

Data Analysis Process

The researcher chose the thematic analysis approach as the preferred approach to analyze qualitative data collected in the study titled exploring the impact of Covid 19 related supply chain disruptions on selected engineering firms. The researcher also preferred the reflexive thematic analysis approach to analyze the interview data collected after interviewing ten key participants including management and staff of selected engineering firms in Ghana. The reflexive thematic analysis (RTA) approach is a step-by-step approach of conducting thematic analysis. Braun and Clarke (2020) argue that reflexive thematic analysis (RTA) is a simple and versatile method for analyzing qualitative data. Reflexive thematic analysis is a method for extracting themes and patterns from a collection of qualitative data. Data familiarization, code and theme generation, theme review, theme naming and definition, theme definition, and report generation are the six phases of RTA (Braun and Clarke, 2021).

The researcher transcribed the interviews in accordance with the first stage of reflexive thematic analysis, which is familiarization. The investigator also checked the transcripts for accuracy by listening to the recorded interviews. The researcher then read all the transcripts multiple times to make sense of the participants' responses to the various research questions.

Following an overview of the interview transcripts, the researcher moved on to developing preliminary codes, the second stage of reflexive thematic analysis. The researcher used Nvivo 14, a popular Computer Aided Qualitative Data Analysis (CAQDAS), to analyze the interview transcripts. After reading through all of the interview transcripts, the researcher used Nvivo 14 to create codes for each transcript. Coding involves labeling and abbreviating descriptive or interpretive information that is relevant to research questions (Byrne, 2021). The following table displays examples of the first set of codes created in Nvivo14.

Initial Codes	No. of participants	No. of Coding References
Caused disruptions in logistics	2	2
Caused disruptions in production	2	2
Caused disruptions in transportation	6	6
Caused labor shortages	2	2
Contributed to delays in supply chain	1	1
Contributed to disruptions across the supply chain	1	1
Contributed to shortages across the supply chain	6	8
Led to manufacturing facilities closures	5	7

Employee wellbeing	1	1
Operations	1	1
Change of purchasing behavior among consumers	3	4
Work arrangements	3	3
Disruption of global economy and job losses	1	1
Acknowledging and closely monitoring the supply chain challenges	1	1
Adjusting inventory management practices	2	2
Collaborating with partners and suppliers to find solutions	2	2
Conducting risk assessment of the supply chain	2	2
Diversifying supplier base	5	5
Establishing alternative sourcing options	1	1
Implementing real-time monitoring systems	2	4
Looking for ways to adapt to changes	1	1
Streamlining communication across the supply chain	5	8
Working with more local suppliers	1	1
Having a dedicated supply chain resilience team	1	1
Implementation of rapid response efforts during disruptions	1	1
Conducting thorough reviews after disruptions	2	2
Maintaining a well-designed business continuity plan	1	1
Caused significant challenges as a result of lockdown measures	1	1
Contributed to the significant disruption of the supply chain	6	6

Restoration of normal operations after short term disruptions dependent on nature and severity of the disruption	1	1
Relies on well-documented emergency response protocols and backup systems to restore operations after short-term disruptions	1	1

The third step of reflective thematic analysis was to come up with themes. The researcher paid close attention to the semantic and meaningful relationships between the various codes in order to formulate initial themes. Preliminary themes derived from the initial codes are listed in the table below.

Preliminary Themes	No. of participants	No. of Coding References
Impact of Covid-19 on Company's Supply Chain	10	29
Other areas affected by covid-19	7	10
Strategies adopted by organizations to deal with supply chain disruption challenges	10	32
Views on the impact of covid-19 on supply chains	9	12
Actions taken by organizations to mitigate Covid19 pandemic supply chain disruption event	10	29
Meaning of organizational supply chain management resilience strategy	7	16
Perceptions of organizations' robustness and resilience during covid-19 pandemic	10	14
Responsive actions taken by organizations to mitigate Covid-19 pandemic's disruption	7	23
Supply chain resilience strategies utilized during and after Covid 19 pandemic supply chain disruption event	10	34
Views on how quickly organization restores normal operations after short-term disruptions	9	12

The fourth stage of a reflexive thematic analysis involves a review of possible themes. During this phase of RTA, researchers are tasked with drawing connections between their initial themes and the coded information as well as the entire dataset (Byrne, 2021). The researcher carefully went through the list of preliminary themes, combining similar ones and discarding those that didn't add anything to the overall interpretation of the data.

The fifth stage of reflexive thematic analysis is to define and name the themes (Braun & Clarke, 2020). This involves defining and describing each theme in detail. Each of the final themes is defined in the table below.

Theme	Description
Impact of Covid-19 on Company's Supply Chain	Effects of Covid-19 on the supply chain of interviewees company
Other areas affected by covid-19	Areas affected by covid-19 other than supply chain related areas.
Strategies adopted by organizations to deal with supply chain disruption challenges	How companies dealt with problems involving supply chain disruption occasioned by the Covid 19 pandemic
Views on the impact of covid-19 on supply chains	Interviewees description of the impact of the Covid-19 on supply chains
Actions taken by organizations to mitigate the Covid19 pandemic supply chain disruption event	Actions taken by companies following the supply chain disruption events due to Covid
Organizational supply chain management resilience strategies	Current organizational supply chain management resilience strategy according to interviewees
Perceptions of organizations' robustness and resilience during covid-19 pandemic	Interviewees views on whether their company was robust and resilient enough during Covid 19

Theme	Description
Responsive actions taken by organizations to mitigate Covid-19 pandemic's disruption	How different organisations respond to Covid-19 pandemic's disruption according to interviewees
Supply chain resilience strategies utilized during and after Covid 19 pandemic supply chain disruption event	The supply chain resilience strategies that were used both during and after the supply chain disruption event involving Covid 19 pandemic
Views on how quickly organizations restore normal operations after short-term disruptions	Interviewees views on how quickly their company restores normal operations after short-term disruptions

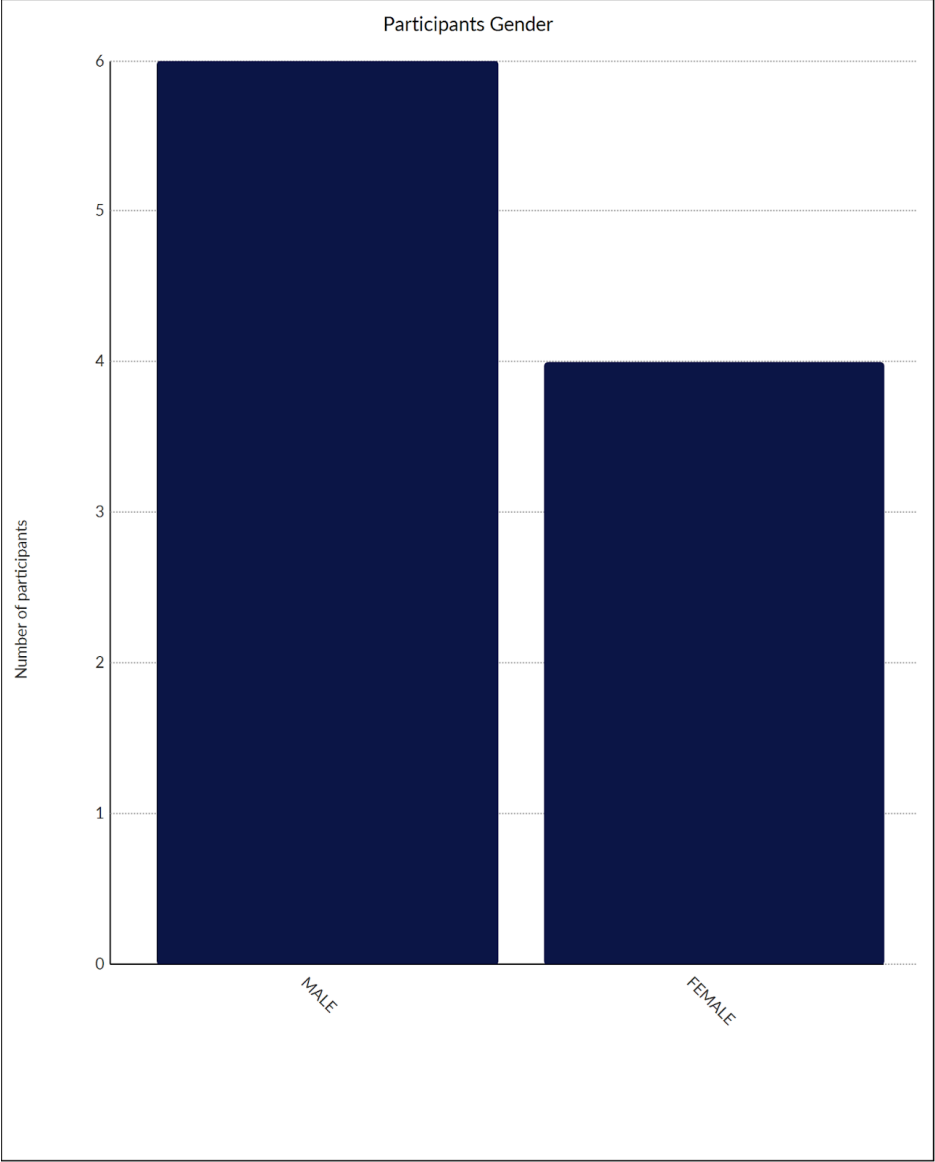
Report writing is the final stage of the reflexive thematic analysis process. The report will consist of a logically organized narrative of findings, as stated by Braun and Clarke (2020). The report the researcher compiled featured a variety of data excerpts to back up the various themes and provide an interpretive narrative that supported the study's aims.

Results

Participant Demographics

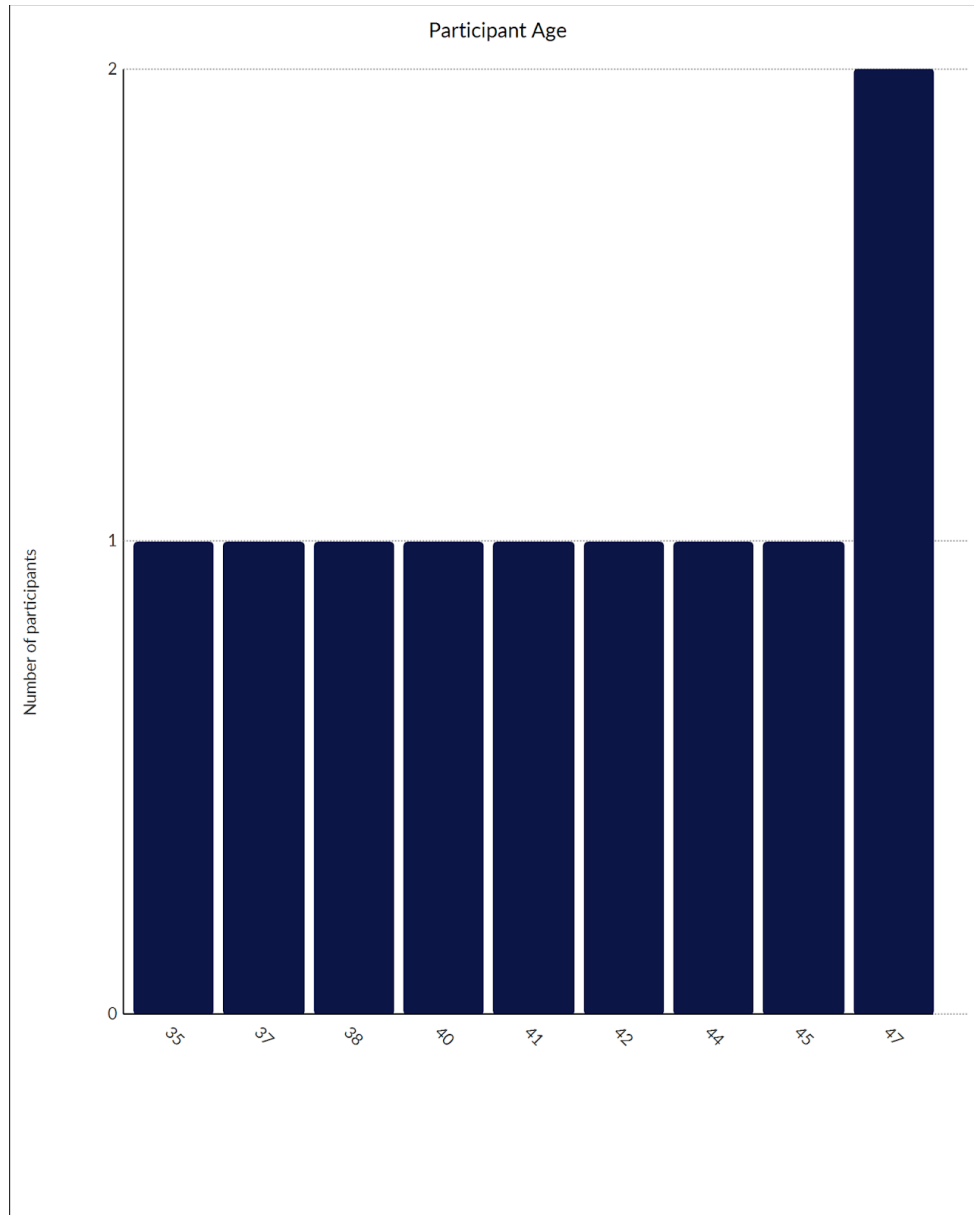
Gender

Of the ten interviewees including managers and staff from selected engineering firms in Ghana, six were male while four were female.



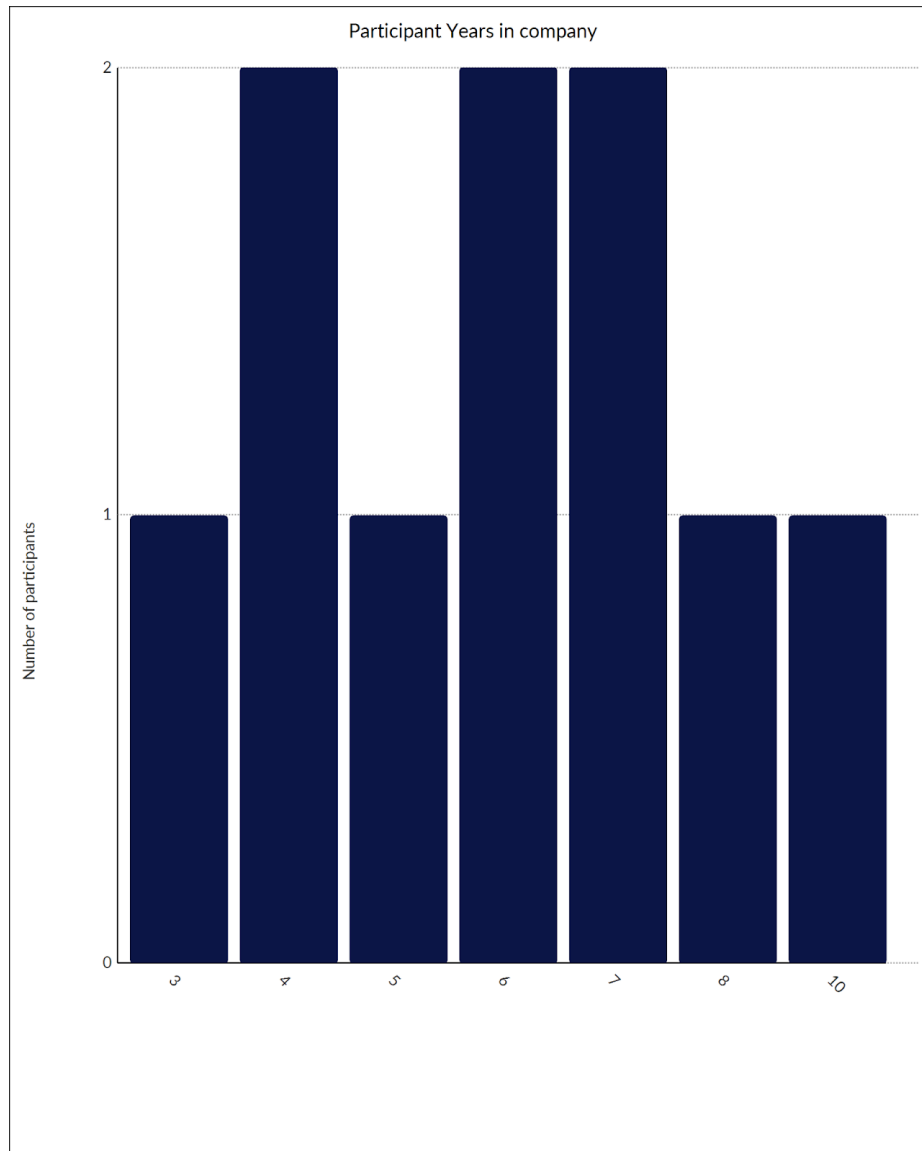
Age

Eight of the participants occupied the age range of between 35 to 45 years with only two participants being 47 years.



Experience in Current Company

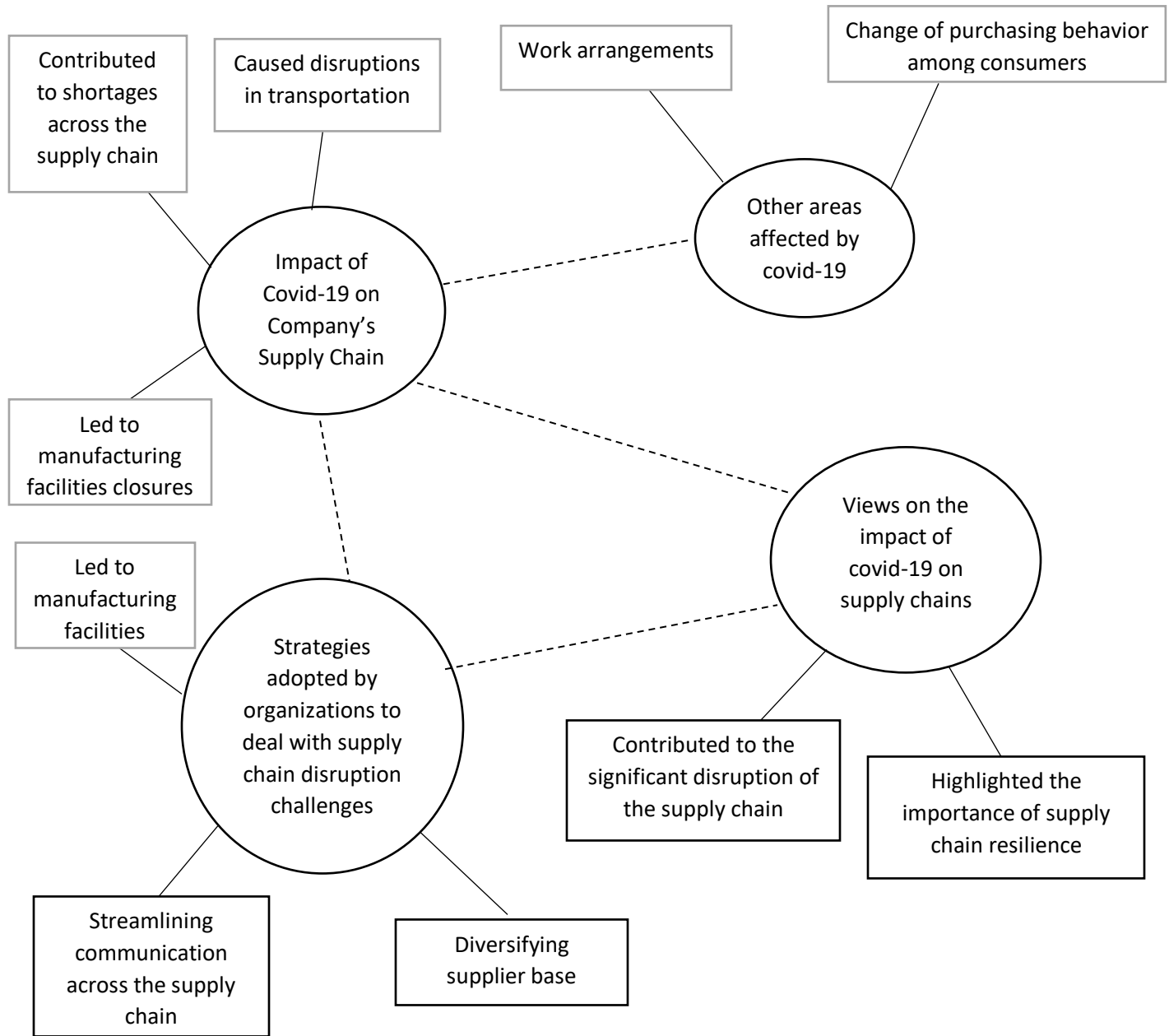
All of the interviewees had between 3 to 10 years' experience working for their current company.



Establishing Thematic Maps to Connect Themes to Research Questions

After conducting the reflexive thematic analysis process which involves first developing codes inductively and then finding an association between the codes to construct themes, the research sought to connect the themes to the research questions. Each theme was therefore connected to a research question it related to. The thematic maps below show how the themes related to each research question.

Thematic map showing the themes under RQ1: Impact of Covid-19 on Supply Chain



Key

○ Theme

□ Code

----- Link to themes

——— Link to codes

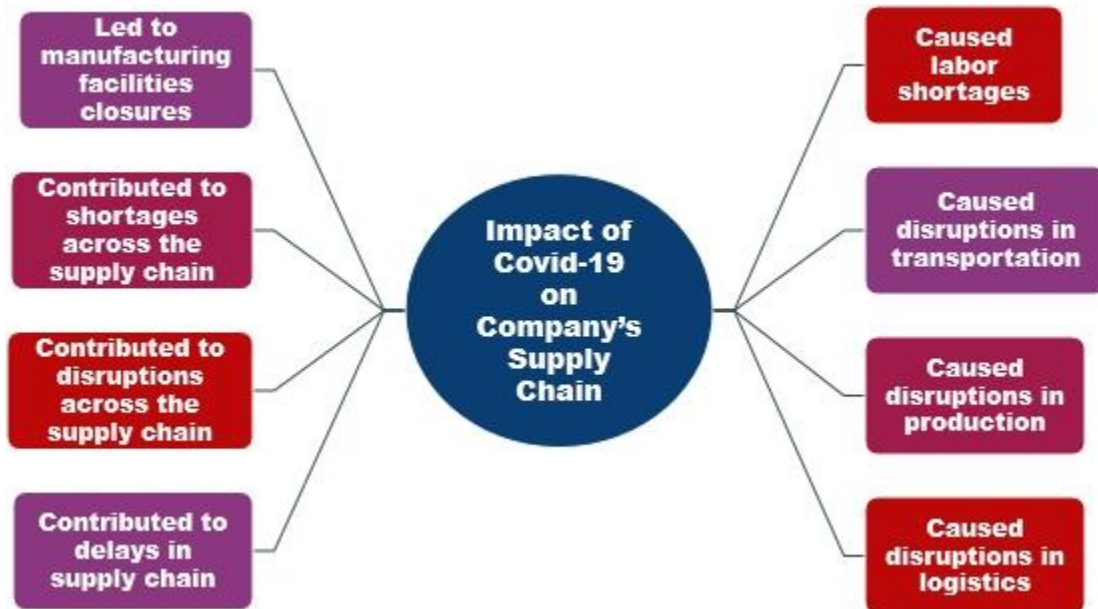
RQ1: Impact of Covid-19 on Supply Chain

After the data analysis process different themes were constructed and later connected to research question one impact of Covid-19 on supply chain. These themes included: Impact of Covid-19 on company's supply chain; Other areas affected by covid-19; Strategies adopted by organizations to deal with supply chain disruption challenges; Views on the impact of covid-19 on supply chains.

Themes	No. of participants	No. of coding references
Views on the impact of covid-19 on supply chains	9	12
Strategies adopted by organizations to deal with supply chain disruption challenges	10	32
Other areas affected by covid-19	7	10
Impact of Covid-19 on Company's Supply Chain	10	29

Impact of Covid-19 on Company's Supply Chain

The interviewees highlighted different ways the Covid 19 pandemic affected their companies' supply chain.



Six interviewees stated that the Covid 19 pandemic contributed to shortages across the supply chain.

Interview 1
shortages of goods.

Interview 3

The Covid-19 pandemic had a significant impact on our company's supply chain. It resulted in disruptions such as

shortages of raw materials,

Interview 4

The Covid-19 pandemic had a significant impact on our company's supply chain. It resulted in

shortages of raw materials,

Interview 6

companies faced delays and shortages in the availability of raw materials and finished products.

Interview 8

The COVID-19 pandemic had a significant impact on our company's supply chain. At the outset, we experienced disruptions in the form of delayed shipments, shortages of critical components,

Interview 9

The COVID-19 pandemic had a cascading effect on our company's supply chain. Initially, we faced demand volatility and supply shortages as lockdowns and restrictions disrupted both production and distribution.

Six interviewees also indicated that the Covid 19 pandemic caused disruptions in transportation.

Interview 1

It caused disruptions in transportation,

Interview 2

It disrupted global transportation,

Interview 3

The Covid-19 pandemic had a significant impact on our company's supply chain. It resulted in disruptions such as delays in transportation,

Interview 4

The Covid-19 pandemic had a significant impact on our company's supply chain. It resulted in disruptions such as delays in transportation,

Interview 7

Travel restrictions, border closures, and reduced air freight capacity led to delays and disruptions in transportation. This impacted the movement of goods and caused bottlenecks in our supply chains.

Interview 8
transportation challenges due to lockdowns and restrictions.

According to five interviewees the covid-19 pandemic also led to manufacturing facilities closures.

Interview 10
COVID-19 created profound disruptions in our company's supply chain. We encountered issues such as factory closures,

Interview 2
led to factory closures

Interview 3
The Covid-19 pandemic had a significant impact on our company's supply chain. It resulted in disruptions such as

closures of manufacturing facilities.

Interview 4
The Covid-19 pandemic had a significant impact on our company's supply chain. It resulted in

closures of manufacturing facilities.

Interview 6

COVID-19 led to widespread disruptions in supply chains due to factory closures,

Other identified impacts of Covid 19 pandemic on companies' supply chain included:

Caused labor shortages

Interview 10
labor shortages,

Interview 2
caused labor shortages

Caused disruptions in production

Interview 1
It caused disruptions in transportation, logistics, and production,

Interview 5
The nation wide lockdown and travel bans that was implemented by the government caused disruptions in supply and therefore delays in production.

Caused disruptions in logistics

Interview 1

It caused disruptions in transportation, logistics,

Interview 10

and logistical bottlenecks.

Contributed to disruptions across the supply chain

Interview 7

The movement of people and goods was restricted due to lockdowns, travel restrictions, and social distancing measures. This led to delays, reduced capacity, and interruptions in our supply chains.

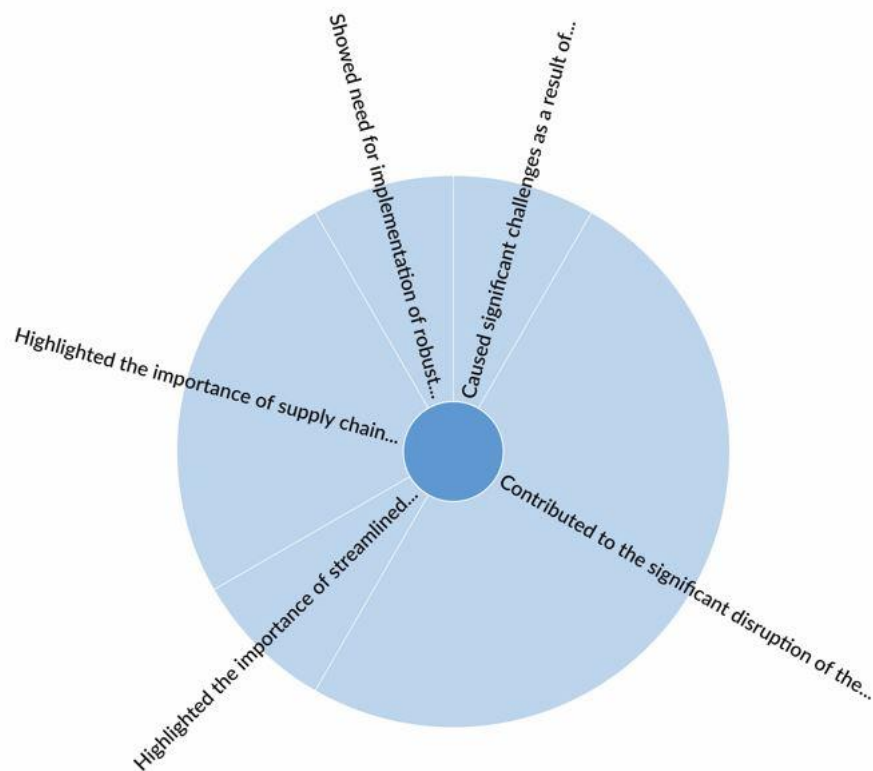
Contributed to delays in supply chain

Interview 1

leading to delays

Views on the impact of covid-19 on supply chains

The interviewees provided different personal views on how the covid-19 pandemic affected the supply chains in their company.



Six of the interviewees stated that covid-19 contributed to the significant disruption of their companies' supply chain.

Interview 10

The COVID-19 pandemic brought about unprecedented disruption to supply chains across the globe. It disrupted the flow of goods, causing shortages of essential items and highlighting supply chain vulnerabilities. Companies faced challenges in securing raw materials, manufacturing products, and delivering goods to customers.

Interview 3

The impact of Covid-19 on supply chains was significant and far-reaching. It led to disruptions in transportation, shortages of materials, and closures of factories.

Interview 4

The impact of Covid-19 on supply chains was significant and far-reaching. It led to disruptions in transportation, shortages of materials, and closures of factories.

Interview 5

The impact of Covid-19 on supply chains was significant. It caused disruptions in transportation, logistics, and production, leading to delays and shortages of goods. However, companies adapted by implementing resilience strategies, finding alternative suppliers, and enhancing communication.

Interview 6

The pandemic caused disruptions at every stage of the supply chain, from raw material suppliers to manufacturers to distributors. Factory closures, lockdowns, and transportation restrictions led to delays and shortages of essential goods.

Interview 8

The impact of the COVID-19 pandemic on supply chains has been profound and far-reaching.

Three of the interviewees also stated that the Covid 19 pandemic highlighted the importance of supply chain resilience in companies.

Interview 2

It highlighted the importance of supply chain resilience

Interview 8

Supply chain disruptions rippled across industries, highlighting the need for increased resilience, diversification of suppliers, and technology adoption to enhance visibility and agility.

Interview 9

The COVID-19 pandemic has had a transformative impact on supply chains worldwide. It emphasized the importance of supply chain resilience and risk management. Supply

chains were challenged by factory closures, shipping delays, and fluctuations in demand. Companies that had invested in digitalization and contingency planning fared better, as they could respond quickly to changing conditions

Other views expressed by the interviewees related to the impact of covid-19 on supply chains included:

Showed need for implementation of robust supply chain strategies

Interview 10

The pandemic underscored the need for robust supply chain strategies that incorporate flexibility, contingency planning, and digitalization to better respond to future disruptions and ensure continuity of operations.

Highlighted the importance of streamlined communication across the supply chain

Interview 2

need for increased visibility and communication throughout the supply chain

Caused significant challenges as a result of lockdown measures

Interview 1

Lockdown measures and restrictions on international trade also contributed to the challenges.

Strategies adopted by organizations to deal with supply chain disruption challenges

The participants highlighted different strategies that their organizations relied on to deal with supply chain disruption challenges occasioned by the Covid 19 pandemic.

Theme/codes	No. of participants	No. of coding references
Strategies adopted by organizations to deal with supply chain disruption challenges	10	32
Working with more local suppliers	1	1
Streamlining communication across the supply chain	5	8
Maintaining a well-designed business continuity plan	1	1
Looking for ways to adapt to changes	1	1
Implementing real-time monitoring systems	2	4
Implementation of rapid response efforts during disruptions	1	1
Having a dedicated supply chain resilience team	1	1
Establishing alternative sourcing options	1	1
Diversifying supplier base	5	5
Conducting thorough reviews after disruptions	2	2

Conducting risk assessment of the supply chain	2	2
Collaborating with partners and suppliers to find solutions	2	2
Adjusting inventory management practices	2	2
Acknowledging and closely monitoring the supply chain challenges	1	1

Streamlining communication across the supply chain was one of the most utilized strategies by different organizations to deal with supply chain disruption challenges with this approach being identified by five interviewees.

Interview 10
We also maintain open lines of communication with customers and partners to provide real-time updates and manage expectations.

Interview 2
improved visibility and communication.

Interview 3
Our Company has dealt with supply chain disruptions by implementing various strategies. These include
enhancing communication with suppliers,

Interview 4
Our company has dealt with supply chain disruptions by implementing various strategies. These include
enhancing communication with suppliers,

Interview 5
We adapted strategies like
enhanced communication with suppliers to help us prepare for and disruptions.

Diversifying supplier base was also identified by five participants as a strategy that was adopted by organizations to deal with supply chain disruption challenges occasioned by the Covid 19 pandemic.

Interview 10
and establishing backup suppliers

Interview 2
We diversified our supplier base,

Interview 3

Our Company has dealt with supply chain disruptions by implementing various strategies. These include diversifying our supplier base,

Interview 4

Our company has dealt with supply chain disruptions by implementing various strategies. These include diversifying our supplier base,

Interview 7

We sought to reduce our dependence on a single supplier or region by diversifying our supplier base. This helped us mitigate the risk of disruptions caused by localised events or supplier-specific issues.

Two interviewees also highlighted that implementing real-time monitoring systems was a strategy that was adopted by organizations to deal with supply chain disruption challenges occasioned by the Covid 19 pandemic.

Interview 3

Our Company has dealt with supply chain disruptions by implementing various strategies. These include

implementing real-time monitoring systems

Interview 4

*Our company has dealt with supply chain disruptions by implementing various strategies. These include
implementing real-time monitoring systems.*

Other identified strategies that were adopted by organizations to deal with supply chain disruption challenges occasioned by the Covid 19 pandemic included:

Conducting thorough reviews after disruptions

Interview 10

Post-disruption, we conduct comprehensive reviews to identify lessons learned and implement changes to fortify our supply chain resilience.

Interview 8

After each disruption, we conduct a thorough post-mortem analysis to identify root causes and implement long-term improvements to enhance our supply chain's resilience.

Conducting risk assessment of the supply chain

Interview 10

Our company has adopted a multi-faceted strategy for dealing with supply chain disruptions. We prioritize risk identification and mitigation, closely monitoring potential disruptions

Interview 6

As a company we conducted risk assessments to identify potential vulnerabilities in our supply chains. This includes assessing the impact of various types of disruptions, such as natural disasters, geopolitical issues, and economic fluctuations.

Collaborating with partners and suppliers to find solutions

Interview 1

collaborated with partners to find alternative solutions

Interview 9

When disruptions occur, we engage in proactive problem-solving, collaborating closely with suppliers to find solutions and mitigate the impact.

Adjusting inventory management practices

Interview 10

Inventory reserves.

Interview 7

We adjusted our inventory management practices to ensure they have sufficient stock to meet demand during disruptions. This involves increasing our safety stock levels, implementing just-in-time (JIT) inventory systems, and adopting advanced forecasting and demand planning techniques.

Working with more local suppliers

Interview 5

We adapted strategies like working with more local suppliers,

Maintaining a well-designed business continuity plan

Interview 9

We now maintain a well-defined business continuity plan that includes risk assessments, supplier diversification, and enhanced communication protocols with key suppliers.

Looking for ways to adapt to changes

Interview 1

adapted quickly to changes,

Implementation of rapid response efforts during disruptions

Interview 8

When disruptions occur, we engage in rapid response efforts, such as reallocating inventory, leveraging backup suppliers, and implementing contingency transportation plans.

Having a dedicated supply chain resilience team

Interview 8

Our company has developed a proactive approach to addressing supply chain disruptions. We've established a dedicated supply chain resilience team that continuously monitors potential risks and identifies vulnerabilities in our supply chain.

Establishing alternative sourcing options

Interview 2

established alternative sourcing options,

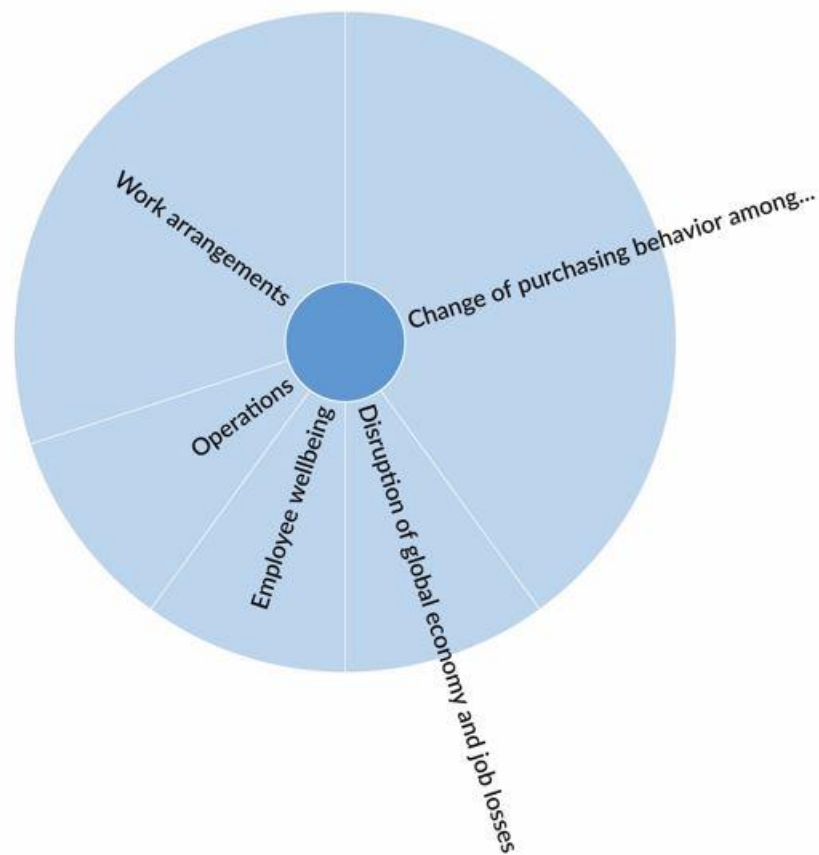
Acknowledging and closely monitoring the supply chain challenges

Interview 1

We closely monitored the situation,

Other areas affected by covid-19

The interviewees identified other normal life and organizational areas that were affected by covid-19 apart from supply chains.



Three of the participants indicated that change of purchasing behavior among consumers was an evident area affected by the covid-19 pandemic.

Interview 1

It also influenced consumer behavior and market dynamics, leading to shifts in customer preferences and purchasing patterns. Overall, Covid-19 had a significant impact on multiple aspects of our company.

Interview 2

Yes, Covid-19 had a wide-ranging impact beyond just the supply chains. It affected customer demand,

Interview 9

Additionally, there were significant changes in consumer behavior, with increased reliance on e-commerce and a shift in purchasing patterns.

Three of the interviewees also indicated that work arrangements were affected by the Covid 19 pandemic.

Interview 10

The impact of the COVID-19 pandemic extended well beyond supply chains. It led to significant changes in the workplace, with a surge in remote work arrangements and the reevaluation of office space requirements.

Interview 4

Many countries implemented lockdown measures, leading to changes in work arrangements

Interview 5

Yes, personnel life was greatly affected due to the travel restrictions and contact restrictions also led to a reduction in number of personnel in a shift which greatly increased the workload on personnel.

Other areas affected by the covid 19 pandemic according to the participants included:

Operations

Interview 2

It affected various aspects of our business, including operations,

Employee wellbeing

Interview 2

It affected various aspects of our business, including operations, customer demand, and employee well-being.

Disruption of global economy and job losses

Interview 8

Yes, the COVID-19 pandemic had a profound impact beyond just supply chains. It disrupted the global economy, leading to job losses, business closures, and economic recession in many regions.

RQ2: What Are the Resilience Strategies Adapted By Your Organization during the Covid-19 Outbreak

After the data analysis process different themes were constructed and later connected to research question two what are the resilience strategies adapted by your organization during the covid-19 outbreak. These themes included: Actions taken by organizations to mitigate Covid19 pandemic supply chain disruption event; Organizational supply chain management resilience strategies; Perceptions of organizations’ robustness and resilience during covid-19 pandemic; Responsive actions taken by organizations to mitigate Covid-19 pandemic's disruption; Supply chain resilience strategies utilized during and after Covid 19 pandemic supply chain disruption event; Views on how quickly organizations restore normal operations after short-term disruptions.

Themes	No. of participants	No of coding References
Views on how quickly organizations restore normal operations after short-term disruptions	9	12
Supply chain resilience strategies utilized during and after Covid 19 pandemic supply chain disruption event	10	34
Responsive actions taken by organizations to mitigate Covid-19 pandemic's disruption	7	22
Perceptions of organizations’ robustness and resilience during covid-19 pandemic	10	14
Organizational supply chain management resilience strategies	7	16
Actions taken by organizations to mitigate the Covid19 pandemic supply chain disruption event	9	27

Organizational supply chain management resilience strategies

The interviewees identified different current organizational supply chain management resilience strategies.



Three interviewees stated that cultivating a close and collaborative relationship with suppliers was their main organizational supply chain management resilience strategy.

Interview 1
collaborating closely with suppliers.

Interview 2
It involved strategies like diversifying suppliers, having backup plans, and building strong relationships with partners.

Interview 5
My organisation's resilience strategy includes

collaborating closely with suppliers.

Having a diverse base of suppliers was also identified as an organizational supply chain management resilience strategy by three participants.

Interview 1
It includes diversifying the supplier base,

Interview 2
It involved strategies like diversifying suppliers,

Interview 8
The organizational supply chain management resilience strategy involves diversifying the sources of supply and distribution channels. By working with multiple suppliers and logistics partners, the organization aims to reduce its vulnerability to disruptions.

Three interviewees also identified coming up with alternative sourcing options as a popular organizational supply chain management resilience strategy.

Interview 1
establishing alternative sourcing options,

Interview 2

It involved strategies like diversifying suppliers, having backup plans,

Interview 5

My organisation's resilience strategy includes establishing alternative sourcing options,

Other interviewee identified organizational supply chain management resilience strategies included:

Improving communication with suppliers

Interview 1
enhancing visibility and communication,

Interview 5

My organisation's resilience strategy includes

enhancing visibility and communication,

Relying on technology

Interview 9
the organizational supply chain management resilience strategy relies heavily on technology.

Having a buffer capacity

Interview 7
This involves maintaining excess inventory or production capacity to absorb disruptions or unexpected changes in demand. By having buffer capacity, organizations can quickly respond to disruptions without major disruptions to their operations.

Creating a flexible and adaptive supply chain ecosystem

Interview 10
The organizational supply chain management resilience strategy is built upon the principles of agility. This approach focuses on creating a flexible and adaptive supply chain ecosystem capable of responding swiftly to unforeseen challenges.

Actions taken by organizations to mitigate the Covid19 pandemic supply chain disruption event

The interviewees identified different actions that were taken by their organizations to mitigate the Covid19 pandemic supply chain disruption event.

Theme/Codes	No. of participants	No. of Coding references
Actions taken by organizations to mitigate the Covid19 pandemic supply chain disruption event	9	27
Streamlined communication and collaboration with key stakeholders	3	3
Redesigning the entire supply chain	1	1
Reallocating inventory from less critical markets to more critical ones	1	1
Prioritizing high-demand products	1	2
Optimizing inventory management	3	5
Monitoring market trends and customer demands to make necessary adjustments to products and services.	1	1
Implementing contingency plans	3	5
Identifying alternative suppliers	3	3
Expedited shipping options to meet customer demand	1	2
Diversifying suppliers	1	1
Developing a comprehensive risk mitigation strategy	1	1
Creating supply schedules	1	1
Adapted operations to comply with health guidelines	1	1

Streamlining communication and collaboration with key stakeholders was one of the most popular actions taken by organizations to mitigate the Covid 19 pandemic supply chain disruption event.

Interview 3

We also enhanced communication and collaboration with key stakeholders to address challenges and find solutions.

Interview 4

We also enhanced communication and collaboration with key stakeholders to address challenges and find solutions.

Interview 6

Assessment and Communication: We Immediately assess the extent of the disruption and its impact on the supply chain and also established a clear communication channels to inform key stakeholders, including customers, suppliers, employees, and shareholders, about the disruption and its implications.

Three of the interviewees also stated that their organizations optimized inventory management as a way of mitigating the Covid 19 pandemic supply chain disruption event.

Interview 2

Following the supply chain disruption event, the company took several actions to lessen the impact. These included identifying alternative suppliers, optimising inventory management,

Interview 3

Following the supply chain disruption event, the company took several actions to mitigate the impact. These included

optimizing inventory management,

Interview 4

Following the supply chain disruption event, the company took several actions to mitigate the impact. These included

optimizing inventory management,

Implementing contingency plans was also a common action taken by organizations to mitigate the Covid19 pandemic supply chain disruption event according to three interviewees.

Interview 2

implementing contingency plans to ensure continuity of operations.

Interview 3

Following the supply chain disruption event, the company took several actions to mitigate the impact. These included

implementing contingency plans to ensure continuity of operations.

Interview 4

Following the supply chain disruption event, the company took several actions to mitigate the impact. These included

implementing contingency plans to ensure continuity of operations.

Three participants also indicated that identifying alternative suppliers was also a common approach taken by organizations to mitigate the Covid19 pandemic supply chain disruption event.

Interview 2

Following the supply chain disruption event, the company took several actions to lessen the impact. These included identifying alternative suppliers,

Interview 3

Following the supply chain disruption event, the company took several actions to mitigate the impact. These included identifying alternative suppliers,

Interview 4

Following the supply chain disruption event, the company took several actions to mitigate the impact. These included identifying alternative suppliers,

Other different actions taken by organizations to mitigate the Covid19 pandemic supply chain disruption event included:

Redesigning the entire supply chain

Interview 9

Recognizing the need for long-term resilience, the company embarked on a supply chain redesign initiative.

Reallocating inventory from less critical markets to more critical ones

Interview 8

In response to the supply chain disruption event, the company swiftly implemented a series of immediate contingency measures. This included reallocating inventory from less critical markets to more critical ones,

Prioritizing high-demand products

Interview 8

In response to the supply chain disruption event, the company swiftly implemented a series of immediate contingency measures. This included

prioritizing high-demand products

Monitoring market trends and customer demands to make necessary adjustments to products and services.

Interview 5

We also closely monitored market trends and customer demands to make necessary adjustments to our products and services.

Expedited shipping options to meet customer demand

Interview 8

In response to the supply chain disruption event, the company swiftly implemented a series of immediate contingency measures. This included

expedited shipping options to meet customer demand

Diversifying suppliers

Interview 9

They reevaluated their supplier base, diversifying sources and reducing dependence on single suppliers in high-risk regions.

Developing a comprehensive risk mitigation strategy

Interview 10

To prevent future disruptions, the company developed a comprehensive risk mitigation strategy. This involved conducting risk assessments for each element of the supply chain, including suppliers, transportation, and inventory management.

Creating supply schedules

Interview 1

We collaborated closely with our suppliers to find solutions and minimize the impact of the disruptions by creating supply schedules to help prevent material shortages.

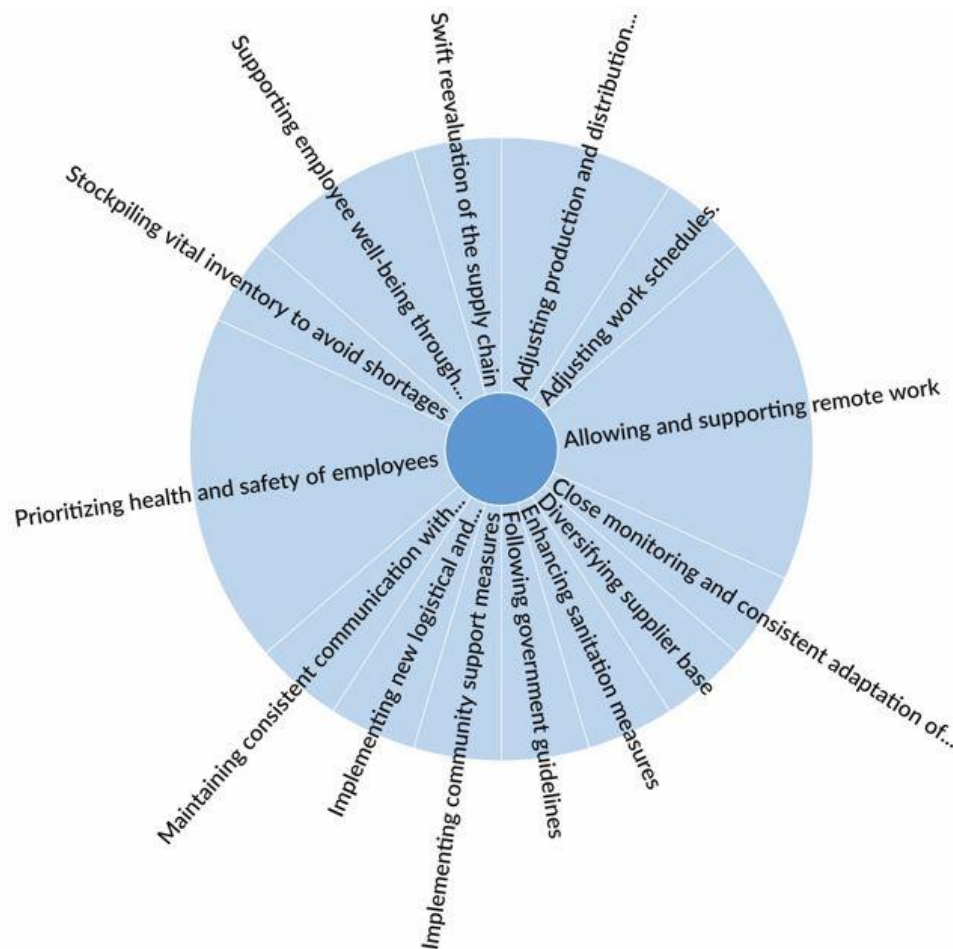
Adapting operations to comply with health guidelines

Interview 5

We adapted our operations to comply with health guidelines

Responsive actions taken by organizations to mitigate Covid-19 pandemic's disruption

The interviewees identified different responsive actions that were taken by their organizations to mitigate Covid-19 pandemic's disruption.



Prioritizing health and safety of employees was identified by four interviewees as a responsive action that was taken by their organizations to mitigate Covid-19 pandemic's disruption.

Interview 2

conducting regular health screenings for employees,

Interview 4

During the Covid-19 pandemic, our organization responded to the disruptions by implementing various measures. These included prioritizing the health and safety of our employees,

Interview 7

This involves reducing or modifying operations to ensure the safety of employees,

Interview 8

They prioritized employee safety by quickly transitioning to remote work arrangements for non-essential staff and implementing stringent health and safety measures for essential on-site employees.

Three of the interviewees also identified allowing and supporting remote work as a responsive action that was taken by their organizations to mitigate Covid-19 pandemic's disruption.

Interview 1

During the Covid-19 pandemic, our organization responded by implementing remote work options,

Interview 2

providing resources and support for remote work

Interview 4

During the Covid-19 pandemic, our organization responded to the disruptions by implementing various measures. These included implementing remote work arrangements,

Supporting employee well-being through different programs was also highlighted as a responsive action taken by organizations to mitigate Covid-19 pandemic's disruption.

Interview 4

We also focused on supporting employee well-being through virtual wellness programs and mental health resources.

Interview 5

In addition to the Covid-19 measures implemented by the government, our organization also focused on supporting our employees during these challenging times. We provided resources for mental health and well-being, encouraged open communication, and offered flexible work arrangements.

Other identified responsive actions taken by organizations to mitigate Covid-19 pandemic's disruption included:

Swift reevaluation of the supply chain

Interview 9

In response to the disruptions caused by the COVID-19 pandemic, the organization demonstrated agility by swiftly reevaluating its supply chain.

Stockpiling vital inventory to avoid shortages

Interview 9

stockpiled critical inventory to mitigate potential shortages.

Maintaining consistent communication with employees

Interview 2

They also communicated regularly with employees to provide updates and guidance,

Implementing new logistical and transportation protocols

Interview 7

implementing new protocols for transportation and logistics,

Implementing community support measures

Interview 2

implemented measures to support the communities in which they operate.

Following government guidelines

Interview 1

During the Covid-19 pandemic, our organization responded by implementing remote work options, enhancing sanitation measures, and following government guidelines.

Enhancing sanitation measures

Interview 1

During the Covid-19 pandemic, our organization responded by implementing remote work options, enhancing sanitation measures,

Diversifying supplier base

Interview 9

They diversified their supplier base

Close monitoring and consistent adaptation of strategies

Interview 4

We also closely monitored the situation and adapted our strategies accordingly to ensure the continuity of our operations.

Adjusting work schedules.

Interview 7

adjusting work schedules.

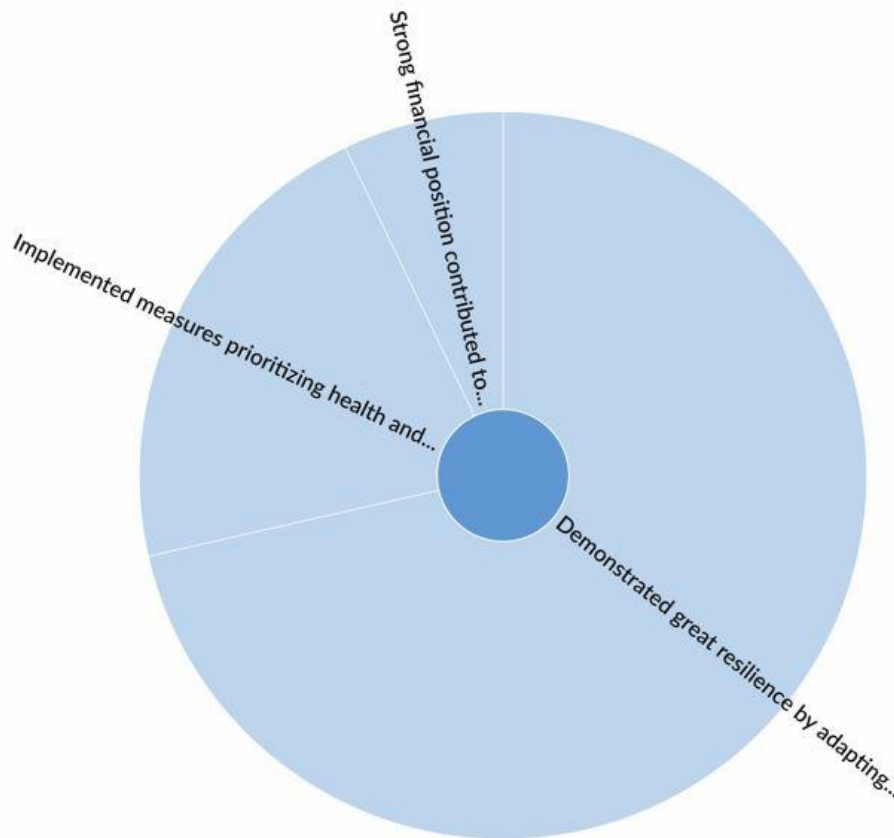
Adjusting production and distribution processes to comply with health guidelines

Interview 4

During the Covid-19 pandemic, our organization responded to the disruptions by implementing various measures. These included adjusting production and distribution processes to comply with health guidelines

Perceptions of organizations' robustness and resilience during covid-19 pandemic

The participants provided views on whether their company was robust and resilient enough during Covid 19.



The majority of the interviewees stated that their companies demonstrated great resilience by adapting quickly.

Interview 1

Our company demonstrated great resilience during the COVID-19 pandemic. Despite the challenges, we were able to adapt quickly, implement necessary changes, and continue providing our services.

Interview 10

The COVID-19 pandemic exposed vulnerabilities in our company's resilience, but it also served as a catalyst for improvement. We faced supply chain disruptions and had to adapt to remote work on short notice. However, these challenges prompted us to reevaluate and strengthen our contingency plans, diversify our supplier base, and invest in digital capabilities

Interview 2

We adapted our operations and remained proactive in navigating the challenges posed by the pandemic.

Interview 3

Yes, during the COVID-19 pandemic, our company demonstrated robustness and resilience by swiftly adapting to the changing circumstances.

While challenges arose, our resilience strategies allowed us to navigate through the pandemic effectively.

Interview 4

Yes, during the COVID-19 pandemic, our company demonstrated robustness and resilience by swiftly adapting to the changing circumstances.

Interview 5

Yes. Despite the challenges, we were able to adapt quickly, implement necessary changes, and continue providing our services.

Interview 6

As a company we had prepared due to prior investments in supply chain resilience, technology adoption, remote work capabilities, and financial stability.

Interview 8

During the COVID-19 pandemic, our company demonstrated remarkable robustness and resilience. We were quick to adapt to the changing circumstances by implementing remote work policies, ensuring employee safety, and adjusting our supply chain to mitigate disruptions.

Interview 9

The COVID-19 pandemic presented unprecedented challenges, and our company worked tirelessly to enhance its robustness and resilience. While we faced some initial disruptions, we rapidly pivoted to address the situation.

Three interviewees also indicated that their companies were robust and resilient during covid-19 because they implemented measures prioritizing health and safety of employees and ensuring business continuity.

Interview 2

We implemented various measures to prioritize the health and safety of our employees and ensure business continuity. These included remote work arrangements, enhanced sanitation protocols, and close monitoring of the situation.

Interview 3

We implemented various measures to ensure the safety of our employees, maintain business continuity, and support our customers

Interview 4

We implemented various measures to ensure the safety of our employees, maintain business continuity, and support our customers.

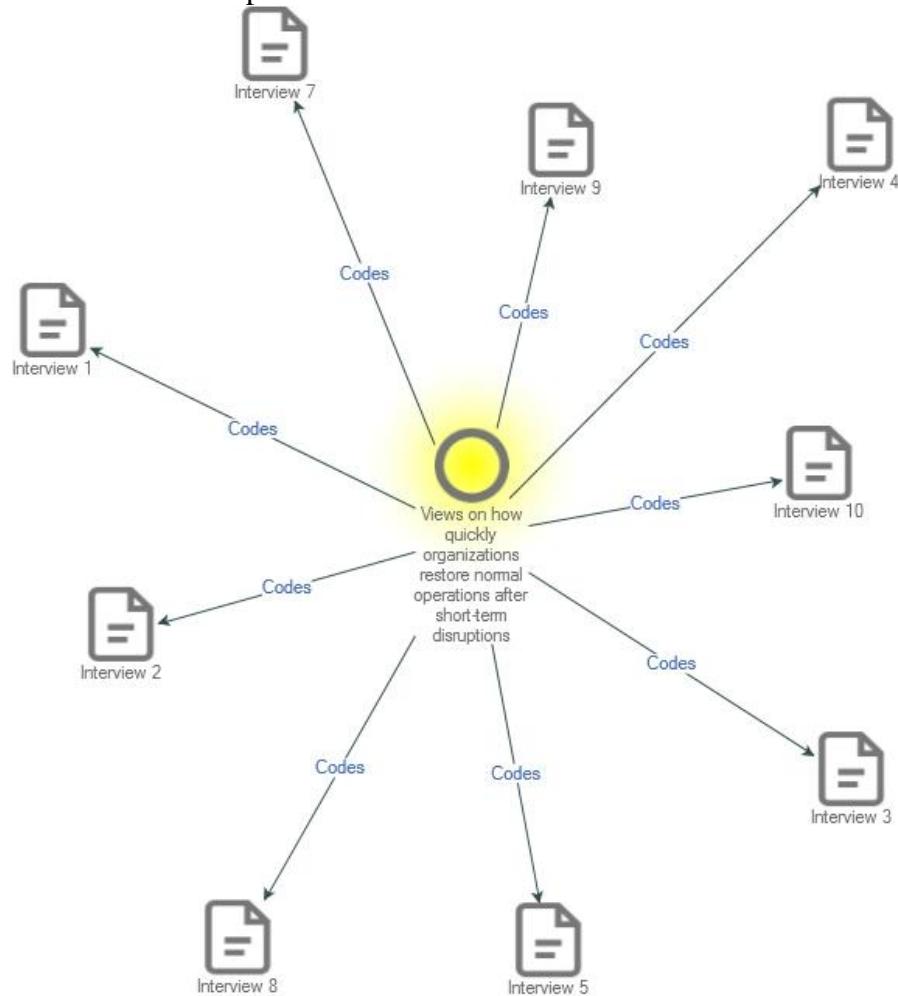
One of the interviewees also indicated that the strong financial position of their organization also contributed to resilience during covid-19 pandemic.

Interview 7

We had good financial stability, which meant we had sufficient financial reserves to weather the economic downturn caused by the pandemic. We were able to continue operations, pay employees, and meet financial obligations.

Views on how quickly organizations restore normal operations after short-term disruptions

The interviewees presented their views on how quickly their organizations restore normal operations after short-term disruptions.



Five of the interviewees indicated that their organizations have contingency plans to ensure restoration of normal operations after short-term disruptions.

Interview 2

We have contingency plans in place such as having backup systems in place, establishing communication protocols to keep employees informed, and collaborating with our suppliers and partners to ensure a seamless flow of operations.

Interview 3

We have established contingency plans and response protocols in place to minimize downtime and ensure a swift recovery. Our goal is to resume normal operations efficiently and effectively.

Interview 4

We have established contingency plans and response protocols in place to minimize downtime and ensure a swift recovery. Our goal is to resume normal operations efficiently and effectively

Interview 7

We have preparedness and planning system in place. and like any other company that has comprehensive contingency plans and disaster recovery strategies in place, is typically able to respond more quickly to disruptions. This includes having backup systems, redundant infrastructure, and clear guidelines for response and recovery. So this helped us to restore back to normal operations

Interview 8

Our company has a well-defined and efficient process for restoring normal operations after short-term disruptions. In most cases, we can achieve full operational recovery within a matter of hours to a few days. Our key to success lies in having robust contingency plans in place,

Three of the interviewees also stated that their organizations ensure swift restoration of normal operations after short term disruptions.

Interview 1

Though we were short staffed due to the pandemic, our dedicated team worked efficiently to resolve any issues and get things back on track swiftly.

Interview 2

Our Company is committed to restoring normal operations as quickly as possible after short term disruptions.

Interview 5

Our Company strives to restore normal operations as quickly as possible after short-term disruptions.

Other views expressed by the interviewees related to how quickly organizations restore normal operations after short-term disruptions included:

Restoration of normal operations after short term disruptions dependent on nature and severity of the disruption.

Interview 9

The speed at which our company restores normal operations after short-term disruptions largely depends on the nature and severity of the disruption. For minor disruptions, such as IT outages or minor supply chain hiccups, we typically achieve a quick recovery within a few hours. However, for more significant disruptions, like natural disasters or unexpected market fluctuations, our recovery timeline may extend to several days or even weeks. We continuously work on improving our response and recovery capabilities to minimize downtime and ensure a more rapid return to normalcy.

Relies on well-documented emergency response protocols and backup systems to restore operations after short-term disruptions.

Interview 10

Our company places a strong emphasis on resilience and continuity planning, which allows us to respond swiftly to short-term disruptions. In many cases, we can restore normal operations within 24 to 48 hours. This is achieved through a combination of well-documented emergency response protocols, cross-functional teams, and investments in redundancy and backup systems.

Relies on highly skilled response teams to restore normal operations quickly after short-term disruptions.

Interview 8

highly skilled response teams, and advanced technology systems that allow us to quickly assess the situation and implement the necessary steps for a swift recovery. We understand the importance of minimizing downtime and aim to resume operations as soon as possible to minimize any negative impact on our customers and stakeholders.

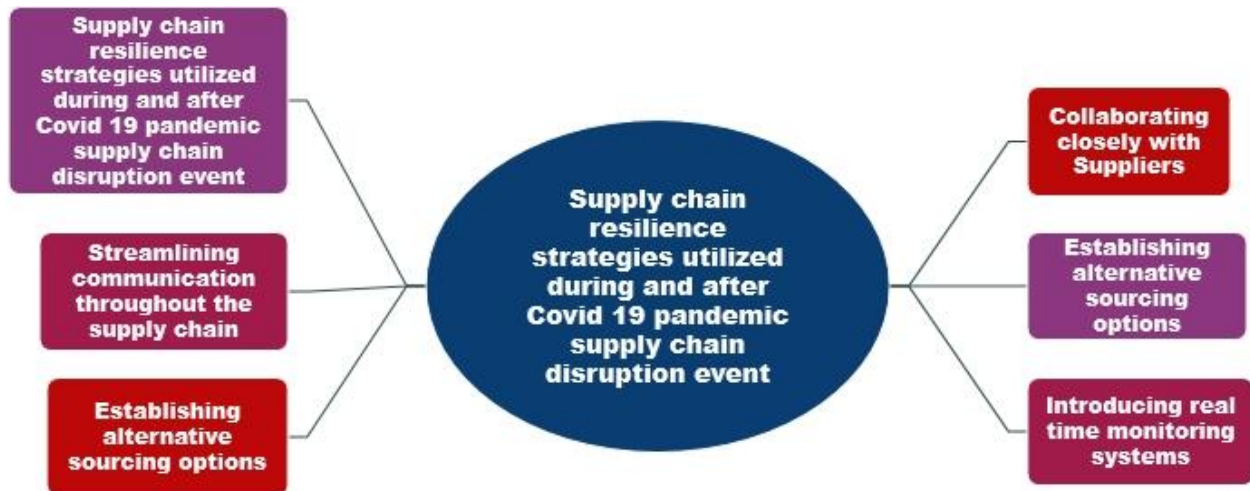
Relies on advanced technology systems to restore normal operations quickly after short-term disruptions.

Interview 8

highly skilled response teams, and advanced technology systems that allow us to quickly assess the situation and implement the necessary steps for a swift recovery. We understand the importance of minimizing downtime and aim to resume operations as soon as possible to minimize any negative impact on our customers and stakeholders.

Supply chain resilience strategies utilized during and after Covid 19 pandemic supply chain disruption event

The interviewees identified different supply chain resilience strategies that their organizations utilized during and after the Covid 19 pandemic supply chain disruption event.



Supplier base diversification was one of the most utilized supply chain resilience strategies during and after Covid 19 pandemic supply chain disruption event with five interviewees identifying this approach.

Interview 1

Diversification of suppliers to reduce dependency on a single supplier.

Interview 2

They included diversifying our supplier base,

Interview 3

During and after the supply chain disruption event, our company employed several supply chain resilience strategies. These included diversifying our supplier base,

Interview 4

During and after the supply chain disruption event, our company employed several supply chain resilience strategies. These included diversifying our supplier base,

Interview 5

We diversified our supplier base to reduce dependency on a single source,

Five participants also identified streamlining communication throughout the supply chain as a resilience strategy utilized during and after Covid 19 pandemic supply chain disruption event.

Interview 2

enhancing visibility and communication throughout the supply chain.

Interview 3

During and after the supply chain disruption event, our company employed several supply chain resilience strategies. These included

enhancing communication with suppliers and customers.

Interview 4

During and after the supply chain disruption event, our company employed several supply chain resilience strategies. These included

enhancing communication with suppliers and customers.

Interview 6

Maintain open lines of communication with key stakeholders, including suppliers, customers, and internal teams, to stay informed and make informed decisions.

Four interviewees stated that their organizations relied on establishing alternative sourcing options as a supply chain resilience strategy during and after Covid 19 pandemic supply chain disruption event.

Interview 2

establishing alternative sourcing options,

Interview 3

During and after the supply chain disruption event, our company employed several supply chain resilience strategies. These included establishing alternative transportation routes,

Interview 4

During and after the supply chain disruption event, our company employed several supply chain resilience strategies. These included

establishing alternative transportation routes,

Interview 8

Additionally, we leveraged our safety stock and alternate sourcing options to maintain critical supplies.

Four of the participants also indicated that collaborating closely with suppliers was a frequently utilized supply chain resilience strategy in their organizations during and after Covid 19 pandemic supply chain disruption event.

Interview 10

Additionally, we fostered stronger relationships with key suppliers and engaged in scenario planning to better prepare for future disruptions, ensuring a more resilient supply chain overall.

Interview 2

We also collaborated closely with our suppliers to identify and address any challenges.

Interview 5

enhanced communication and collaboration with suppliers,

Interview 8

During the supply chain disruption event, our company implemented several supply chain resilience strategies to mitigate the impact. We established real-time communication channels with key suppliers to stay updated on their status and potential disruptions.

Two interviewees also highlighted that introducing real time monitoring systems was one of the supply chain resilience strategies in their organizations during and after Covid 19 pandemic supply chain disruption event.

Interview 3

During and after the supply chain disruption event, our company employed several supply chain resilience strategies. These included implementing real-time monitoring systems

Interview 4

During and after the supply chain disruption event, our company employed several supply chain resilience strategies. These included implementing real-time monitoring systems,

Two interviewees identified implementing robust inventory management systems as one of the supply chain resilience strategies in organizations during and after Covid 19 pandemic supply chain disruption events.

Interview 5

implemented robust inventory management systems.

Interview 7

boosting inventories, and enhancing digital and risk-management capabilities,

The interview identified other supply chain resilience strategies utilized during and after Covid 19 pandemic supply chain disruption event including:

Rerouting shipments

Interview 10

Both during and after the supply chain disruption event, our company focused on supply chain resilience through a multi-faceted approach. During the event, we quickly rerouted shipments.

Relying on a business continuity plan

Interview 9

To navigate the supply chain disruption event effectively, our organization employed a combination of proactive and reactive supply chain resilience strategies. During the event, we activated our business continuity plan, which included regular assessments of supplier risk and diversification of transportation routes.

Investing in technology to deal with future disruptions

Interview 10

After the event, we reevaluated our supply chain design, investing in more agile technology systems and enhancing data analytics capabilities.

Continuous monitoring of the situation to gather real-time data

Interview 6

We continuously monitored the situation to gather real-time data about the disruption.

Conducting a thorough post-disruption analysis

Interview 8

After the event, we conducted a thorough post-disruption analysis to identify areas for improvement, leading to the development of a more robust risk management strategy for the future.

Conducting a comprehensive supply chain audit to identify vulnerabilities post disruption

Interview 9

Afterward, we conducted a comprehensive supply chain audit to identify vulnerabilities and implemented changes such as dual-sourcing strategies and enhanced supplier collaboration. These strategies have since bolstered our resilience to future disruptions.

Adjusting production schedules

Interview 10

adjusted production schedules, and expedited key supplies to minimize disruptions.

References

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