Supply chain gaps analysis during COVID-19 pandemic - the case of medical supplies in Tanzania

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Abstract

Purpose – This study aims to investigate the supply chain gaps during the COVID-19 pandemic in Tanzania amid the pandemic era.

Design/methodology/approach – This study adopted a mixed approach, using both structured questionnaires and individual interviews to gather raw data (quantitative and qualitative data). To assess quantitative data for statistical (descriptive and inferential) analysis, this study used a sample of 57 wholesale and retail pharmacies and 10 hospital pharmacies, which were randomly selected. The thematic analysis was applied to the gathered qualitative data to authenticate the quantitative findings and conclusions which were the outcome of the descriptive and inferential analysis (binary logistics regression) analysed by the SPSS.

Findings – The results revealed the presence of various supply chain gaps in terms of target gaps, time gaps and coverage gaps. This study highlighted the disruption on demand and uncertainty in business environment as ways that the COVID-19 pandemic contributed to the gaps and revealed the negative effects of the supply chain gaps on the effectiveness of medical supplies in Tanzania.

Research limitations/implications – The results revealed the presence of various supply chain gaps (in terms of target gaps, time gaps and coverage gaps), underlined the disruption in demand and uncertainty in the business environment as ways that the COVID-19 pandemic contributed to the gaps and revealed the negative effects of the supply chain gaps on the effectiveness of medical supplies in Tanzania.

Practical implications – Data generated and used in this study is from participants from one country only (Tanzania), despite the supply chain gaps being common to many developing countries in general.

Originality/value – This study provides a novel framework in medical supply chain literature by identifying numerous disruptions in the medical supply chain which emerged during the COVID-19 emergence and serves as a basis for future studies on how to counter the gaps and rebuild a resilient and sustainable medical supply chain in developing countries.

Keywords Humanitarian logistics, Health supply chain, Supply chain gaps, Medical supplies, COVID-19, Tanzania

Paper type Research paper

1. Introduction

The effectiveness of the supply chain in medical supplies is vital in ensuring a better and healthier nation as a result of good medical services. The primary purpose of the health supply chain has always been to regulate the movement of all essential medicines, medical devices and medical service providers and manufacturers to patients and those in need so as to balance the demand and supply of medical supplies throughout the period and for the betterment of society's health and well-being (Thompson and Anderson, 2021). The flow of medical supplies can be maintained by obtaining and allocating all relevant resources towards the respective supply chain, better management of supplies and effective delivery of the supplies (Thompson and Anderson, 2021). During supply chain disruptions, the health supply chain became the key component of ensuring the effectiveness of the humanitarian supply chain and healing the communities at large (Zijm *et al.*, 2019). The humanitarian supply chain can organize the distribution and storage of medical supplies to aid the population during disasters (Sharma *et al.*, 2022a, 2022b). The health supply chain plays a major role in disaster relief efforts; first to mitigate the negative impact that emerged as a result of that particular disaster and to formulate a useful data repository that can be used for analysing the effects of the pandemic and for providing post-event learning (LaPointe, 2016).

Studies revealed a substantial negative unrest in the supply chain which was influenced by the emergence of COVID-19 effects on major supply chain actors, including the manufacturers of industrial products, automotive products and retail firms (Kovács and Spens, 2021). Unlike the other sectors, the high-tech sector grew by 11% during the period (Thompson and Anderson, 2021). Chen *et al.* (2021) highlighted the challenges faced by several actors during the COVID-19 pandemic. The suppliers faced increasing demand for goods (such as ventilators, personal protective equipment, testing supplies and equipment) and transportation difficulties. On the contrary, manufacturers could not move technology from one factory to another because

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of regulatory approvals that required more than 18 months to obtain (Chen *et al.*, 2021). Many supply chain actors, including logistics firms, focused on increasing supply chain visibility, efficiency and resilience as a major tool for survival during the era. Various studies proposed solutions for rebuilding supply chains after a pandemic; Muhammad *et al.* (2022) identified the measures that firms can use to achieve operational excellence in pandemic outbreaks such as COVID-19, which include the implementation of lean, six sigma and sustainability. The study argued that it is these performance indicators that have been giving lucrative benefits to many developed countries. These indicators were proven to have a positive impact on a firm's efficiency, growth and profit in the context of developing countries like Pakistan (Muhammad *et al.*, 2022).

In Tanzania, where the automation of logistics activities and supply chain coordination is still in progress, the medical supply rate was growing at over 10% annually and was expected to reach 85% from that of 21%, which was recorded in January 2019 (Ministry of Health, 2020). The Ministry of Health revealed that the medical supplies achievement rate had reached 62% countrywide, far away from the target set. Among many reasons for the failure to achieve the target was the COVID-19 pandemic, which was the most mentioned factor (Ministry of Health, 2021). This raised the curiosity of the researcher to analyse the supply chain gaps caused by COVID-19 on the medical supply chain in Tanzania.

It is expected that the strength of the medical supplies (health) supply chain in times of natural calamities, human-made disasters and pandemics will be stronger to counter the increasing demand for medicine supply during such occurrences (Kovács and Spens, 2021). But the reality is always the opposite, as witnessed back in 2004 during the occurrence of tsunamis along the Indian Ocean, Pakistan floods and the notable earthquake in Haiti in 2010 (Kovács and Spens, 2021) and the 1994/1995 Rwanda Genocide (Pettit and Beresford, 2005). This study investigated the supply chain gaps in medical supplies during the COVID-19 pandemic in Tanzania, using the city of Dar es Salaam as a focal point. Specifically, the study fulfilled the following objectives:

- assess the existence of supply chain gaps in medical supply chain during COVID-19 emergence;
- assess the means which COVID-19 contributed to these gaps; and
- analyse the effect of each supply chain gap towards the effectiveness of medical supplies in Tanzania during the COVID-19 emergence.

Although the study reveals the supply chain situation during the pandemic, it also reveals the weaknesses of the supply chain at large. The study proposes suggestions to various stakeholders in the health sector to better perform and correct the shortfalls identified to improve the supply chain and the health sector at large.

2. Theoretical literature on the health supply chain

2.1 The resource complementarity theory

This study is guided by the Resource Complementarity Theory (RCT) that explains the effectiveness that an organization can achieve as a result of interfirm resource linkages (Ozlem *et al.*, 2009). The theory describes the advantages of combining supply chain actors and resources in achieving a better state and a competitive advantage. Invoking the theory to the case of medical supplies in Tanzania, the effectiveness of the medicines and medical devices supplies in the health centres and hospitals in Tanzania is an output of the proper exploitation of the medical supply chain actors' linkages in serving the downstream of the medical supplies. During the pandemic, several sectors in Tanzania were adversely affected, including the disruption of major supply chains in the country and, as a result, the decline in major businesses such as tourism-associated businesses and retail businesses. RCT was used to conceptualize the relationship between the supply chain actors, understand the need to integrate such channels and how supply chain disruptions can impact the performance of the supply chain at large. The RCT theory, however, did not state the effects of several disruptions such as pandemics and force majeure on supply chain management and what could be the impact and remedy thereafter. The study, however, assessed the gaps in the supply chain that emerged because of the disruptions caused by COVID-19 and revealed the impacts they posed on the distribution of medical supplies. Furthermore, the study elaborated on the lack of strong linkage to deliver the desired result of the holistic distribution chain, as well as the consequences raised as a result of distortion of the relevant chain effectiveness and readiness.

2.2 Empirical review

In the distribution of medical and food supplies in Germany, the main attribute of success is the collaboration of all the supply chain actors and logistics service providers (Breitbarth *et al.*, 2021). To attain a better supply chain and better response time, a holistic concept is encouraged to apply from the pre-disaster phase with the inclusion of all involved public actors and private actors, including the stakeholders (Breitbarth *et al.*, 2021). Different other measures have been outpointed as the business sector finds a way forward in reshaping and stabilizing all the fractured sectors amid the COVID-19 emergence. Agrawal *et al.* (2021), after realization of several gaps in business performance, assessed the relationship between the circular economy and sustainable business performance. The study revealed a significant relationship between the circular economy and 14.0 and other possible contributions of smart technologies to resolve the circular economy business models and enable sustainable business performance through the era of digitalization.

However, the adoption of circular economy is not very easy to emerge from within firms; external factors facilitating the adoption of circular economy include environmental awareness, stakeholders' pressure and government rules and regulations (Upadhyay *et al.*, 2021). Upadhyay *et al.* (2021) emphasized the benefits of circular economy from the perspective of the UK, such as increased GDP and providing a sustainable supply chain in the face of various social and economic unrest. There has been a strong emphasis on implementing circular economy as a means of rebuilding the distorted manufacturing sector caused by the emergence of COVID-19 (Jaeger and Upadhyay, 2020). High start-up costs, the quality of recycled materials, high technology-intensive processes required and time consuming are among the many barriers to circular economy that manufacturers face (Jaeger and Upadhyay, 2020).

The debate on what the correct measures should be taken is extended in the study of Upadhyay *et al.* (2022a, 2022b, 2022c),

as it was cemented that the application of lean and agile principles and practices in both phases (pre-disaster for mitigation and preparedness and post-disaster for response and recovery) is essential.

Perhaps the medical supply chain in Tanzania needs to adapt to the green supply chain practices as suggested by Upadhyay (2020) as one way to improve the sustainability of supply chain management of medical supplies. Green supply chain management encompasses the entire product life cycle, from raw material extraction to product design and development to distribution to end users (Upadhyay, 2020). Despite this being the most preferred measure to develop and maintain a sustainable supply chain, the reality in developing countries suggests otherwise. The year 2021 revealed several environmental challenges that the Ethiopian health-care supply chain faces in implementing a green supply chain. Poor inventory management, inefficient tracking and tracing and substandard products (counterfeit medicines) all contribute to bottlenecks (Jaeger *et al.*, 2021). The study by Kumar *et al.* (2019) also emphasized the rationale for introducing green practices as the study revealed a significant impact of the green practices on operational performance. However, adoption of green practices is still lagging because of firms' limited knowledge of how to integrate the practices to improve operational performance (Kumar *et al.*, 2019).

From the literature of supply chain management, a lot of evidence shows the need to merge the demand and supply of medical supplies because such supplies mark a stable health supply chain. According to Zijm *et al.* (2019), the strength of medical supplies improved the condition and state of the whole health sector in India. This is due to the fact that hospitals, pharmacies and health centres depend fully on the supply of these products for offering different treatments and services to the needy and for business purposes (Rusell and Swamson, 2019). The same was revealed in Africa; among the reasons mentioned in South Africa as the main contributors to the health sector's stability is the stability of the supply chain of medical supplies (Zijm *et al.*, 2019). During the COVID-19 pandemic in Tanzania, various sectors were distorted because of the economic panic that emerged. For instance, the banking sector had to rely on the internet and mobile banking platforms to counter the market (Sallwa *et al.*, 2020); the tourism sector recorded a minimal number of tourists for the first time in the history of Tanzania. Different reports from the relevant authorities showed a slight distortion of the supply chain of medical supplies in the country during the coronavirus emergence in Africa (WHO Quarter Report, 2020). This begs the question of whether the same effects were observed in the supply chain, specifically the medical supply chain. As a result, this study was undertaken to ascertain the supply chain gaps that existed in medical supplies during the COVID-19 emergence in Tanzania (Figure 1).

Figure 1 Conceptual framework

Sources: Modified from (Upadhyay *et al.*, 2022; Sharma *et al.*, 2022; Thompson and Anderson, 2021)

3. Methodology

The developed methodology is based on a mixed approach, accommodating both quantitative and qualitative methods. The study was cross-sectional in design, as it allowed a one-point data collection to enable an objective analysis without the consideration of past trends in the supply chain (Hair *et al.*, 2009). The study focused on Dar es Salaam as the city at the centre of the country's medical supply chain, both for imported and locally manufactured medical supplies (Magasi, 2020).The researcher was based in the Ilala district because of the convenience of data collection.

From the population of 80 pharmacies, which were both wholesale pharmacies (distributors) and retail-sale pharmacies, the researcher used the sample size of 67 from the sample calculation by applying Yamane's (1967) formulae. A total of 57 wholesale and retail pharmacies and 10 hospital pharmacies were randomly selected and involved in the study using the structured questionnaires. The researcher also included face-to-face interviews to collect qualitative data from the 10 hospital managers to augment the empirical findings.

Thematic analysis was used to analyse qualitative data in NVivo version 10, whereas descriptive statistics and binary logistic regression (inferential statistics) were used in SPSS to analyse quantitative data retrieved from collected questionnaires. Descriptive statistics for objectives (i) and (ii) necessitated computation of means, standard deviations, minimum, maximum, Chi-square, frequency and percent, whereas tables were used to present findings. To estimate the effect (objective iii) of the supply chain gaps on the effectiveness of medical supplies in Tanzania, the model of binary logistic regression was adapted as the result of treating the dependent variable as a dummy variable (1 = if procurement effectiveness increased, 0 = otherwise). The binary logistic regression model is presented using the equation as hereunder:

$$EMS\left(Y=\frac{1}{Xs}\right)=\beta_0+\beta_1 Sg_1+\beta_2 Tag_2+\beta_3 Tig_3+\beta_4 Cog_4+\beta_5 Np_5+\beta_6 Exp_6+\varepsilon_i$$

whereby:

Y = dependent variable, which is effectiveness of medical supplies in Tanzania,
Sg = Supply gaps;
Tag = Target gaps;
Tig = Time gaps;
Cog = Coverage gaps;
Np = Nature of pharmacy;
Exp = Experience in the industry; and
β_o = coefficients estimated in the model.

4. Results and discussion

Because the analysis involved use of factor analysis, the Kaiser–Mayer–Olkin (KMO) and sphericity tests (Bartlett's) were performed to test the relevance of factor analysis. The KMO statistic values normally range from 0 to 1, whereas the value of 0 depicts a large partial correlation significant in relation to the

whole correlation sum, which displays dispersion in the correlation patterns. This implies that the use of factor analysis was inappropriately used in a study. Whenever the presented value of KMO is adjacent to 1, it shows compact patterns of the studied correlations and this authenticates the use of factor analysis, which gives unique and significant factors (Field, 2013). The score of KMO above 0.5 is acceptable, whereas values below 0.5 may necessitate the study to gather additional data or rethink about the variables involved in the study (Kaiser, 1974). Moreover, KMO scores from 0.5 to 0.7 are adequate, KMO values from 0.7 to 0.8 are satisfactory, whereas scores from 0.8 to 0.9 are abundant and all scores above that (0.9) are referred to as excellent scores. According to the findings, the KMO value was 0.912 implying that the value was excellent, and thus the data in this study were suitable for factor analysis (Field, 2013).

The sphericity test (Bartlett's) measures null hypotheses on the originality of the correlation matrix to be an identity matrix. The researcher was required to establish possible relationships existing within the variables to ascertain the identity matrix of the R-matrix (shown by a zero [0] correlation score of all variables' correlation coefficients). In this regard, the value is supposed to be significant. A test of significance indicates the R-matrix is a non-identifiable matrix; thus, there is a significant relationship between all the variables included in the study and analysis. In this study, the p-value was less than 0.001 (Bartlett's test), revealing an appropriate use of principal factor analysis (Nyange, 2016; Mashenene and Kumburu, 2020).

4.1 Supply chain gaps amid COVID-19 pandemic

The results from Table 2 reveal a mean score of above 3.0 for all nine supply chain gaps analysed, implying that the gaps are significant in medical supplies and that they emerged as a result of the COVID-19 outbreak in Tanzania. Specifically, the study ranked market coverage gaps first (Mean = 4.1886), followed by gaps in demand forecasting (Mean = 3.7029), followed by prioritized supply strategies gaps (Mean = 3.6971), followed by gaps in the distribution channels (Mean = 3.6457), then gaps in medical supplies policy (Mean = 3.5257), followed by supply chain inelasticity (Mean = 3.4971), gaps in supply chain relationships (Mean = 3.4514), followed by gaps in distribution timing (Mean = 3.3371) and target gaps (Mean = 3.0286). These findings imply that numerous supply gaps emerged within the medical supply network in Tanzania as a result of the COVID-19 outbreak in the country. The gaps result from the demand disruption that the pandemic caused. For instance, in the current business trends, the distortion of demand will hamper market coverage and timing issues as it directly affects the supply chain performance, as revealed by an interviewee from one of the selected hospital pharmacies. These results are compatible with those of Kovács and Spens (2021), which revealed the same when assessing the trends of the humanitarian supply chain.

4.2 Contribution of COVID-19 towards the supply chain gaps

In assessing this objective, the study assessed ways that the pandemic made the medical supply network ineffective and failed to match the demand and supply of medical devices and medicines during the pandemic eruption. From Table 3, it was revealed that the pandemic contributed to the supply chain gaps in the medical supplies industry by forming an economic tension, business shock, uncertainty and disruption of demand, making it difficult to match demand with supply and the increased business risks forcing supply chain actors and partners to reduce investment during the pandemic.

The outcomes from the questionnaires and those from the interviews reveal that business uncertainty, disruption of demand and increased business risk contributed much to the supply chain gaps of medical supplies. One of the interviewees stated that:

> *It was difficult for us to counter the supply disruptions that occurred. Meanwhile, doing so required more funds, which during the time it was very difficult to seek capital since many financial institutions and capital sources suffered the same, and as a result, we failed to contain the supply chain.*

This is shown by the mean score of 4.1 that each factor scored compared to that of 3.9143 that economic tension scored. The findings of COVID-19's contribution to supply gaps are compatible with that of other natural calamities as reported from the 2004 Tsunami experience along the Indian Ocean, the Haiti earthquake in the early 2010s and Pakistan floods (Pettit and Beresford, 2005), and human-made disasters such as the 1994/1995 Rwanda Genocide (Kovács and Spens, 2021).

4.3 Regression results

The overall model fit (Table 1) was found to be statistically significant ($p < 0.05$) as measured by Chi-square in the omnibus test as depicted by the binary logistic results. This significance indicates that the model predicted supply chain gaps that affected the effectiveness of medical supplies in Tanzania. Furthermore, the results of Nagelkerke R^2 and Cox & Snell R^2 were 0.436 and 0.274, respectively, which indicate that the independent variables in the model, explained 43.6% and 27.4% of the variance in medical supply effectiveness in Tanzania. The extent of the variance of the response variable explained by the model is revealed by the coefficients of Nagelkerke R^2 and Cox & Snell R^2 which normally range from 0 to 1. The values of Nagelkerke R^2

Table 1 KMO and sphericity test

KMO – Sampling adequacy measure		0.912
Bartlett's test of sphericity	Approx. Chi-square	1241.630
	df	67
	Sig.	0.000

Table 2 Supply chain gaps during COVID-19 pandemic

Supply chain gaps	Mean	SD
Target gaps	3.0286	0.94946
Distribution channels gaps	3.6457	0.80242
Demand forecast gaps	3.7029	0.71337
Supply chain inelasticity gaps	3.4971	0.80853
Prioritized supply strategies gaps	3.6971	0.73088
Medical supplies policy gaps	3.5257	0.90856
Distribution timing gaps	3.3371	0.95022
Coverage gaps	4.1886	3.07453
Supply chain relationships gaps	3.4514	0.99809

Source: Study findings (2021)

Table 3 Magnitude of COVID-19 contribution towards the supply chain gaps

Factors	Mean	SD
Economic tension	3.9143	1.11343
Business shock (uncertainty)	4.1200	0.87257
Disruption of demand	4.4057	0.67889
Increased business risk	4.1600	0.91451

Source: Study findings (2021)

and Cox & Snell R^2 statistically explained as pseudo R^2 that are different from those of multiple regressions, which are true R^2 values (Pallant, 2011).

The extent of the effects of the supply chain gaps on the effectiveness of medical supplies in Tanzania is reflected by the results of the Binary Logistic analysis as presented in Table 4. The coefficient of supply chain gaps was negative (−1.428) related to the performance of medical supplies and statistically significant ($p = 0.003$), implying that a unit change (increase) in supply gaps will result in a 142.8% decrease in medical supply effectiveness in Tanzania. The effect of supply gaps on the medical supplies' effectiveness was further supported by the odds ratio of 1.840, which implies that the likelihood of supply chain gaps changing the medical supplies' effectiveness is 1.8 times.

Table 4 also shows that the coefficient of effects of COVID-19 was negative (−0.518) related to the effectiveness of medical supplies and, statistically, it was significant ($p = 0.001$). These findings imply that a unit change in the effects of COVID-19 will cause a 51.8% decrease in the effectiveness of medical supplies in Tanzania. For instance, as disruption of demand, trade and finance will jeopardize the effectiveness of medical supplies, this has also been shown by the odds ratio of 2.296, which implies that the likelihood of COVID-19 effects related to the effectiveness of medical supplies was 2.3 times.

Furthermore, Table 4 shows that the coefficient of determinants of supply chain gaps was positive (0.934) related to the effectiveness of medical supplies and, statistically, it was significant ($p = 0.001$). These findings imply that any unit rise in the determinants of supply chain gaps will increase the effectiveness of medical supplies by 93.4%. This is also demonstrated by the odds ratio of 2.545, which indicates that the likelihood of supply chain gaps changing the effectiveness of medical supplies was 2.6 times.

Table 4 also discloses the "nature of pharmacy" was negative (−0.780) associated with the effectiveness of medical supplies like the Experience in industry (which scored −0.017) and statistically they were both insignificant ($p > 0.001$). These findings imply that a change in the nature of the pharmacy or industry experience has no significant impact on the effectiveness of medical supplies in the country.

5. Conclusion

The study revealed the presence of various supply chain gaps in terms of target gaps, time gaps and coverage gaps. The gaps included the failure of distribution channels to embrace rapidly emerging markets and demand distortions; unstable supply chain partnerships; absence of effective demand forecasting; supply chain inelasticity in countering distortions; nonprioritized medical sector; and lack of policies to govern medical supplies during pandemics. These observed gaps were mostly as a result of the eruption of the pandemic. The study highlighted the ways that the COVID-19 pandemic contributed to the gaps and revealed the effects of the supply chain gaps on the effectiveness of medical supplies in Tanzania. Among the ways that COVID-19 accelerated the supply chain gaps are the economic tension created by the pandemic and the business shock experienced by businessmen (both distributors, wholesalers and retailers), which created a forester effect on the demand for medical supplies and increased the risks relevant to supplies of the said products. The findings from the binary regression show a negative contribution of the supply chain gaps and other assessed factors towards the supply of medical supplies during the pandemic emergence in the country.

It can be concluded that the decrease in medical supplies during the COVID-19 emergence in Tanzania was the output of the pandemic itself, which created an uncomfortable and unstable environment for the medical supply chain. This is to say, several gaps hindered the supply chain actors in fulfilling the increased demand for medical supplies at large.

5.1 The study's practical implications

The identified gaps indicate the present situation in the medical supplies supply chain and emphasize the necessity to rebuild

Table 4 Effect of supply chain gaps towards the effectiveness of medical supplies in Tanzania during the COVID-19 emergence

Variables	B	SE	Sig.	Exp(B)
Supply chain gaps (index)	−1.428	0.476	0.003	1.840
Effects of COVID-19 (index)	−0.518	0.318	0.001	2.296
Determinants of the supply gaps (index)	0.934	0.249	0.000	2.545
Nature of the pharmacy (dummy)	−0.780	0.518	0.133	2.181
Experience in industry (years)	−0.017	0.036	0.644	1.017
Constant	−0.555	1.744	0.744	0.574
Omnibus test – Chi-square	53.342(6) ($p = 0.000$)			
Hosmer and Lemeshow – χ^2	8.286(8) ($p = 0.406$)			
Cox & Snell R^2	0.263			
Nagelkerke R^2	0.419			
−2 Log Likelihood	118.990			

Note: Dependent variable: Effectiveness of medical supplies (increased = 1, otherwise =0)
Source: Study findings (2021)

and strengthen the supply chain linkage as a measure to correct the fragmented network and develop a more resilient and collaborative supply chain that was distorted by COVID-19. However, the data used was generated from only one country (Tanzania) to give a perspective on the developing countries.

5.2 Originality of the study

Despite several articles on the supply chain, this article specifically addresses the supply chain gaps experienced as a result of the COVID-19 pandemic emergence in early 2021; a special reference on the medicine supplies in Tanzania draws on the RCT. The study serves as a basis for future studies on how to counter the gaps and rebuild a resilient and sustainable medical supply chain in developing countries, specifically in the context of African states.

5.3 Recommendations

Based on the findings, the following are recommended:

- Medical supply chains should be resilient, collaborative and networked with the aim of increasing and distributing the supply chain profit to both the upward and downward streams of the supply network. This will prevent a fragmented supply chain and solidify the network during such pandemics. It is also important to examine and identify all the concrete issues faced by a firm during a crisis before redesigning the supply chains (Miroudot, 2020).
- Among the dominant policies in building the resilience of a firm and its supply chain are agility and flexibility (Miroudot, 2020). Firms should increase investment in supply chain technology (transform the operations to automated and digital enablement) to increase supply chain agility in the medical supplies sector at all times.
- Increase supply chain visibility and efficiency through developing the skills of different supply chain actors to improve demand forecasting and planning. Among the best practices in reshaping the global economy after a pandemic include the use of pre-existing supply chain capabilities and infrastructure together with varying risk mitigating strategies; integrating supply chain internal teams with those of other actors to overcome issues of logistics and transportation; and creating digital ordering platforms to meet customer needs quickly (Coleman, 2021).
- To create a sustainable supply chain competition to allow a win-win supply chain benefit through a long-term partnership relationship so as to attain optimum utilization of available resources and minimize the cost of distribution.
- Policies should be developed to govern the medical supply and humanitarian supply chains during pandemics and other calamities to improve and maintain life standards during such occurrences.

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