SUPPLY CHAIN RISK INDEX™ LEHIGH + CSCMP

Lehigh Business Supply Chain
Risk Management Index

# Quarterly Report

2nd Quarter / 2024

LEHIGH UNIVERSITY | College of Business

CENTER FOR SUPPLY CHAIN RESEARCH AT LEHIGH

CSCMP™ Council of Supply Chain Management Professionals

*Educating and Connecting the World's Supply Chain Professionals.™*

# LEHIGH BUSINESS SUPPLY CHAIN RISK MANAGEMENT INDEX

Welcome to the **Lehigh Business Supply Chain Risk Management Index Report** developed by the Center for Supply Chain Research at Lehigh University and the Council of Supply Chain Management Professionals.

We launched this index in August of 2020 to better understand the different kinds of supply chain risks businesses face. **Supply chain professionals rated the likelihood that the risk in the 2nd quarter of 2024 compared to the risk in the 1st quarter of 2024 would likely increase, remain the same or decrease for 10 different Supply Chain categories.**

The Lehigh Business Supply Chain Risk Management Index (LRMI) value is a number between 0 – 100, where greater than 50 suggests increased risk, equal to 50 suggests the same risk and less than 50 suggests decreased risk. **The average LRMI for the 2nd quarter is 65.88 which is an increase from the 1st quarter, suggesting a higher level of risk in the 2nd quarter 2024.**

The table below reflects the 10 categories of risk from highest risk to lowest risk when evaluated independently as perceived by supply chain professionals.

**If you would like to have additional information about the survey or to participate in the survey, please contact Dr. Zach G. Zacharia at zacharia@lehigh.edu.**

# Executive Summary

Cybersecurity is again the highest risk overall at 83.80, a significant jump from the last quarter, suggesting cyber-attacks, data corruption, data theft, system viruses and security platform controls are becoming more severe. Surprisingly, technology risk became the second highest risk at 70.83, which seems to be a concern related to the role of generative AI. Technology risk has never been ranked this high in the 3 years that we have been publishing this report. Government intervention risk is the third highest risk at 69.44, which could be related to apprehension about new regulations and the geopolitical uncertainty that exists with the Red Sea crisis and wars in Ukraine and the Middle East. Supplier risk jumped up to the fourth highest risk at 68.52 with worries about single/sole source suppliers, supplier quality issues and price volatility. The average risk index has increased slightly, compared to the last quarter, to 65.88, which is still low compared to the average risk historically.

| Risk Type | 1st Quarter 2024 Risk Index | 2nd Quarter 2024 Risk Index | Trend |
|---|---|---|---|
| Cybersecurity and Data Risk | 78.21 | 83.80 | ↑ |
| Technological or Competitive Risk | 65.38 | 70.83 | ↑ |
| Government Intervention Risk | 65.58 | 69.44 | ↑ |
| Supplier Risk | 60.90 | 68.52 | ↑ |
| Transportation Disruption Risk | 59.62 | 67.13 | ↑ |
| Economic Risk | 68.83 | 66.20 | ↓ |
| Customer Risk | 71.79 | 65.74 | ↓ |
| Environmental Risk | 64.94 | 60.19 | ↓ |
| Operational Risk | 58.33 | 54.63 | ↓ |
| Quality Risk | 52.56 | 52.31 | ↓ |
| Average Risk Index | 64.61 | 65.88 | ↑ |

*The Risk Index is a number between 0 – 100.*
*The further the number is from 50 the greater the level of risk.*
*The arrow indicates whether the risk is increasing or decreasing in comparison to the previous quarter.*

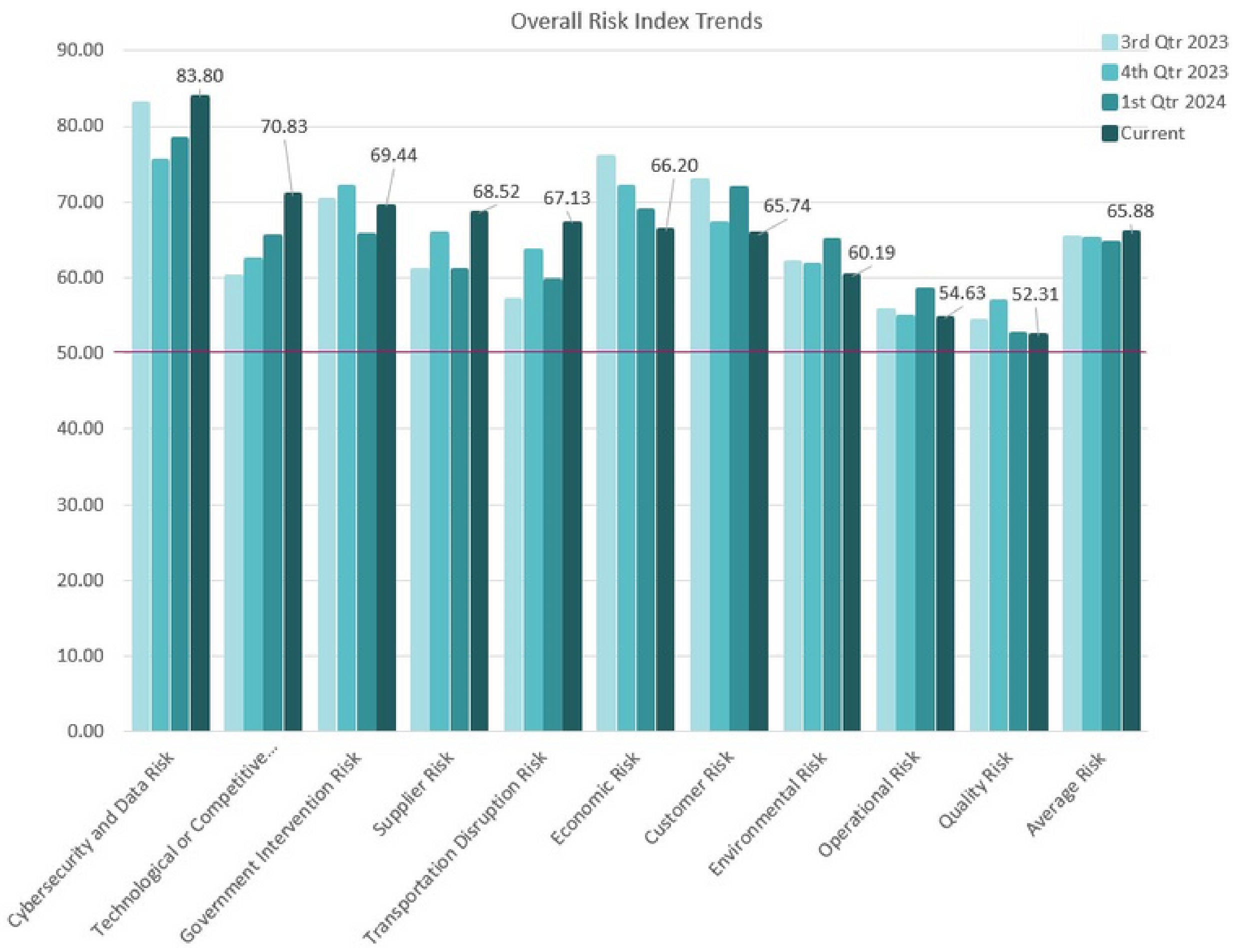
## Did You Know?

The Lehigh Business Supply Chain Management Risk Index for the 2nd Quarter in 2024 is

65.88

# LRMI Risk Index Over the Last Year

One of the advantages of examining supply chain risk is to consider how these risks change over time. The table below shows the changing levels of risk across the 10 different areas of the supply chain this last year. It is also insightful to see that some areas of the supply chain are consistently seen as high risk and other areas of the supply chain are seen as lower risk over the same 1-year time period.




**Four Biggest Risks in Head-to-Head Comparison 2nd Quarter 2024**

*(Respondents are asked to compare across all 10 risks simultaneously, instead of rating one risk at a time.)*

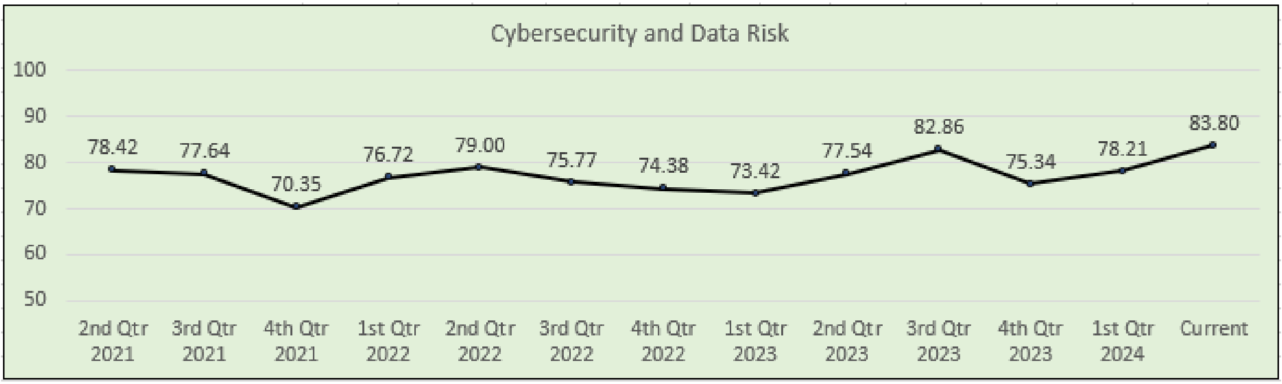
1. Cybersecurity and Data Risk
2. Economic Risk
3. Transportation Disruption Risk
4. Customer Risk

# 01 Cybersecurity and Data Risk

**Some examples are: cyberattacks, data corruption, data theft, system viruses, hardware and software issues and security platform controls.**

***Selected Comments:***

- As the world economy gets worse and AI gets stronger, these risks will increase.
- There is a general upward trend for cyberattacks, disruptions and events.
- Russian hacking of US infrastructure will cause these risks to increase.
- The use of AI has made phishing and scamming harder to detect. There aren't enough examples of arrest and prosecution to deter criminals, but a lot of press about breaches, ransoms and fraud.
- I believe that the AI arms race will sophisticate cyberattacks and other data breaches.
- The rollout of Generative AI increases data risk and the retrieval of potentially incorrect and harmful information.
- As we continue to grow, we are going to be at high risk for attacks. We have already seen an increase in phishing attempts. Additional global security events add to the uncertain risks that many of us don't fully understand.
- Increased threats are likely to continue with the proliferation of AI and global unrest.
- China and Russia are both in cyberattack mode.
- Cyberwar is at an all-time high and won't be decreasing anytime soon. Overdependence on computing and network technology is a clear disadvantage now. We are getting back to basics.
- We are constantly getting hit with phishing emails. But, we have a quarterly training session to keep our employees knowledgeable and up to date on scams.
- There has been an increase in cyberattacks, including phishing, and DDoS attacks.
- Although we are very focused in continuing to put in the right level of protection, these risks will continue to increase.
- These risks will be some of the biggest concerns in 2024 and beyond.

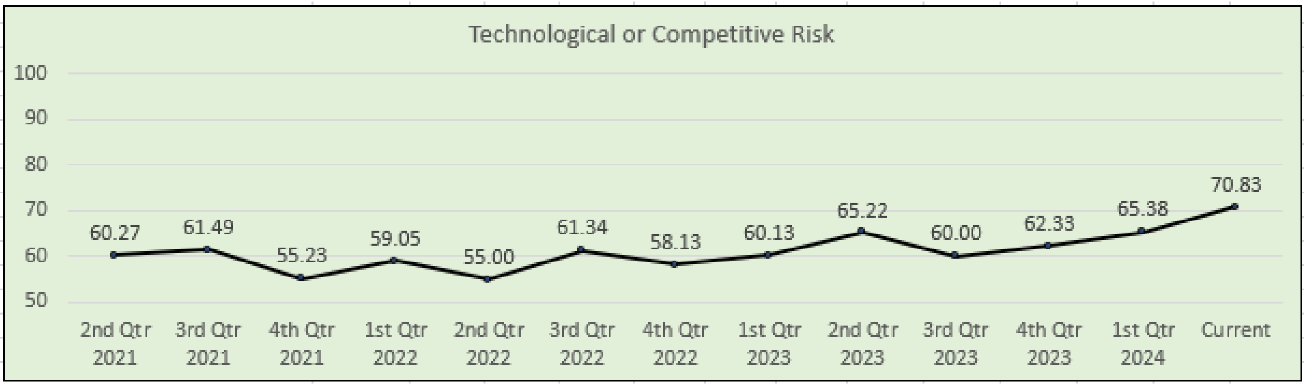


# 02 Technological or Competitive Risk

**Some examples are: disruptive or replacement technologies, introduction of new competitor firms and ineffective or non-existent regulation for competitors.**

***Selected Comments:***

- The AI of everything will continue to upend how we think about doing work.
- The competitive landscape continues to expand. Technological developments are accelerating in the supply chain space. This trend will continue to increase over the next 3-5 years in a big way.
- The impact of the broad application of AI-supported innovations is still uncertain.
- AI and next-generation, cognitive-based warfare tactics are on the rise.
- Due to a lot of focus on AI, everyone is forced to upgrade; this will increase the risk of biased behavior of the system and threaten data privacy.
- GenAI presents a great opportunity, as well as the risk of misinformation.
- The risk will continue to increase with AI driving so many new technical breakthroughs.
- We need to respond to freight market conditions more quickly.
- As lower-cost suppliers enter the market and inflation is still high, customers are seeking a low-cost, "good enough" alternative.
- We need to maximize our knowledge of what exists. "New stuff" is not on our immediate time horizon.
- We expect these risks to increase as a result of AI-driven disruption.
- It is important to stay front footed on emerging technologies, as well as AI.
- Technology is always a losing proposition. Gaining returns from the cost is becoming harder and harder.
- We expect these risks to decrease as we recently replaced all legacy systems.

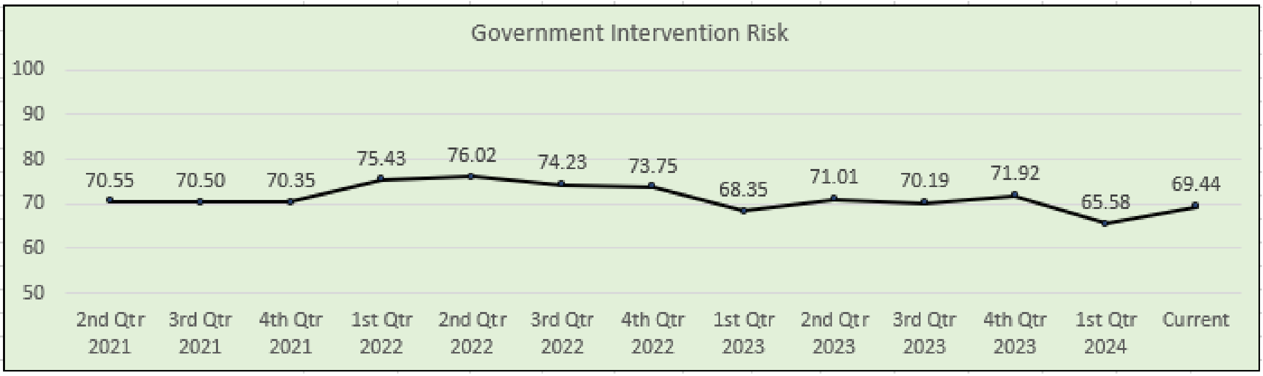


# 03 Government Intervention Risk

**Some examples are: new regulations, tariffs/trade wars and governmental restrictions on source material, methodologies or technologies.**

***Selected Comments:***

- The current highly unstable geopolitical environment, both internationally and domestically, is not likely to resolve and become less volatile. This will lead to increased efforts by the US federal government to restrict businesses via executive order.
- We expect a decrease in risk as the Red Sea crisis should ease in Q2, allowing for more global container flow.
- Increased risk is expected due to the unrest in Israel and the Middle East, the war in Ukraine, and saber-rattling by Russia and North Korea.
- The current administration, both in Illinois and nationally, has policies that are counterintuitive to the efficient and effective operations of American businesses.
- Political unrest is on the rise globally. The weaponization of space is a big concern.
- The chances of additional disruption are greatly increased by two active wars around the globe and a surging Donald Trump candidacy for president.
- The government's desire to "go green" is adding costs and unrealistic burdens to the trucking industry. The industry has been a wonderful steward to the environment and the government is saying it's "not enough," which is very costly to all stakeholders.
- This risk is increased by ineffective government, which includes the present Congress and the Biden administration.
- Increased risk due to global supply chain challenges as a result of worldwide political strife is expected.
- We expect this risk to increase as the China Section 301 tariffs still exist, and there is a new 25% tariff on materials being imported into Mexico.
- We expect an increase in risk due to the fact that an election year always includes changes that benefit the incumbent party.

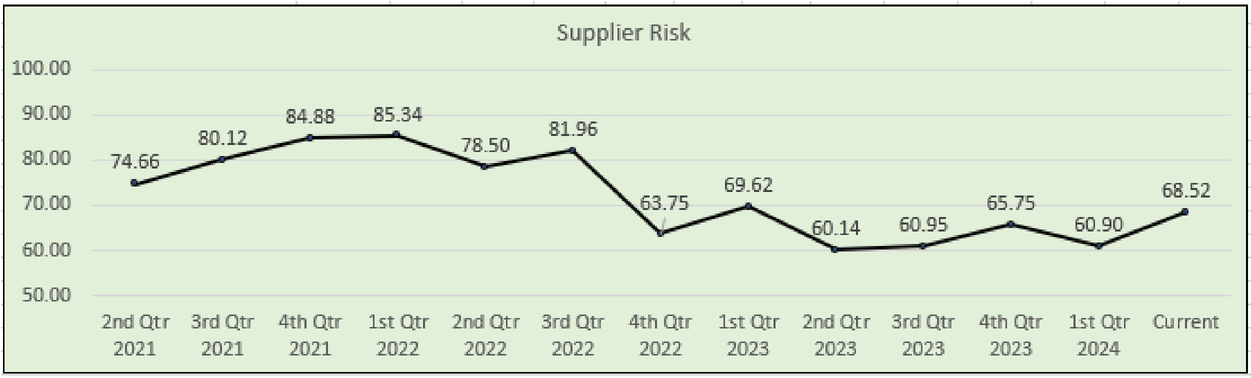


# 04 Supplier Risk

**Some examples are: single/sole source supplier, suppliers from one geographic location, supplier quality issues, and price volatility.**

***Selected Comments:***

- Nearshoring changes create process adjustments and introduction to new suppliers. These changes introduce risk.
- We're still seeing slightly lower than forecast volumes and inventory levels across multiple verticals/sectors.
- The demands of the supply-base for increased quality, improved delivery, and lower costs does not align with the macroeconomics of labor and operating capacity. There are too few people doing to much, introducing increased opportunities for error.
- Suppliers are getting cranky about customer demands for them to hold inventory, and/or get longer payment terms. Cash-in-advance demands are increasing.
- This risk will remain high with a slight increase possible due to high geopolitical tensions and delays by USA in funding Ukraine, delays in addressing the Mexico border, and continued Israeli attacks in Gaza, etc.
- Price volatility is on the rise, as major suppliers and manufacturers are increasing their minimum order quantities and their pricing, forcing my company to go back from a multi-source to a dual or single source to fight price increases.
- Decoupling from China has increased supplier risk.
- International shipping will continue to be unstable both in cost and reliability of transport schedule.
- The cocoa market is currently experiencing volatility.
- Geopolitical issues globally are a concern. We continue to see how vulnerable the supply chain is even when the conflicts are local (Middle East/Houthi attacks).
- Suppliers are increasing lead times, and finding suppliers to produce raw material is challenging.

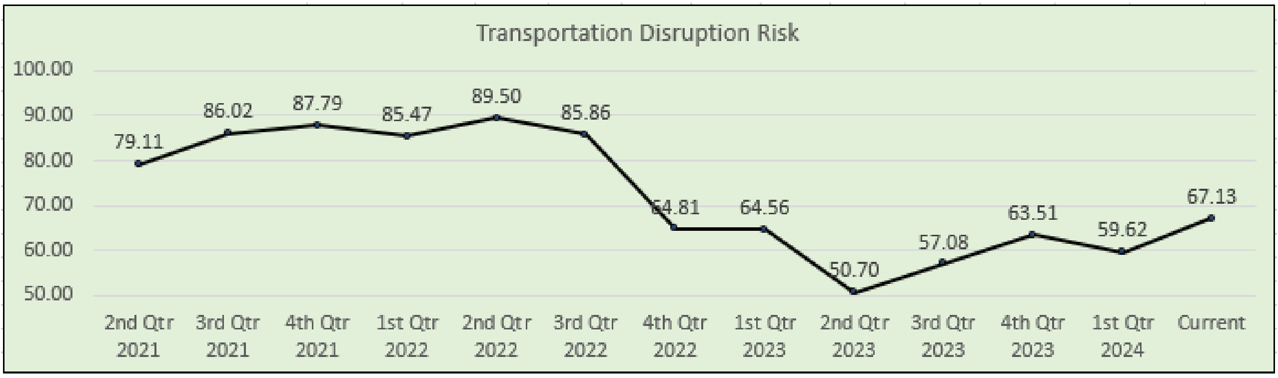


# 05 Transportation Disruption Risk

**Some examples are: fuel prices, driver shortage, infrastructure and demand volatility.**

***Selected Comments:***

- Fuel prices look to be on the rise for a majority of the year along with the ocean container transport disruption coming from the Red Sea challenges.
- Transportation pricing is too low. Shippers are attempted to procure pricing at the bottom of the market, and any slight demand increase will accelerate pricing significantly.
- International ocean shipping will remain challenging with the Panama Canal and Red Sea issues. The potential for labor disruption with the ILA also looms.
- Trucking costs have been low for enough time that a rise is imminent, especially as more trucking companies are consolidating. Ocean freight costs are 2-3 times more than they have been in the last 6 months, matching post-pandemic pricing in early 2023 before the big drop in freight costs that occurred in March-April 2023.
- Damaged goods and back-ordered parts and equipment are the most common shipping risks that I have experienced.
- Q2 will see some snugged up capacity. Still easy to cover freight. Many brokers and carriers have closed and continue to close. Less supply equals tighter capacity. Shippers should gravitate to carrier fleet partnerships vs brokers.
- The canal drought has caused major delays, as cargo ships are redirected around the coast of Africa. Lead-times have increased by 3-4 weeks.
- There is increased risk in maritime shipping from Panama Canal, and higher rail costs from line repairs.
- Diesel prices are increasing.
- Capacity is high and is expected to stay high. With increased capacity, risk is lowered.
- Our clients have told us that gas prices have seen some relief; however, the lack of driver availability has been more of an issue.

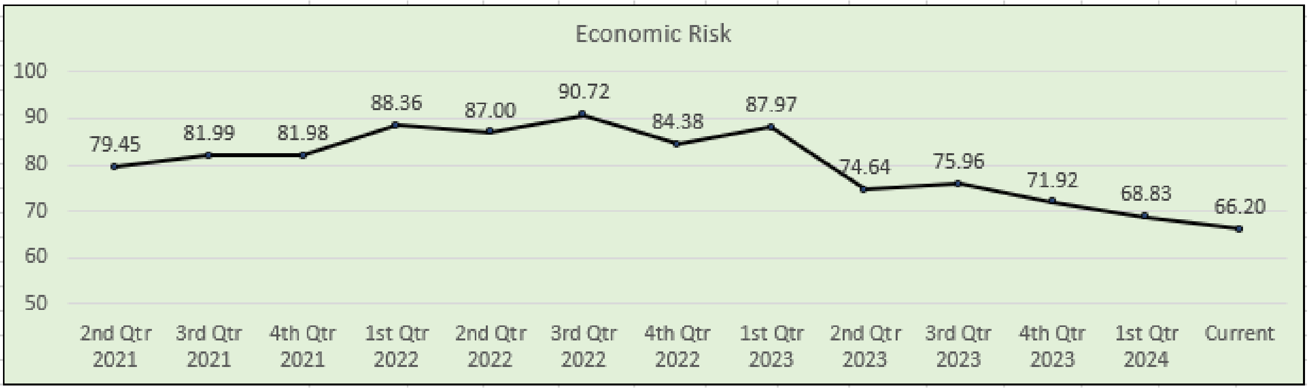


# 06 Economic Risk

**Some examples are: increasing energy costs, commodity price volatility, labor shortages, sudden demand shocks, global energy shortages and border delays.**

***Selected Comments:***

- Lower interest rates with an already tight labor market will likely create economic expansion.
- The US - Mexico border issue is volatile and unresolved. Is already impacting commerce. It will remain chaotic in the absence of federal intervention and new policy. The quality of the unskilled labor pool in the US continues to erode. There are sufficient job seekers for openings, but their exceptionally weak quality and desire to really work is impacting productivity and cost.
- The price of energy and vicissitude of the labor force, especially in terms of the difficulty in hiring skilled and trade workers, is still hurting productivity.
- Inflation continues, and basic wage increases have driven significant price pressure on fast food and other labor intensive markets.
- We may have more Mexico to USA border delays given the chaotic situation and lack of bipartisan US government negotiations for solutions.
- Insurance, taxes, and health care costs are all rising.
- Business is crossing more borders, which will enable a lessening of risk in this area.
- Suppliers that have held pricing through 2023 are now presenting increases, due to labor increases and raw material increases.
- Risk will remain the same as energy costs continue to impact homes, businesses and economies.
- Economic risk goes hand-in-hand with operational risk.
- 2024 will be a slow and steady year with regard to this risk.

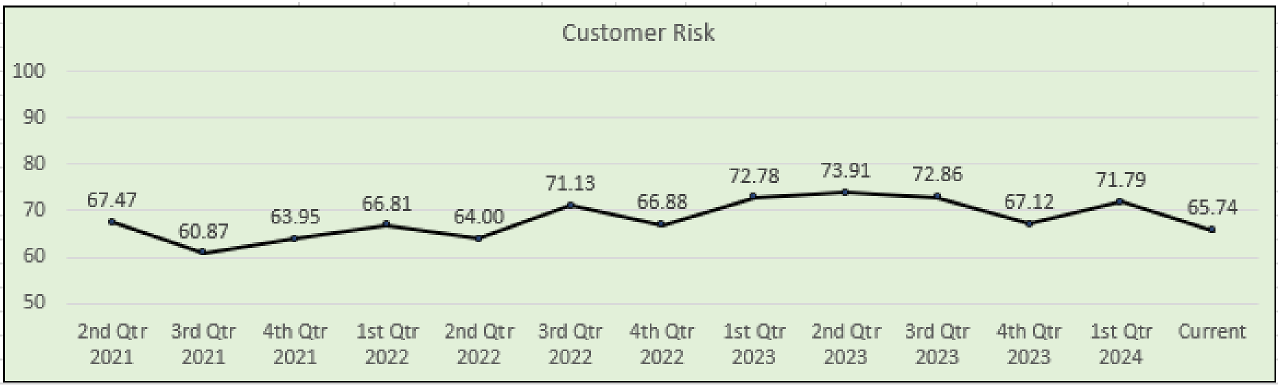


# 07 Customer Risk

**Some examples are: fast changing customer demand, easy to lose customer loyalty, changing customer base demographics, hard to predict customer behavior and hard to service customers.**

***Selected Comments:***

- Pricing pressures should reduce as inflation stabilizes and interest rates drop.
- We're seeing a broad and significant push from 3PL customers to drive cost down in a still volatile, inflationary environment.
- General order placement from customers is down due to the negative consequences of the current administration's economic policies, which increase operating costs with no benefit to quality or delivery and can't be passed along to consumers. This puts our customers in a precarious position and introduces order instability.
- Europe remains a very difficult economic environment due to the Ukraine war and the level of socialism that is dragging down growth on the continent and in the UK.
- The rate of conversion to clean energy is the risk for decarbonizing supply chains. No change for now.
- Continuing to source cheap, non-asset freight transportation solutions will lead to a volatile situation for shippers seeking low-cost solutions as capacity tightens.
- The upcoming election season will create an environment less focused on facts and data, as opposed to feelings.
- As inflation is still high, customers are either delaying their purchases or buying less expensive alternatives.
- Initial KPIs for recession are triggering; as a result, we could see lower customer orders.
- Wallets continue to be tightened and consumers are pushing back on higher prices.
- Consumer behaviors are a "wildcard," and difficult to predict with one exception - as consumer margins fall, business margins fall. Our business is at the mercy of those who purchase from us.

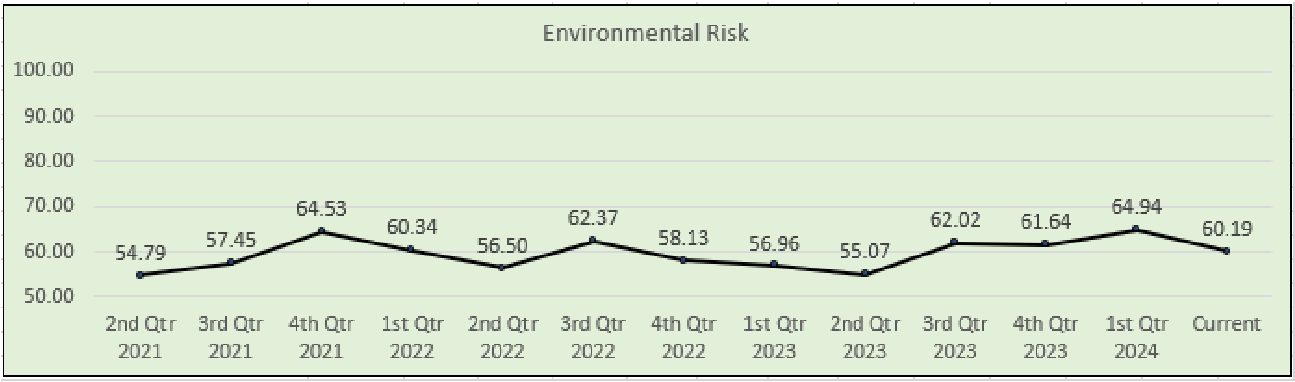


# 08 Environmental Risk

**Some examples are: natural disasters, extreme weather, industrial accidents and pandemics.**

***Selected Comments:***

- This risk continues to get worse each year.
- An increase in risk is anticipated as summer and El Niño bring greater weather extremes.
- We'll see an increase in risk due to snow and rain across the United States.
- Risk is expected to remain the same, with the footnote that hurricane season predictions aren't yet out.
- Accelerating global warming continues to drive higher environmental risks of extreme weather, property/crop damage, etc.
- We're expecting fewer weather-related impacts in Q2 than in Q1, mainly fewer large snow storms.
- We cry wolf regarding climate change! Yet, the DOD has been spraying the sky with chemtrails for 40 years, causing great harm to the health of all, and nobody says a thing.
- Organizations that are doing REAL preparation for changing climate conditions will continue to outperform those who want to play silly games like adopting EVs, etc.
- This risk will increase due to climate change and the lack of focus on this issue.
- Yes, this risk will increase, but only because of the increase in unpredictability.
- Recent extreme weather events have caused disruptions for some clients.



# 09 Operational Risk

**Some examples are: site disasters, product counterfeiting, damage or disruption to physical assets and machine breakdown.**

***Selected Comments:***

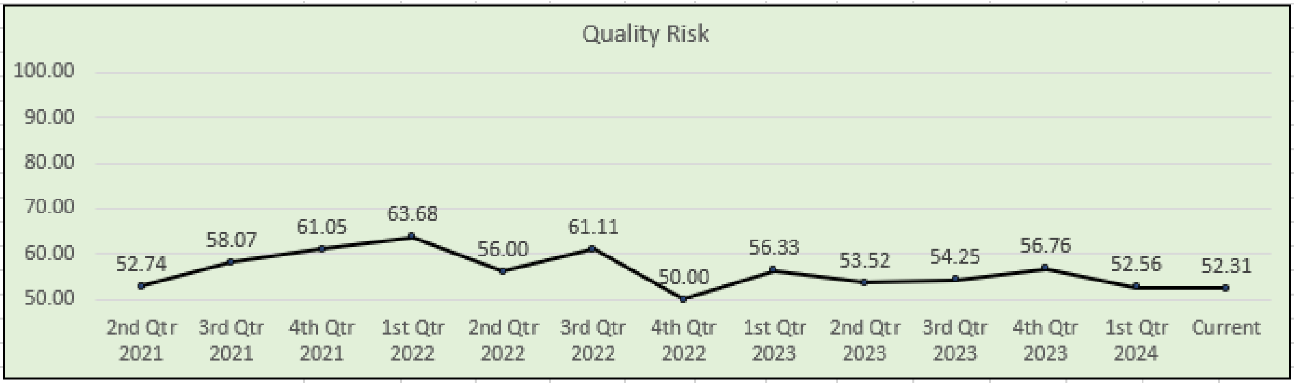
- We don't anticipate much changing here.
- This risk remains the same as weather events continue to impact new equipment, particularly electric vehicles and MHE.
- Increased risk is expected due to demand pressure and continued maritime logistics delays owing to the Panama Canal water level.
- Red Sea issues, underwater cables being cut, and pipelines exploding, etc. increases the level of risk in what have otherwise been non-risky areas.
- The level of risk is already very high and quite tenuous. It is what keeps all of the firms we work with going. It's tough to imagine and increase in risk above what is already "high risk".
- Operational risk will increase as the impact of climate change is ongoing with increasing event occurrences.
- A change in management from old to newer machines will result in increased risk.
- Some of our clients have experienced increased disruptions due to recent extreme weather conditions.
- 2024 will be a slow and steady year with regard to this risk.
- Some of our clients have experienced increased disruptions due to recent extreme weather conditions.
- The assets are getting older and in more need of maintenance.
- Carrier client financial failure. The level of risk remains the same.
- Our company has made major investments in the recent past in IT infrastructure and facilities to reduce risks.
- Things seem to be stabilizing.

# 10 Quality Risk

**Some examples are: lack of sufficient quality testing, changing quality standards, informal quality control documentation, customer safety issues and product recalls.**

***Selected Comments:***

- A decrease in risk is expected as internal processes are stabilizing and cross function support teams are staffed appropriately to support.
- 2024 will be a slow and steady year with regard to this risk.
- Damaged goods and back-ordered parts and equipment are the most common shipping risks that I have experienced.
- This risk seems to be getting higher, as there are more rules and regulations to adhere to, with larger penalties for lack of compliance.
- We see no changes to quality concerns.
- Changing standards and customer safety issues are on the rise, but we're uncertain as to whether risk will increase much over the period of a quarter (3 months) of the year.
- People are asked to do more with less... this trend continues. When processes are "streamlined" without consideration to safety and quality, this risk increases.
- We do not manufacture products, with the exception of private label that are manufactured externally. We are highly disciplined in ensuring our quality meets expectations.
- System changes may lead to increased risk.



# Appendix A
## Risk Index Summary

**The Risk Index is a number between 0 – 100.**

Risk Index ≤ 49 suggests less risk

Risk Index = 50 indicates no change in risk

Risk Index ≥ 51 suggests greater risk

**The further the number is from 50 the greater the level of risk.**

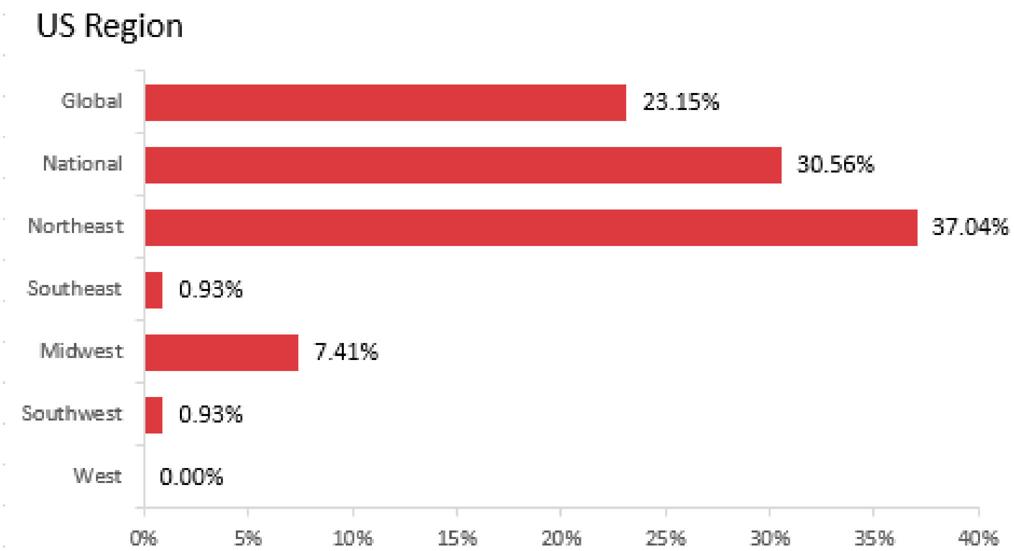
LRMI = (P1 * 1) + (P2 * 0.5) + (P3 * 0)

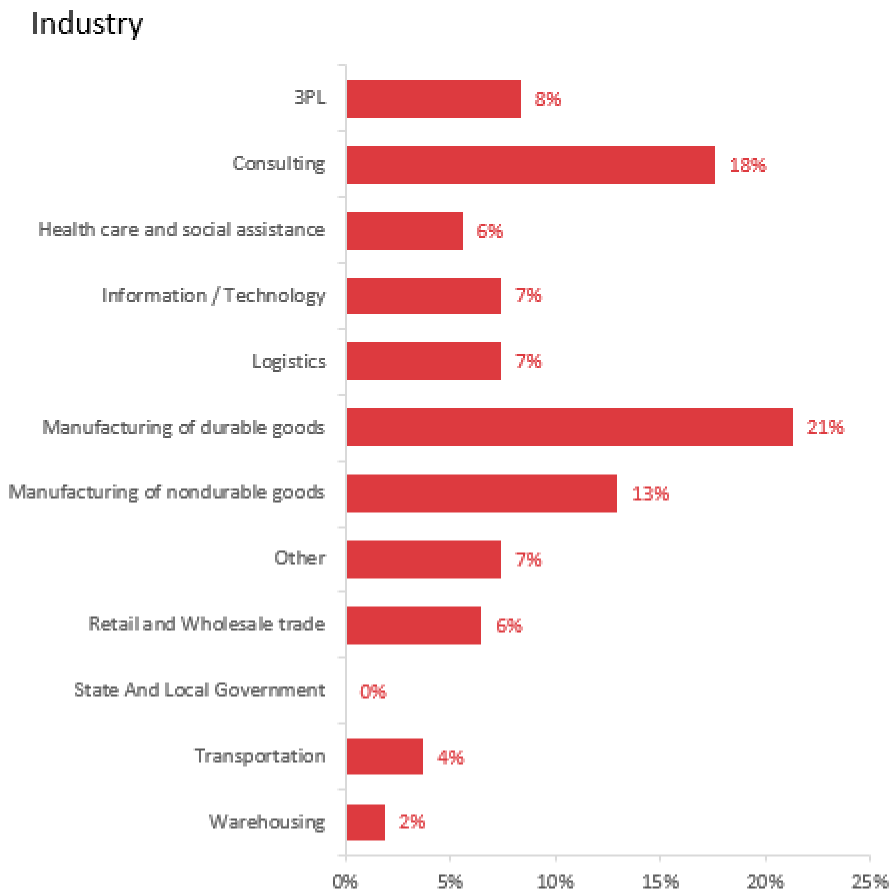
P1 = percentage of answers reporting an improvement

P2 = percentage of answers reporting no change

P3 = percentage of answers reporting a deterioration

# Appendix B
## Survey Demographics

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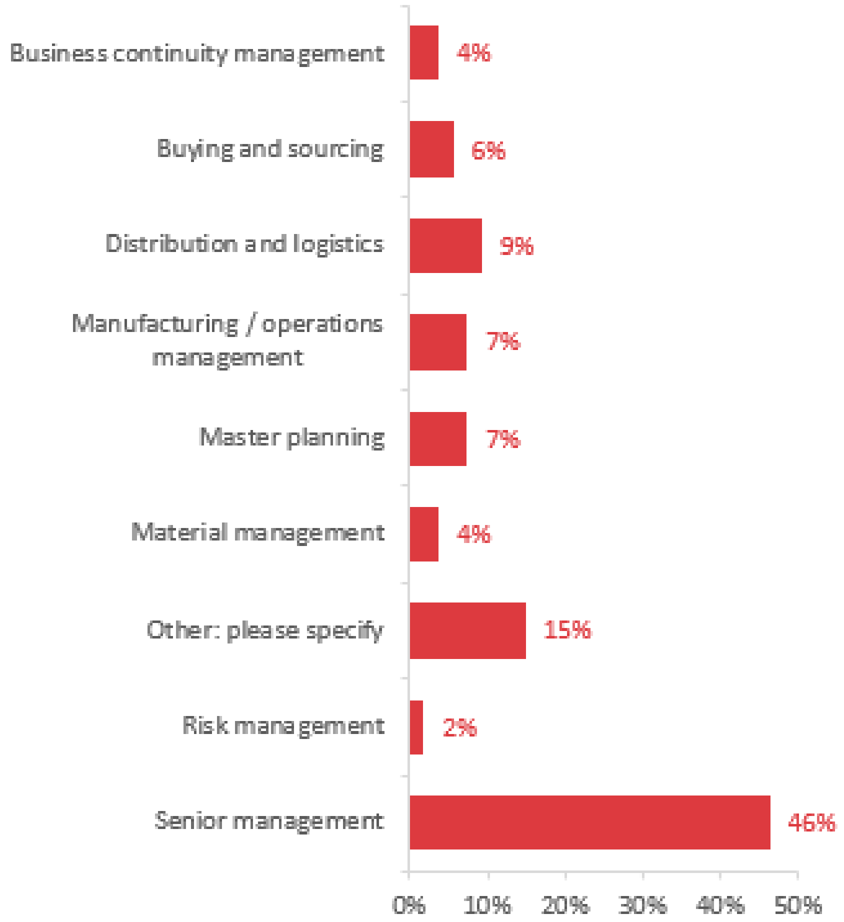
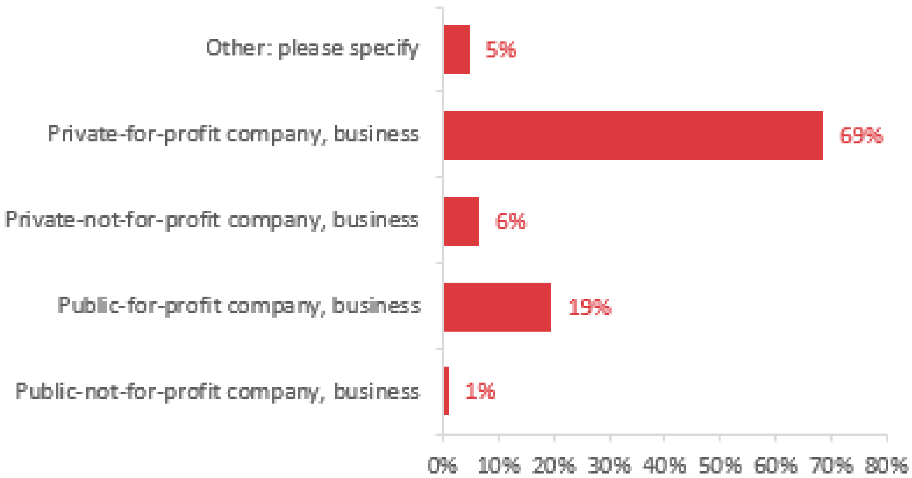
# Appendix B
## Demographics (continued)

### Primary Role




### Place of Employment



# Appendix B

## Demographics (continued)