A.A. (Anshu Arora); Proof Reading, J.A. and J.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research is funded by the Georgia Tech's Center for International Business Education and Research (CIBER) and National Science Foundation Grant # 1912070.

Data Availability Statement: The paper complies with MDPI data requirements.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Scales and Their Sources.

Label	Item	Likert Scale	Adapted from
	(1) Supply Chain Collaboration Level		
	The organizations involved:		
CL_1	made joint decisions on most issues	5	[11]
CL_2	shared a lot of information	5	[11]
	Throughout this collaboration:		
CL_3	there was an openness to new ways of thinking and discovering new knowledge	5	[129]
CL_4	there was an openness to ways to improve joint performance	5	[129]
	(2) Operational Outcomes		
	This collaboration resulted in:		
OO_1	lower costs	5	[130]
OO_2	improved quality	5	[130]
OO_3	better customer service	5	[130]
OO_4	reduced cycle time or lead time	5	[130]
OO_5	improved value to our customers	5	[130]
	(3) Relational Outcomes		
	As a result of this collaboration, our organization gained:		
RO_1	an increased respect for the skills and capabilities of our collaboration partner	5	[11]
	This collaboration resulted in our two organizations having:		
RO_2	an enhanced commitment to work together in the future	5	[131]
RO_3	an overall more productive working relationship	5	[131]
RO_4	an improved level of honesty and trust	5	[77]
	(4) Market Turbulence		
MT_1	Changing customers' product preferences	5	[84]
MT_2	Tendency of customers to look for new products	5	[84]
MT_3	Product needs of new customers in comparison to existing customers	5	[84]
MT_4	Catering to many new customers	5	[84]
	(5) Organizational Performance		
	Financial Performance		
FP_1	Average return on investment over the past three years.	5	[132]
FP_2	Profit growth over the past three years.	5	[132]
	Marketing Performance		
MP_1	Average market share growth over the past three years.	5	[132]
MP_2	Average sales volume growth over the past three years.	5	[132]

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