



4TH SUPPLY CHAIN RISK BAROMETER

**At the dawn of an
agile and sustainable
Supply Chain?**

Study conducted in partnership
with



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01

INTRODUCTION

War in Ukraine, a proliferation of natural disasters, lockdown in China, tensions around Taiwan and Korea, shortages of materials and components, rising energy prices, the return of inflation, threats of recession, the rise of nationalism... In an increasingly uncertain environment, it is the very model of globalization and the global Supply Chain that is being questioned.

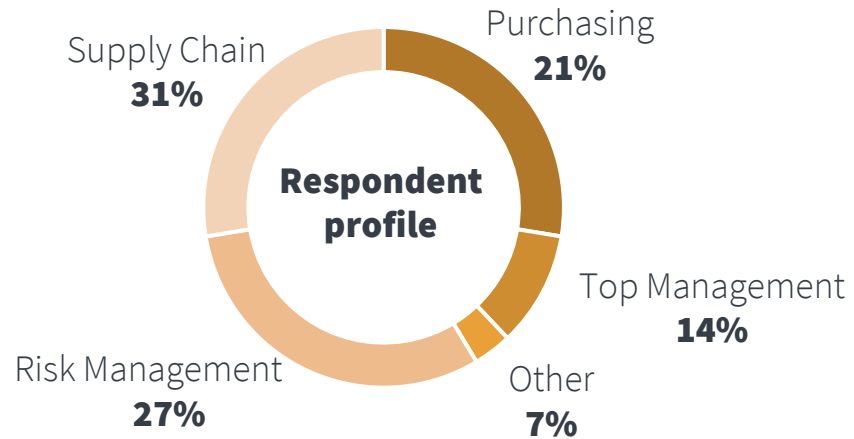
While companies have become aware of the complexity of their Supply Chains, of their fragility and dependence, and even of their unpreparedness to deal with events, it is now time to adapt and rise to the new challenges of geopolitics and global warming

This 4th edition of the KYU Supply Chain Risk Barometer, conducted in partnership with Arts & Métiers, France Supply Chain and AMRAE, is an opportunity to take the pulse of the Supply Chain, to measure the changes in the risks to which it is exposed, to assess the maturity of organizations to address the new challenges, to identify and share trends and best practices in terms of control.





STUDY SCOPE

A large panel representing the diversity of the Supply Chain

We sent out our questionnaire to more than 800 Supply Chain, Purchasing and Risk managers and obtained nearly 100 answers that allowed us to better perceive where companies are regarding the new challenges facing today's Supply Chain, what they perceive as risks and what they have decided to implement to improve their control.

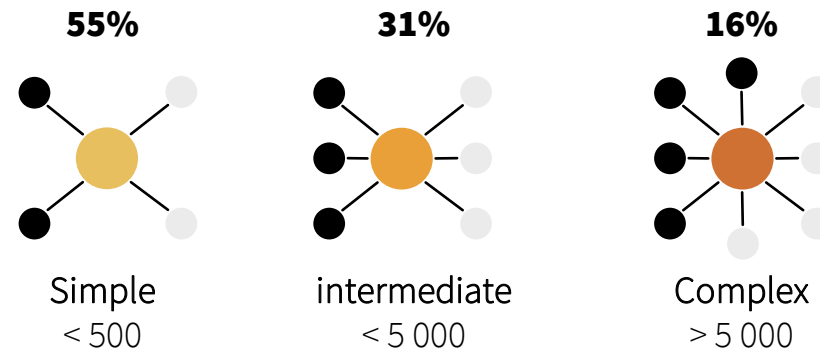


12 sectors of activity split into 4 key clusters

-  Aerospace & Automotive **30%**
-  Other Industries **23%**
-  Luxury & Retail **27%**
-  Networks & Services **20%**

Supply Chain profiles

In number of upstream and downstream partners



STUDY PARTNERS

Management Consultancy

KYU Partners is a consulting and research practice specialized in Operations Performance and Risk Management.

Founded in 2002, KYU today has more than eighty consultants in Paris and Cologne working for major French and international corporations. Combining business expertise with innovative and collaborative approaches, our teams are committed to delivering tangible results and accelerating the transformation of organizations

Institute of technology

Arts et Métiers is committed to training engineers specializing in sustainable technologies who are capable of designing environmentally friendly products and systems, as well as managing an industrial organization by controlling risks and costs.

Created in 2000 and the result of close collaboration with companies, the Specialized Master's Degree® in Global Risk Management offers a cross-cutting, multidisciplinary and integrated approach to risk, based on solid scientific foundations, to help students deal with current uncertainties.



France Supply Chain Association

In an increasingly complex world, transforming the Supply Chain into a lever for a more sustainable world is a vital/strategic issue for all companies; This is why France Supply Chain brings relevant solutions to all Supply Chain actors, thanks to its network of 450 affiliated companies and an approach based on collective intelligence.

This collective intelligence of the members acting within the LABS (Digital & Technologies, Human Resources, Supply Chain 4 Good, ETI-PME and the LAB Jeunes) allows to imagine and conceive contents and tools necessary to the production of value for the companies concerned with having a positive environmental and societal impact.



AMRAE - Company Risk and Insurance Management Association

AMRAE is the benchmark professional association for corporate risk and insurance professionals. It brings together 1,650 members from over 750 private and public organizations. AMRAE supports these organizations in achieving their strategic and operational objectives to enable them to improve their performance and control their risks.



EDITORIAL

The Supply Chain between tension and transformation

The COVID-19 pandemic, war in Ukraine, extreme climatic phenomena: for three years now, the world's economies have been affected by numerous crises that have greatly weakened them while highlighting their very strong interdependence.

After the pandemic revealed dependence on China, the Russian-Ukrainian conflict has highlighted Europe's dependence on Russian gas and the dependence of many countries on Ukrainian agricultural resources. Shortages that appeared in 2021 have continued into 2022, particularly in semiconductors, and new ones have emerged, related especially to labor shortages, rising energy costs, severe droughts in some regions and floods in others.

Geopolitical and climatic events now play a major role in the industrial strategies of businesses that must strengthen their ability to anticipate them to better protect themselves and/or prepare their organization to deal with them.

The current Supply Chain models were built for a world of certainties, that of (naively) harmonious globalization and demand predictability. The succession of crises over the last 3 years has brought us into a new age of tension and forces us to revisit organizations that were built for calm times and have become far too rigid.

In this new era, the challenge for companies will be to take back their value chains, to gain in agility and flexibility, but also to meet the new requirements of transparency, traceability and compliance.

Against this backdrop, the use of internal and external data will play a key role in modeling risk scenarios and defining strategies for reconfiguration, investment, procurement and operations planning.

It is to this double challenge of permanent agility and sustainable transformation that Supply Chain stakeholders must respond to make resilience a competitive advantage.



**Laurent
GIORDANI**

*Founder
partner*



**Thibaud
MOULIN**

Partner



TOP 10 SUPPLY CHAIN RISKS

| | | | |
|-----------|----------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1 | LACK OF CAPACITY | Suppliers are either short on capacity or short on labor and cannot keep up with demand. |  |
| 2 | RISING COSTS | Rising commodity, energy and wage costs are fueling inflation. |  |
| 3 | CYBER ATTACKS | Attacks on the Supply Chain are more and more frequent, and suppliers are poorly protected. |  |
| 4 | GEOPOLITICAL CRISIS | Geopolitical tensions are escalating, increasing the instability of critical supply areas. |  |
| 5 | LOGISTICS | Bottlenecks form during lockdowns and operators lack the labor to meet the needs |  |
| 6 | DEMAND VOLATILITY | Due to a lack of reliable forecasts, companies are unable to meet demand or carry significant excess inventory. |  |
| 7 | SOURCE SCARCITY | Successive crises have led to supplier panel consolidation and finding new sources is a challenge |  |
| 8 | CLIMATE CRISIS | Global warming increases the criticality of disasters affecting many companies. |  |
| 9 | PANDEMIC | The virus has not been eradicated and the end of the zero Covid policy in China raises fears of further lockdowns. |  |
| 10 | CSR CONTROVERSY | Expectations and regulations in terms of CSR are increasing, particularly regarding the Supply Chain. |  |





02

A LOOK BACK AT TWELVE MONTHS OF CRISES

While 2022 was a very contrasting year from one business sector to another, with some returning to growth and others experiencing profound new crises, all have struggled to run their operations due to fluctuating Supply Chains.

The companies with sufficient resources to adapt to a new, more uncertain and more constrained environment have embarked on their transformation, while others, more depleted, are waiting for institutions to provide them with a huge hand-out to help them survive the energy crisis, hoping that it will not last indefinitely.



58%

of respondents have been through more than 10 major crises in 2022

A LOOK BACK AT TWELVE MONTHS OF CRISES

Shortages and apathy in the Automotive and Aerospace industries

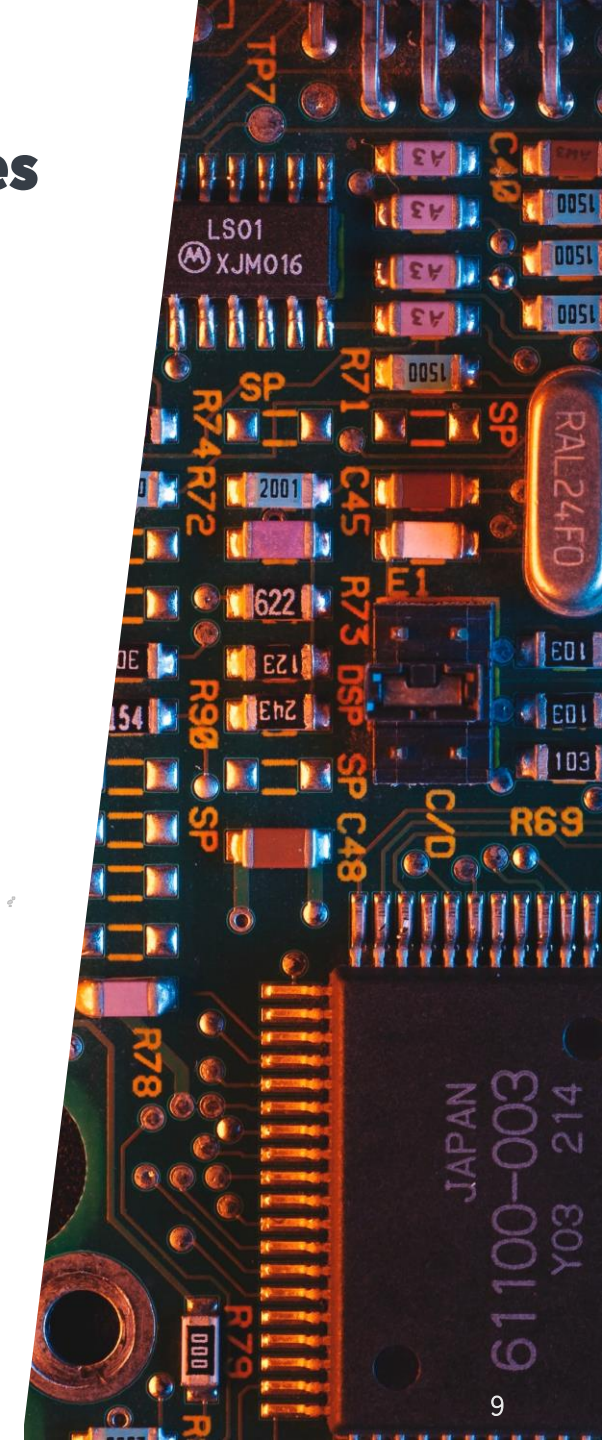
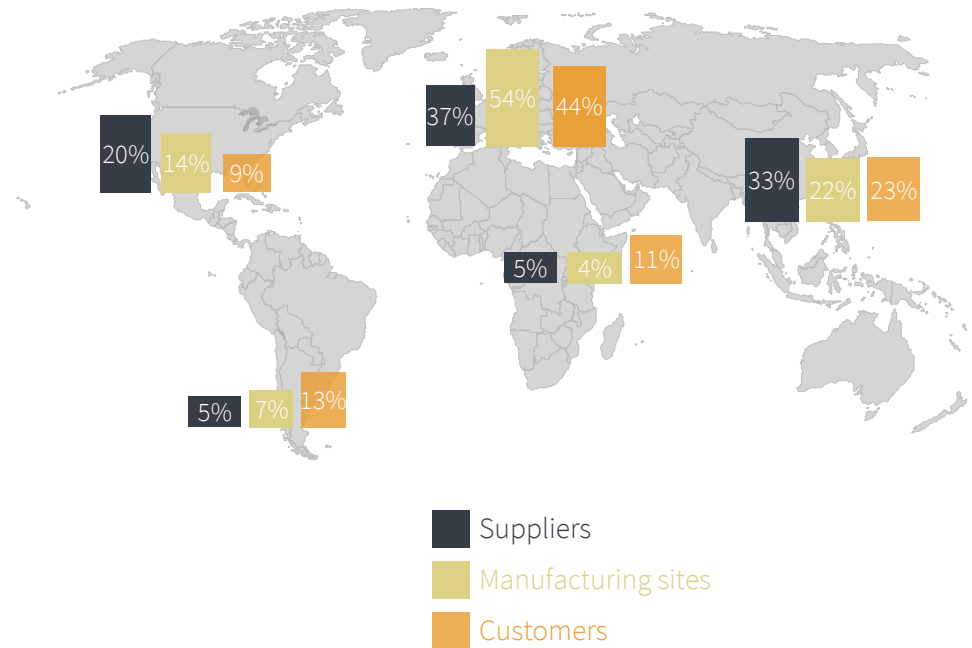


Both major manufacturing sectors in France are struggling to emerge from the slump caused by the Covid crisis and are still far from their previous levels of activity. The global automotive market has plateaued at 81 million vehicles (11 million in Europe) compared to 90 million (16 million in Europe) before the crisis; as for Airbus and Boeing deliveries, they should just exceed 1,000 units (including just over 600 for Airbus) compared to over 1,600 in 2018 (before the 737 Max crisis).

For the automotive industry, crises are piling up: shortage of semi-conductors, rising raw material and energy costs, a lack of truck drivers, changing consumer habits, particularly in anticipation of affordable electric vehicles... This situation is becoming less and less sustainable for subcontractors, incapable of passing on price hikes to manufacturers. Some could go bankrupt in 2023. A recent German VDA study shows that 10% of them are already in serious financial trouble.

Mapping of respondents' Supply Chain

Geographical split in % by catchment area



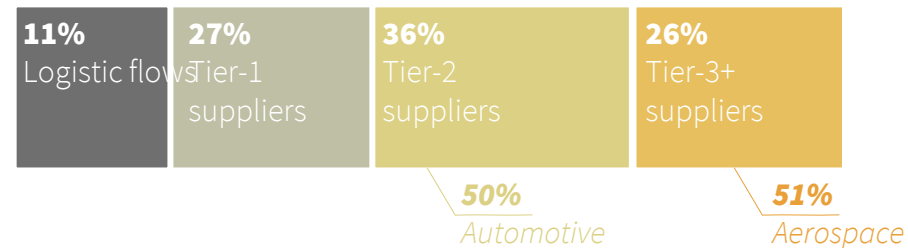
A LOOK BACK AT TWELVE MONTHS OF CRISES

Shortages and apathy in the Automotive and Aerospace industries

For the European aerospace industry, the scarcity of raw materials (titanium, aluminum, steel, stainless steel and semi-conductors) and the shortage of labor have hampered the increase in production rates called for by Airbus. In Occitania, for example, 80% of companies in the sector had difficulty recruiting in 2022. Some of them were forced to cut jobs in 2020 and are now struggling to find the skills they need for their business. These problems affect both large and small suppliers, with inflation, as in the automotive sector, weighing on costs and putting the most fragile firms at risk. The consolidation of the sector, which gathered pace in 2022, could well continue in 2023.

These two sectors are facing the dual challenge of transitioning to low-carbon technologies that require significant long-term investment, and the need to enhance the job attractiveness of their industry, both suffering from a significant loss of image

Origin of crises in 2022



Focus on crises in 2022

Average number of crises
19 crises

Top 3 Causes

Top 3 Impacts



A LOOK BACK AT TWELVE MONTHS OF CRISES

Shortages and price hikes slow down the recovery in Manufacturing



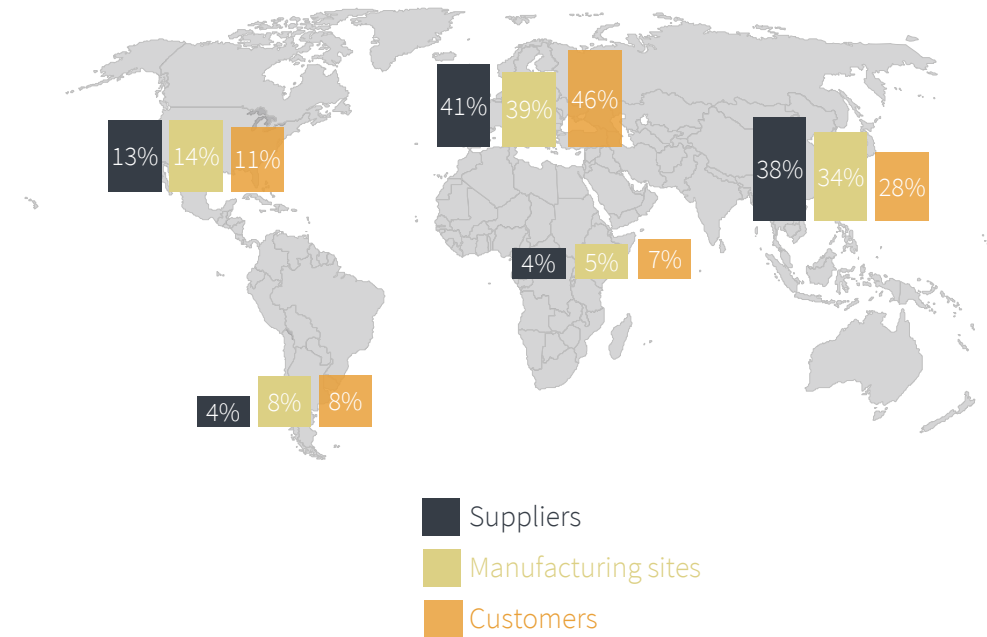
Agri-food, iron and steel, chemicals, pharmaceuticals, building materials, all manufacturing sectors are affected by the increase in energy costs, shortages of raw materials and labor, as well as by the lack of transport capacity.

The main risk for small and medium-sized manufacturers is the concomitant increases in raw materials, energy and wages, and their ability to pass these on to their customers in the face of global competition.

Rising energy costs in Europe are detrimental to the most energy-intensive sectors. Not all countries are able to implement support systems that meet their needs, and some manufacturers are forced to reduce their capacity. Thus, even if the level of European production is still good, it could deteriorate significantly in 2023. Some large groups like Solvay are even considering the possibility of offshoring if Europe does not take the necessary measures to limit inflation.

Mapping of respondents' Supply Chain

Geographical split in % by catchment area

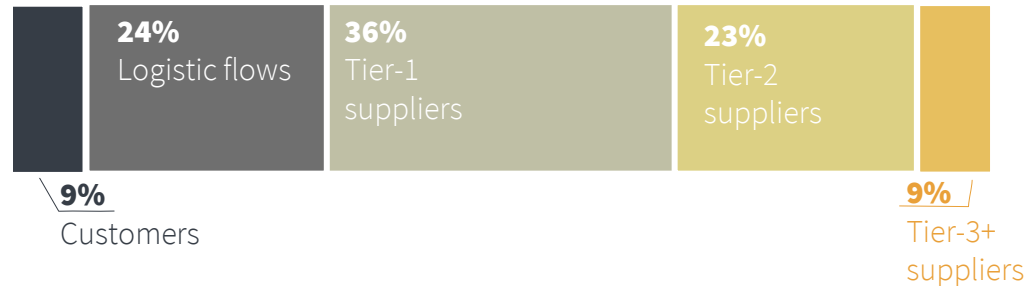


A LOOK BACK AT TWELVE MONTHS OF CRISES

In other sectors, Manufacturers are chasing capacity

The agri-food industry is particularly affected by the difficulties, firstly through shortages of raw materials linked to intense climatic phenomena in many regions, such as the heat wave in Canada, which led to a shortage of mustard; the war between Russia and Ukraine, two of the world's largest granaries; or animal health crises such as avian flu. In addition, increases in production costs, energy, raw materials and packaging have led to the closure of factories for several months, putting their employees on short-time work. Finally, the lack of labor has become widespread in the sector, with 30 to 40k unfilled positions in France. This situation is not expected to improve in the short term because the production of raw materials could suffer from the lack of nitrogen fertilizer essential for soil fertilization, following the shutdown of a large number of ammonia production units in Europe, again due to the rise in energy prices

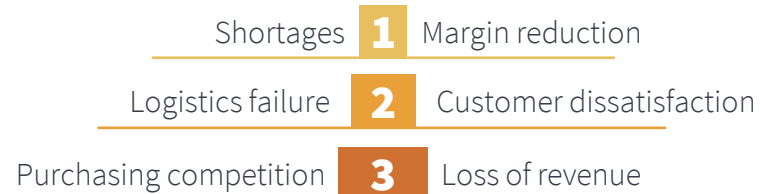
Origin of crises in 2022



Focus on crises in 2022

Average number of crises
10 crises

Top 3 Causes Top 3 Impacts



A LOOK BACK AT TWELVE MONTHS OF CRISES

String of shortages spells empty shelves in Retail

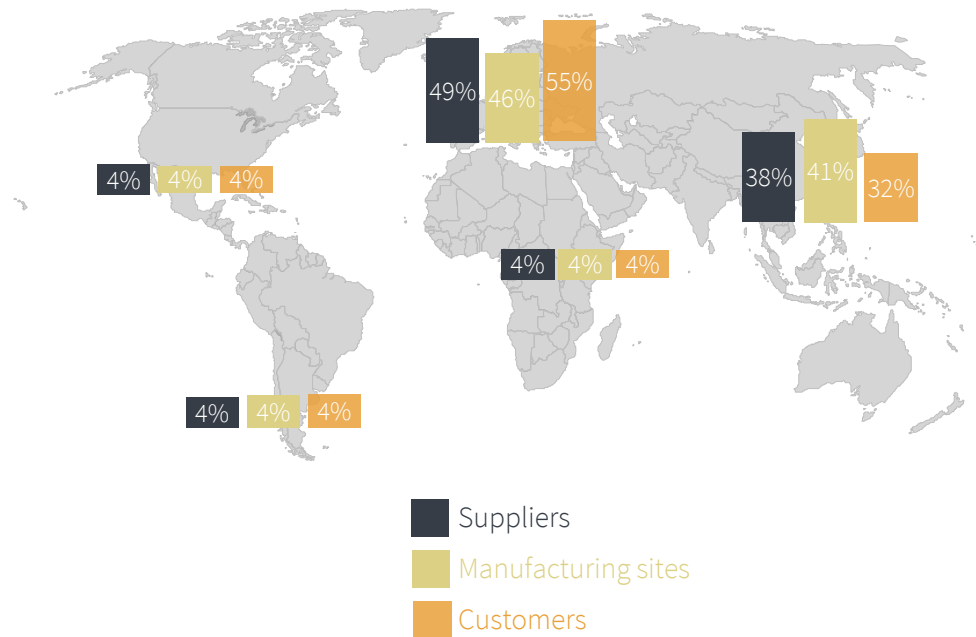


In the wake of the food industry's woes, supermarkets have seen record inflation in retail prices and numerous shortages. In France, retailers are experiencing very high stockout rates, with a shortfall of more than €4 billion in 2022, according to NielsenIQ. In addition to shortages, tensions on freight and packaging have delayed restocking and the preventive and at times irrational behavior of consumers has amplified these phenomena. These difficulties are expected to continue in 2023 if the agri-food sectors remain under pressure.

Specialty retailers, from textiles to consumer durables, whose dependence on China and Asia in general is very strong, have gone through a chaotic end of year after a good period in 2021 and early 2022. Replenishment times are long in their Supply Chain model, so orders placed in line with growing business volumes have left them with very high inventories due to the drop in consumption linked to inflation.

Mapping of respondents' Supply Chain

Geographical split in % by catchment area



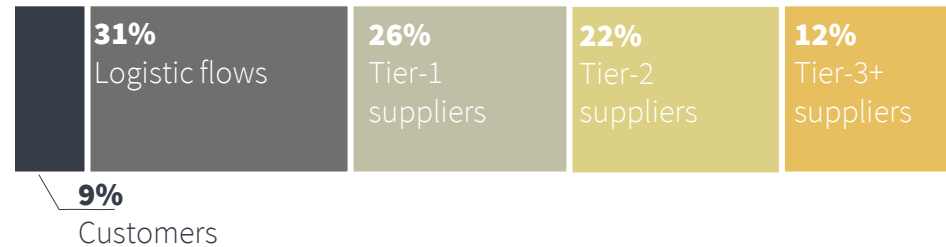
A LOOK BACK AT TWELVE MONTHS OF CRISES

Specialty Retail and Luxury solutions feel the strain

Many firms in these sectors are working on changing their Supply Chain model to be more agile. One solution is to locate production as close as possible to the markets, which means finding capacity, particularly in Euromed for Europe. Being more expensive, the products originating from these basins will undoubtedly be specific to the European market and more durable, in order to increase their value. The shorter supply time will reduce stocks and markdowns.

The only sector not to be affected by the crisis, luxury goods companies are going from record to record in terms of turnover despite a difficult economic environment. However, they are still exposed to the shortage of labor which also affects the craft industry (in France 20k jobs are not filled each year according to the Colbert Committee), to the inflation of costs which endangers their network of small and medium-sized European companies and to the impact of global warming on the production of their exceptional raw materials, mainly from livestock and agriculture.

Origin of crises in 2022



Focus on crises in 2022

Average number of crises

10 crises

Top 3 Causes Top 3 Impacts



A LOOK BACK AT TWELVE MONTHS OF CRISES

Labor shortages in the Services sector

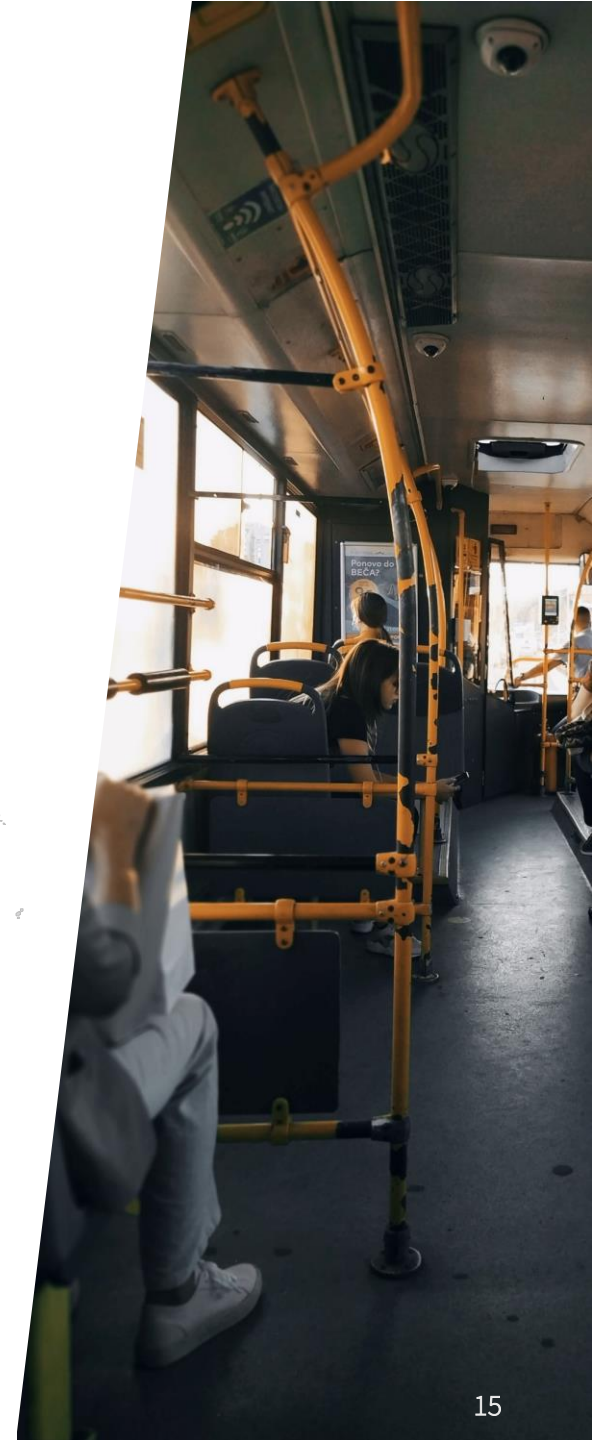
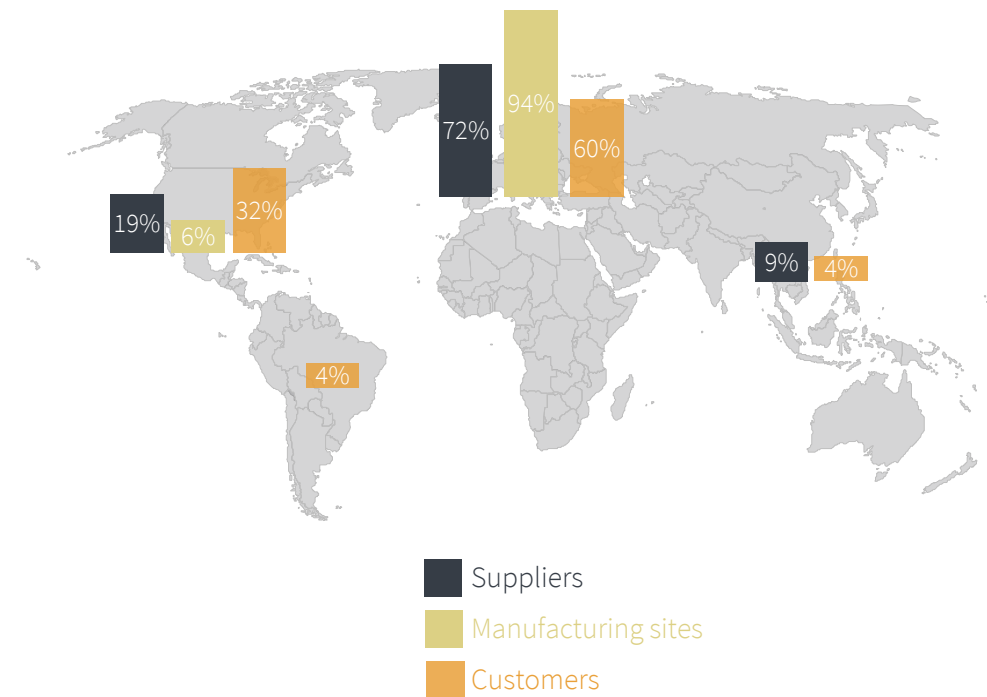


Labor shortages escalated to critical levels in many service sectors in 2022. First and foremost, road and urban transport lack drivers to operate trucks, buses, streetcars and trains. In total, according to the IRU, there could be a shortage of nearly 2 million drivers in Europe by 2026 caused by the growing gap between retirements and the hiring of new drivers due to the lack of attractiveness of these professions. With around 75% of European freight, road transport is at the heart of the Supply Chain for all sectors and this structural capacity shortage therefore represents a major risk for business growth.

The hotel and restaurant sector is also being hit hard by shortages of labor and raw materials, but also by the increase in costs of the latter, coupled with that of energy and wages. Most companies are considering raising their prices to preserve their margins, even if it means impacting revenues.

Mapping of respondents' Supply Chain

Geographical split in % by catchment area



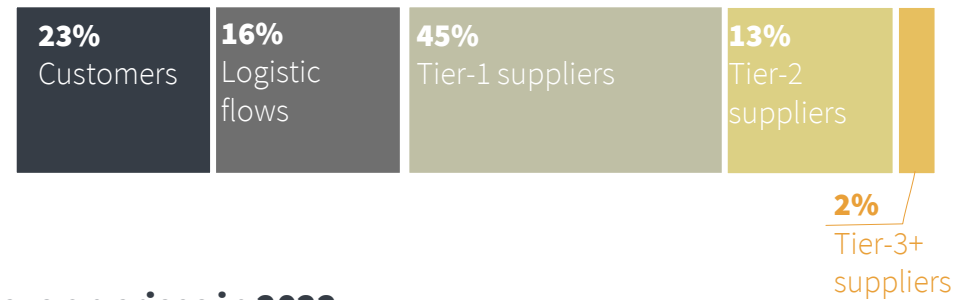
A LOOK BACK AT TWELVE MONTHS OF CRISES

Labor shortages in the Services sector

In the energy sector, electricity operators are faced with the daunting challenge of extending the service life of their facilities while maintaining their production levels to offset the shortage of Russian gas. In France, labor shortages are most acute in the nuclear industry, mainly among EDF's subcontractors. The heavy maintenance projects associated with the "Grand Carénage" program require many qualified personnel in technical fields such as welding. As an example of this critical situation, a hundred or so welders from the US and Canada have been hired as back-up to work on French power plants.

Overall, the service sectors are suffering from a shortage of labor in all their subcontracting fields. Most of the time, this is due to a lack of job attractiveness, but also to a structural shortage of qualified staff to replace retiring workers or to cope with an upswing in activity.

Origin of crises in 2022



Focus on crises in 2022

Average number of crises
9 crises

Top 3 Causes Top 3 Impacts



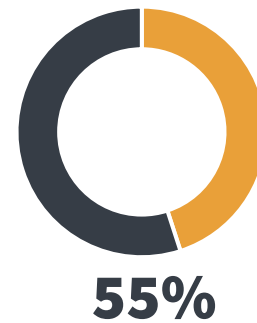


03 MAJOR RISKS IN 2023

2022 was supposed to be a year of recovery, but extreme geopolitical and climatic events have greatly affected the global economy and disrupted the Supply Chains of many sectors. These events have maintained and often amplified the "bullwhip" effects generated by the global pandemic, the consequences of which remain ominous with the end of zero Covid in China.

While logistic flows seem to be easing as inventories are at their highest, inflation is threatening to turn into a recession and companies are struggling to find the materials and labor needed to meet demand, leading to repeated shortages.

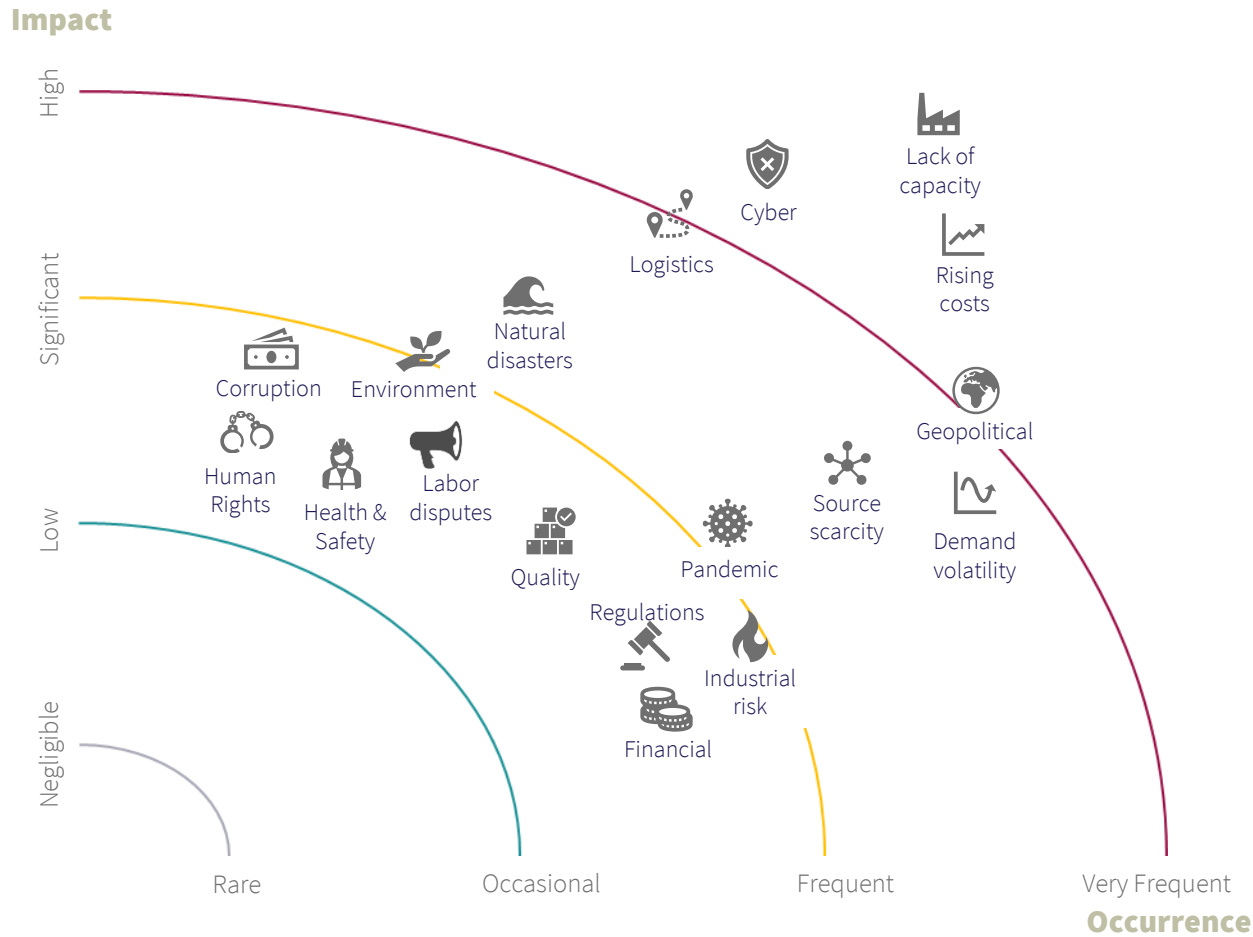
Between geopolitical instability, climate disasters and economic uncertainty, the coming year could well resemble 2022.



55% of respondents consider capacity risk to be the most critical

MAJOR RISKS IN 2023

Risk matrix



Source : 4th Supply Chain Risk Barometer - KYU

Trends in the top 10 risks

- Product shortages due to capacity limitations, lack of raw materials and labor are of great concern.
- Rising energy costs and high inflation in many countries, especially in Europe, could continue into 2023.
- Cyber attacks on companies, especially on the Supply Chain, remain in the top 3 risks.
- Global geopolitical tensions have risen sharply with the war in Ukraine, raising fears of further conflicts.
- Even if maritime traffic has been regulated, road transport remains very tense in Europe and lockdown risks persist in China.
- Demand is still very uncertain and is subject to strong variations because of inflation.
- The difficulties of implementing alternatives in a world of scarcity and hyper-competition are confirmed.
- Initially the cause of shortages, climate impact is increasingly weighing on production capacities of certain exposed areas.
- The virus has not been eradicated and the end of the zero Covid policy in China raises fears of new brutal lockdowns.
- The Responsible Supply Chain is a key issue under increased scrutiny by stakeholders.

- Criticality up sharply
- Criticality up
- No change
- Criticality down
- Criticality down sharply

MAJOR RISKS IN 2023

Shortages of materials, components and workers

Sunflower oil, mustard, wheat, paper, fertilizer, aluminum, semiconductors, glass, timber, medicine... Like 2021, 2022 was marked by shortages initially due to the global "bullwhip" effect of the Covid crisis. But this initial shock has been sustained by successive crises and difficulties have become widespread with bottlenecks in the supply of energy and raw materials as well as worsening labor shortages.

Production capacities are limited despite continuing high demand. In October 2022, INSEE and the German IFO reported that the proportion of industrial companies reporting production bottlenecks was 49% in France and 64% on the other side of the Rhine. At the same time, 65% of French business leaders and 87% of German family businesses reported difficulties in recruiting.

The most critical component shortage for many sectors remains that of semiconductors, which is expected to continue in 2023 until new production capacities are opened at TSMC and Texas Instrument.

Demand has never been so strong (+7% between 2021 and 2022), driven by IoT, 5G and automotive electrification. Supply has failed to keep up due to Chinese lockdowns and shortages of key raw materials for production from Russia and Ukraine.

On the labor side, the shortage seems to be lasting in Europe and the United States, particularly in the service sector. To explain this gap, besides the increase in mortality and the drop in immigration linked to the pandemic, more and more experts have pointed to the psychological impact of the crisis as a vector for job changes for workers looking for a different relationship with work. The "Great Resignation" in the United States was an illustration of this, affecting mainly the service sector. Put more bluntly, the current pressure on labor markets is leading to high turnover as employees seek better pay and working conditions. Coupled with the ageing of the population, this phenomenon is expected to last for several years and there are calls for short-term solutions.

1



LACK OF
CAPACITY

"These shortages are the result of both cyclical factors, like the fact that companies had to abruptly slow down their production during the pandemic and restart it just as abruptly afterwards, and structural factors, such as workers no longer wishing to take on precarious, arduous and low-paid jobs."

Orsetta Causa - Senior Economist OECD

MAJOR RISKS IN 2023

From inflation to recession

The sudden upturn in consumer spending in 2021 on the heels of the health crisis led to a return of inflation caused by the rise in raw material prices, increased transport costs, the multiplication of shortages that disrupted Supply Chains and tensions on the labor market.

The outbreak of war in Ukraine in February 2022 led to a real energy crisis, particularly in a Europe that was more than 40% dependent on Russian gas before the conflict. As a result, inflation rose (+9.2% at the end of December in the euro zone, including +25.7% for energy, +6.7% in France according to Eurostat). For the most energy-intensive companies, such as paper, iron and steel, chemicals and food processing, this has resulted in a real drop in profitability.

After a sharp decline during the pandemic, due to public policy support, company bankruptcies started to rise sharply again in 2022 and should accelerate internationally in 2023. In its annual report, the insurer Allianz anticipates a rise in corporate insolvencies of

2



RISING COSTS

around 19% in 2023, after +10% in 2022. These two significant rebounds should bring insolvencies back above their pre-pandemic levels from next year.

Europe should be particularly hard hit over the next two years. In Asia, China, whose economy has been weighed down by a very restrictive zero-Covid policy, should see insolvencies rise by 15% next year. The acceleration will be much stronger in the US (+38% in 2023).

These are all weak signals that should alert us to possible Supply Chain disruptions due to the many interdependencies between players.

According to IMF forecasts, growth should be weak in the United States and negative in Europe, especially if the conflict continues. Emerging economies should experience a less marked slowdown than in 2022, even if uncertainties weigh on activity in China regarding the consequences of the abrupt exit from the Covid zero policy. 2023 should therefore resemble 2022, but worse!

"2023 will be more difficult than the year we are leaving behind (...) Why? Because the three largest economies - the United States, the European Union, and China - are all slowing down simultaneously (...) for the first time in 40 years, China's growth in 2022 will likely be equal to or less than global growth."

**Kristalina Georgieva - IMF
Managing Director**

MAJOR RISKS IN 2023

One of the main targets of cyber attacks

In an economic environment marked by digital technology development, growing interconnection of organizations, standardization of hybrid work, increasing geopolitical tensions and the war in Ukraine, cyber attacks remain one of the main threats for companies.

If the largest companies are aware of what is at stake and have invested massively in the security of their information systems over the last few years, the smallest companies remain particularly vulnerable and are often their clients' Achilles' heel.

For companies that already lack visibility on how their Supply Chain is composed, knowledge of their partners' level of maturity in terms of cybersecurity remains very low or non-existent.

According to cybersecurity solutions provider Trend Micro, one out of two global companies (52%) has already encountered a ransomware attack on their Supply Chain with varying degrees of impact.

For globalized Supply Chains, involving hundreds or even thousands of companies, a cyber attack that paralyzes a single player by preventing it from producing, delivering or receiving can have a butterfly effect on the entire chain or even on an entire sector.

The global chip shortage has revealed that the weakest link in the global economy is its interconnectedness. By targeting companies that play a critical role in the operations of other companies, such as key component suppliers or logistics companies, cybercriminals have realized that they can cripple an entire Supply Chain and pressure victims to meet their demands.

Moreover, the increasing digitalization of the "physical" Supply Chain around a large heterogeneity of interoperable solutions will amplify the threats by creating multiple vulnerabilities that can be exploited by cybercriminals via the "IT" Supply Chain of software editors to affect each link and spread to the entire chain.

3



CYBER ATTACKS

"While large corporations have invested in cyber security to reduce risk, this is still too often not the case for many of their subcontractors who remain vulnerable and expose the entire Supply Chain."

***Philippe Cotelle - Airbus
Head of Cyber Insurance
Management***

MAJOR RISKS IN 2023

The Supply Chain, a new field of tension

The Supply Chains of many sectors were destabilized by the COVID-19 crisis and were again strongly impacted by the Russian invasion of Ukraine. First, the energy sector in Europe, which was sourcing 40% of its natural gas needs from Russia, then, on a global level, the agri-food sector, especially for Ukrainian grain and sunflower, but also for Russian fertilizers needed for agriculture, and finally the metallurgy sector, as Russia and Ukraine are among the leading exporters of iron ore and cast iron to Europe, as well as lithium, titanium, and other raw materials essential for many industries.

According to Dun & Bradstreet, more than 370k companies depend on Russian suppliers and 240k on Ukrainian suppliers in 25 countries. But in addition to the disruption of the Supply Chain, which has led to numerous shortages, this local conflict has extremely important global repercussions and is at the origin of much of the inflation we are experiencing in Europe, which could lead to protectionist withdrawal policies that are harmful to the global economy and international trade.

At the same time, tensions between China and Taiwan are at their highest, fueled by the trade agreements between Washington and Taipei. The island is an essential link for many global Supply Chains, particularly those using semiconductors, as it produces around 65% of the world's annual volume and 90% of the world's chips. It is estimated that it supplies 35% of automotive needs and 70% of smartphones. Although most of the major powers have invested in developing their own production capacity, it is a costly and time-consuming process. In any event, and given the global dependence on China, a conflict involving it even indirectly will lead to an unprecedented crisis. The United States seems to be preparing for this by strongly reducing its dependence on Chinese imports.

2022 marks the return of a period of strong geopolitical instability that leads to rethinking and redefining Supply Chains as we know them today. The search for stability in their Supply Chain will lead manufacturers to favor long-term partners in "friendly" countries.

4



GEOPOLITICAL RISK

“Comparative advantage explains the efficiency gains of international trade and specialization. But we have learned that we must also account for the reliability of trade (...) Friend-shoring is about deepening relationships and diversifying our Supply Chains with a greater number of trusted partners to lower risks for our economy and theirs »

Janet Yellen - US Treasury Secretary

MAJOR RISKS IN 2023

Maritime backflow and road bottlenecks

2022 was a very tense year for the logistics sector, whether in terms of sea freight capacity, road transport or packaging.

In ocean freight, many major ports were disrupted by various events due to inflation and the extra workload required to make up for the backlogs accumulated in 2020 and 2021. Major strikes took place in the western ports of the United States in May and in Hamburg in Germany in July, to demand wage increases. In China, it was first the port lockdowns in March and April, and that of Shanghai, where 250,000 containers pass through each week and which generated a bottleneck of nearly 500 ships, which affected global supplies. However, activity from Asia fell sharply in the last quarter and impacted freight rates, which fell from \$11,000 to \$2.5 thousand for a 40-ton container. This is mainly due to the decline in consumption in the last half of 2022, linked to inflation in Europe and the United States. As a result, companies are left with a lot of inventory and need to clear it before placing orders again.

In road transport, the situation is no better, as the sector is still facing a severe labor shortage. According to the IRU, about 2.6 million drivers are needed, including 1.8 million in China, 400,000 in Europe (100,000 in the UK, 80,000 in Germany and Poland, 70,000 in Romania and more than 20,000 in France) and 80,000 in the USA and Turkey. Experts point to the increase in demand, especially due to e-commerce, and the lack of qualified drivers, low wages, difficult working conditions and retirement. This is therefore a structural difficulty that is not likely to be resolved any time soon.

Finally, 2022 was also the year of exploding prices and lead times for packaging. This was especially true for cardboard, where needs are increasing with the gradual phase-out of plastic, while capacities remain limited, notably due to the war in Ukraine, a major exporter of paper pulp with Russia.

The logistics risk therefore remains critical and is likely to continue in 2023, as the global system is still very disrupted and fragile.

5



LOGISTICS
CRISIS

“Chronic commercial driver shortages are getting worse, with millions of positions remaining unfilled. This is putting already stressed economies and communities at higher risk of inflation, social mobility issues and Supply Chain meltdowns.”

***Umberto de Pretto - IRU
Secretary General***

MAJOR RISKS IN 2023

Managing repeated “bullwhip” effects

For decades, experts have been trying to solve this thorny issue without any large-scale solution being implemented in practice in the Supply Chain. However, demand volatility has never been so important and the urgency to find operational solutions is becoming vital. In the short term, inflation could lead to a recession of varying degrees in many countries, but predicting the level of inflation and consumer behavior is almost impossible.

What is certain, however, is that the historical models that still form the basis of business planning are wrong, and that the behavior of retailers in order to avoid shortages is fueling the dreaded "bullwhip" effect. The situation is becoming critical in Europe with an average inventory level of €80 billion in 2022, reaching an all-time high of €90 billion at the end of the year, compared to a pre-crisis level of between €20 and €40 billion. Faced with these overstocks, distributors are cutting or postponing orders until demand returns, which will inevitably generate new shortages...

Nevertheless, in order to cope with uncertainty, the trend from a just-in-time model to one with more inventory seems to be taking hold. The just-in-time model is no longer a dogma, as Toyota, its inventor, has demonstrated by adjusting its system to stock critical components, such as semiconductors. Coupled with its proximity to manufacturers, stable business conditions and critical size, this shift initially meant that the manufacturer was far less affected by shortages than others.

Many companies have set up permanent crisis cells to manage shortages and overstocks, integrating sales, engineering, production and procurement. They will now have to learn how to effectively manage uncertainty by adapting their short- and long-term planning. This will involve enriching probability forecasting models and risk scenarios, having permanent buffers at critical points in the Supply Chain to gain in agility, and giving suppliers visibility over a sufficient time horizon to reserve capacities and adjust them to major fluctuations in needs.

6



DEMAND
VOLATILITY

“I don’t think anyone knows whether we’re going to have a recession or not, and if we do, whether it’s going to be a deep one or not (...) It’s just not knowable.”

Jerome H. Powell - Federal Reserve Board Chairman

MAJOR RISKS IN 2023

Is this the end of dependency?

7



SOURCE
SCARCITY

If the tensions between China and the United States before the Covid crisis had already underlined the need to be less exposed to the predominance of China in the global Supply Chain, the health crisis and now the war in Ukraine have only reinforced the need for companies to diversify their sources of supply both in number and in geographical areas in order to regain agility.

Particularly impacted by shortages due to the recovery of demand, capacity reductions linked to China's zero Covid policy or defaulting suppliers unable to weather the last two years of crises, companies will have to move away from "global sourcing" policies that favored the reduction of panels or even "single sourcing" to bulk purchasing in order to reduce their costs and take advantage of captive suppliers

If a reflection on the transformation of the logistics chain is underway, other solutions must exist and be financially sustainable.

Globalization and the geographic concentration of certain products in China or other low-cost labor regions have led to a scarcity of alternative capacities or skills in developed countries. In addition, doubling up on sources in order to have alternative suppliers and/or to be closer to consumer markets risks increasing costs and complicating the economic equation.

More than an imaginary industrial relocation, the current trend is towards "nearshoring" with a gradual rebalancing of China towards countries that still have a competitive advantage and are equipped with infrastructure and a skilled workforce (India, Vietnam, Mexico, Turkey, Tunisia, Morocco, etc.).

Although it is not conceivable to deconstruct 30 years of globalization in just a few years, the challenge for companies will be to gradually reconfigure their Supply Chain by developing reliable and competitive alternatives and by bringing their supply sources closer to their markets.

"We have a new relationship with globalization. Everyone has understood that it is better to produce things at home [...] It is better to produce everything that is essential and strategic to the life of the nation locally, at least on a European scale. This is the first change, which is a change in our relationship with the world."

Bruno Le Maire - Minister of the Economy and Finance

MAJOR RISKS IN 2023

A wave of climatic disasters

2022 has been described by many climate experts as the year of extreme weather events: intense droughts in Europe, India, Brazil and China, major floods in Pakistan, China, Australia and South Africa, destructive storms in North America (Ian and Fiona) and Europe (Eunice), gigantic forest fires in Europe and California, and finally the blizzard of the century in the US. According to Swiss Re, the economic impact of natural disasters reached \$268 billion, of which about 45% was covered by insurers.

Supply Chains were hit hard by these disasters, either directly because logistics infrastructures, production tools, energy and water networks were damaged, or indirectly because the production of raw materials in sourcing areas, particularly from agriculture, was greatly reduced. In all cases, this has led to shortages and price increases proportional to the scale of the phenomena and the criticality of the regions concerned in the Supply Chain.

There are many examples in 2022. The heat

wave that hit India led to a drop in wheat production and an increase in already high prices following the conflict in Ukraine. The same was true for fruit and vegetables from California facing its worst drought, for coffee in Brazil and for mustard in Canada. In August, China suffered a heat wave in Sichuan, which led to reductions in electricity supply and the shutdown of major suppliers to Volkswagen, Intel and Toyota.

Climate disasters also have consequences for freight. Flooding in South Africa damaged the port of Durban and put severe pressure on the price of cobalt. The Rhine, a major route for the German economy, was hit by a severe drought that prevented navigation.

The climate risk impacts the whole Supply Chain of companies, and it is urgent for them to have better visibility on their entire value chain, the location of their suppliers' factories and transport routes, in order to anticipate and lessen the impact of increasingly recurrent events.

8



CLIMATE
CRISIS

"We were warned about the climate consequences we are seeing today. We are within the limits of what the IPCC projected, (...) we are living a foretaste of the 2050s."

***Christophe Cassou -
Climatologist, research
director at Cerfacs (CNRS) and
author of the sixth IPCC
report***

MAJOR RISKS IN 2023

New Chinese waves?

The end of the zero Covid policy in China was initially welcomed by companies that have suffered throughout 2022 from the consequences of successive major lockdowns. This was the case of the Shanghai shutdown last April, which had a very strong impact on companies in the technology sector.

It was in Zhengzhou, nicknamed "iPhone city" and where the largest Foxconn manufacturing site for the famous smartphone is located, that demonstrations and then riots took place at the end of November following a drastic lockdown, showing the weariness of the Chinese population regarding sanitary measures.

But this relatively good news hides a perhaps much greater danger for the global Supply Chain. Although contamination seems to be already very important in the country now and is very worrying in Europe and in the United States despite the reassuring figures of the authorities, it could be exponential during Chinese New Year celebrations. The Chinese production model based on factory cities of 10 to 250k people generates a very high

population density and facilitates contamination. However, this highly exposed population will finally be able to move throughout the country after two years of forced lockdown. Some estimates go as far as to project the contamination of 800 million people that the Chinese health system will not be able to manage efficiently.

The effects on the Supply Chain are already being felt, particularly through sea freight from China. A report by Hong Kong-based freight forwarding company HLS recently indicated that half or more of the Chinese factory workforce is contaminated and unable to work. Activity at the ports of Shanghai, Qingdao and Shenzhen is down sharply due to delivery cancellations.

The COVID-19 crisis remains a major threat for the Supply Chains dependent in China. We will have to wait for a hypothetical herd immunity or a new change in health policy to see a return to business as usual, hoping that this will not have further consequences on an already slowing economy in 2022.

9



PANDEMIC

"We believe that the current figures released by China under-represent the true impact of the disease in terms of hospital admissions, ICU admissions, and especially in terms of deaths."

Dr Michael Ryan - WHO's Chief of Health Emergency Management



MAJOR RISKS IN 2023

Strategies built on diligence

10



CSR
CONTROVERSY

2022 began in France with the National Assembly's recognition of the Uyghur genocide, citing the use of forced labor by major Western brands through their sourcing of cotton from the Xinjiang province.

Faced with the pressure of public opinion and the urgency of climate change, governments are pushing companies to review their Supply Chain strategies to favor sustainable and responsible Supply Chains through increasingly stringent regulations.

In Germany, the UK, the USA and Australia, laws prohibiting forced labor in the Supply Chain are already in place.

In France, the law on the duty of care goes even further and is in the process of being transposed on a European scale through the CSDD directive, which aims to oblige companies operating in the EU and employing more than 1,000 people to identify and manage negative social and environmental risks throughout their Supply Chains.

They will also have to have a plan to ensure that their strategy is compatible with limiting global warming to 1.5°C. This is the other challenge for responsible companies: decarbonizing their Supply Chain to protect the environment and fight against global warming.

At the end of February 2023, the first verdict on due diligence will be handed down in the lawsuit between Total Energies and six NGOs concerning the Eacop/Tilenga mega oil project in Uganda and Tanzania.

In the face of public opinion, regulators and now investors who prefer financial transactions that take extra-financial (ESG) criteria into account, CSR issues are taking on a more concrete form after years of fluctuating sustainability commitments. It is therefore essential for companies to go further in mapping and controlling risks in terms of human rights and environmental impact of their entire Supply Chain.

"Since the first proceedings launched in 2019, the number of cases has multiplied. Today, 23 proceedings - 17 formal notices and six subpoenas - have thus been conducted on the basis of the Due Diligence Act, i.e., twice as many compared to March 2021."

Luc Vansteenkiste, Chairman of the law firm De Gaulle Fleurance



04

WHAT SOLUTIONS FOR THE SUPPLY CHAIN?

Companies have understood the extent of the disruption caused by the COVID-19 crisis and the advent of a permanently unstable world from a geopolitical and climate perspective.

After the awareness, they are strengthening their systems and implementing pragmatic solutions to prevent, detect and mitigate the impacts of new crises on their Supply Chain.

On a deeper level, procurement and plant location strategies are being widely reviewed and will lead to significant rebalancing in the coming years to enable diversification of sources, which is essential for resilience.

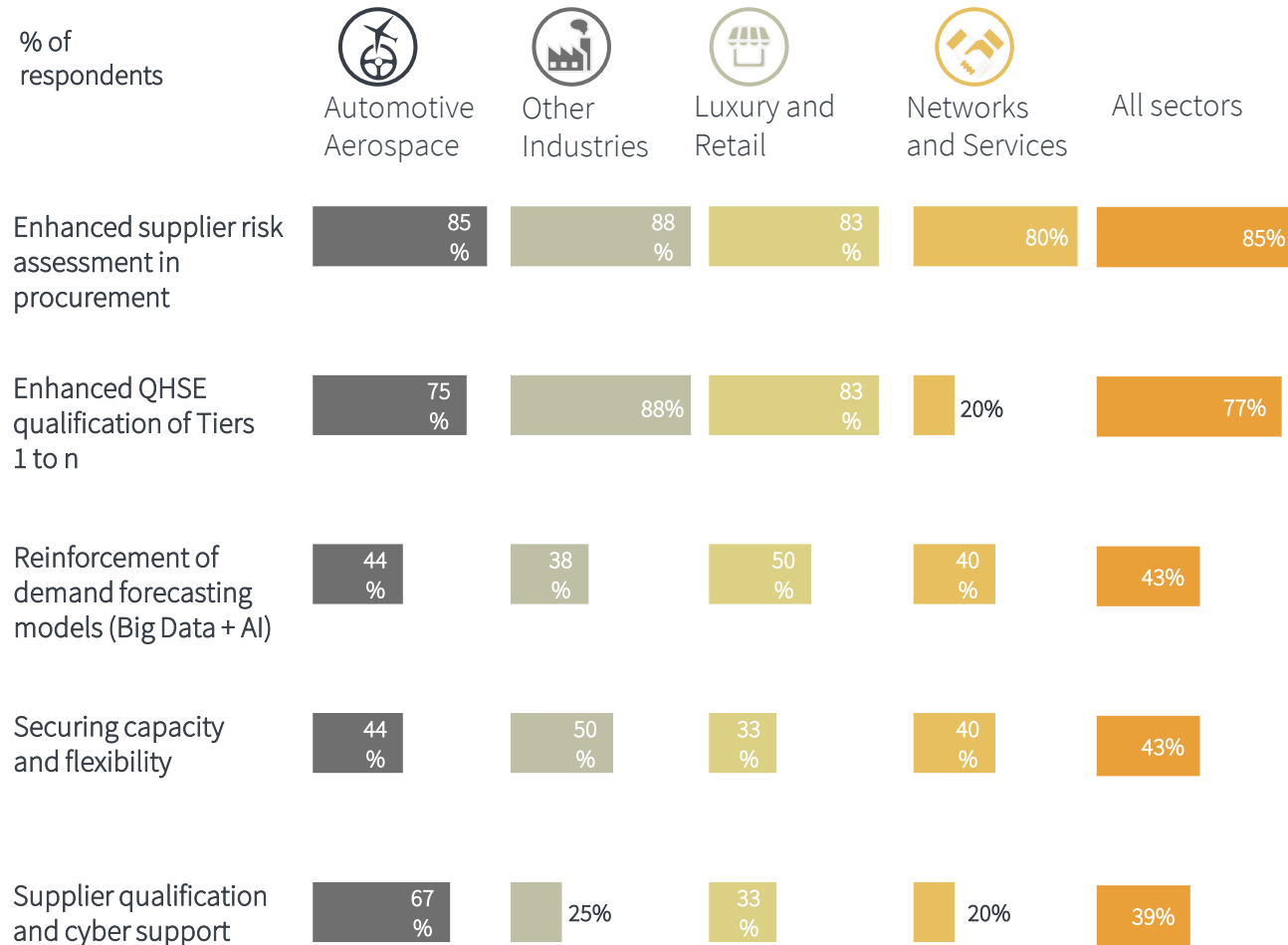


79%

of respondents consider the BCP to be the most efficient system

WHAT SOLUTIONS FOR THE SUPPLY CHAIN

Evaluate and qualify to have strong partners



The solutions preferred by companies to prevent risks consist first and foremost in better assessing them, supplier by supplier, by implementing a systematic and exhaustive analytical approach, integrated into their contract award decision process and establishing their purchasing strategies.

These assessments are based on the QHSE qualification of suppliers, mobilizing resources to conduct audits and lead improvement action plans to prevent any operational incident. However, these practices are much less common in service sector companies, where purchasing management is less developed.

The difficulty remains, however, in the ability of companies to go beyond Tier 1 and to have sufficient information on the sources of supply of commodities, as many of them are affected by shortages linked to Tier 3 and beyond.

However, these approaches cannot protect companies from all crises and some of them are seeking to structurally secure their Supply Chain by working to improve their demand forecasting models using more and more data and artificial intelligence algorithms.

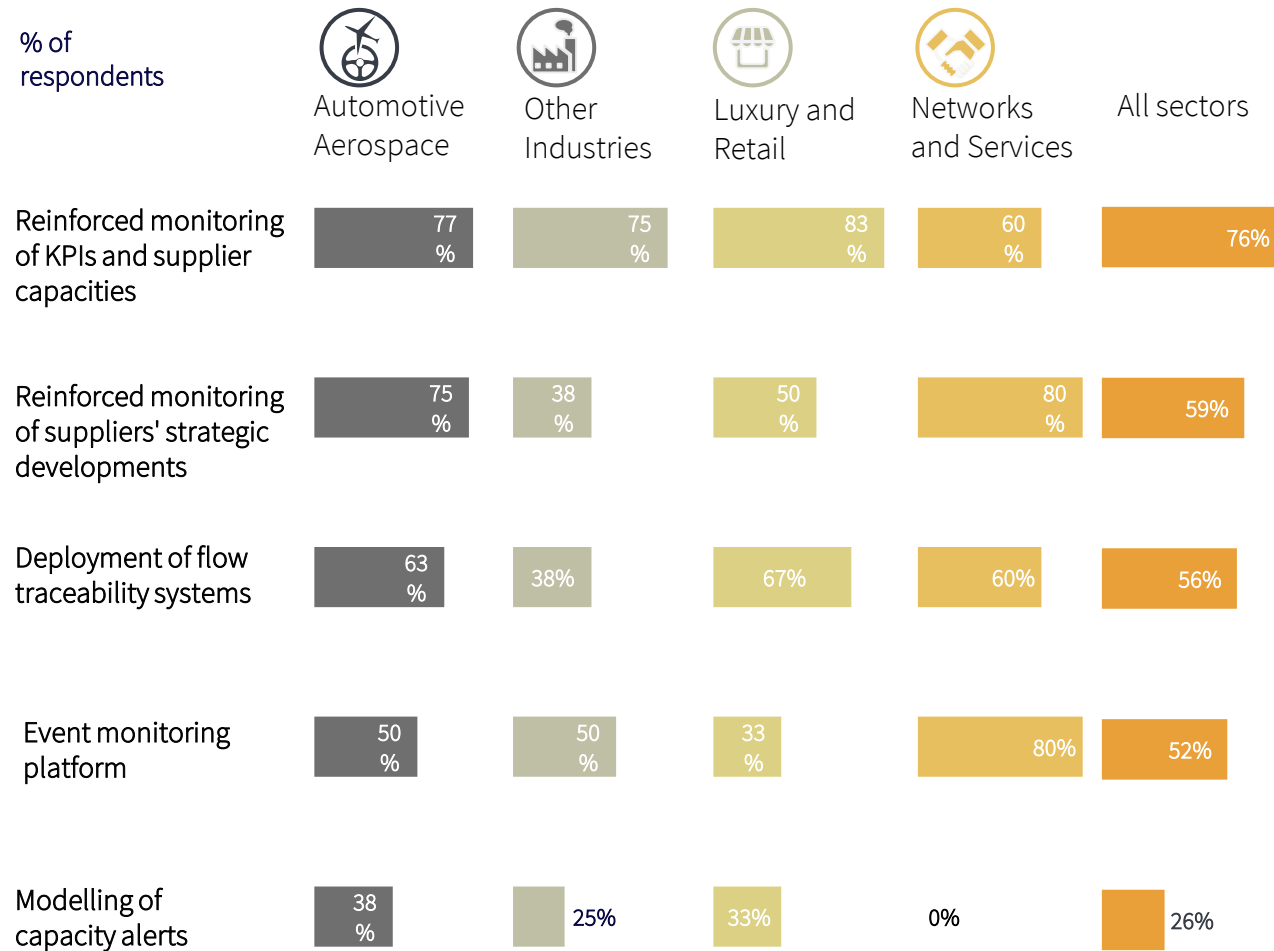
They are also trying to reposition inventories and capacity in order to absorb the variations linked to an increasingly uncertain demand with devastating "bullwhip" effects.

Finally, some companies are working to better assess the risks to their operations and to support their suppliers in managing cyber risks, and to a lesser extent, climate risks, by deploying ad hoc qualification and prevention guidelines.

Source: 4th Supply Chain Risk Barometer - KYU

WHAT SOLUTIONS FOR THE SUPPLY CHAIN

Implement more accurate and responsive tools



Source: 4th Supply Chain Risk Barometer - KYU

Suppliers are now the focus of constant attention, particularly regarding changes in their capacity. For principals, it is a question of steering their industrial resources throughout the Supply Chain in a more precise manner in order to be able to react as quickly as possible by reallocating, committing volumes over shorter periods or even by monitoring component or material stocks.

At the strategic level, monitoring must be increased because successive crises lead to panel concentrations that can lead to harmful monopoly situations in the long term. For some sectors whose Supply Chain is largely composed of SMEs, it is equally necessary to monitor the critical resources of its partners, both financial and human, which can change very quickly in the current context.

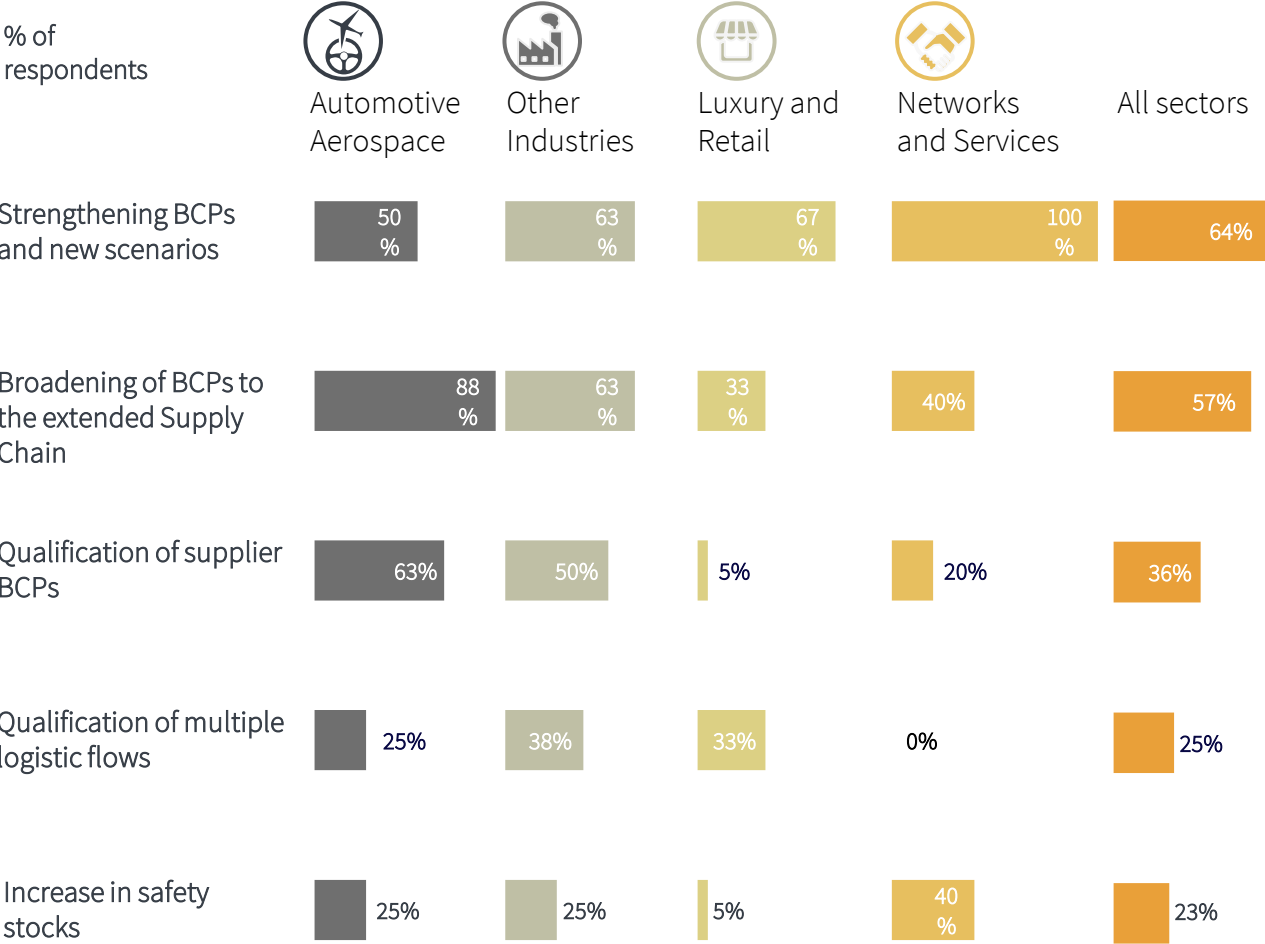
For a long time considered merely as a means to improve the Supply Chain performance by having accurate information about the state of the work in progress, flow traceability is becoming essential to detect bottlenecks on the one hand, but also to check compliance of the production process (authorized subcontracting) and transport conditions.

Companies are increasingly using tools to monitor events affecting the global Supply Chain, connected to their logistics flow management systems on the one hand and to their supplier databases on the other. These platforms go as far as identifying the order lines concerned to enable the operational staff to react efficiently. In some sectors, collaborative planning is underway with suppliers.

Nevertheless, alert detection is still only very rarely based on modeling of capacity scenarios that include risks. As this solution requires significant modeling efforts, it is not yet within the reach of all companies.

WHAT SOLUTIONS FOR THE SUPPLY CHAIN

Anticipate for greater protection from the consequences



The Business Continuity Plan still appears to be the preferred tool for limiting the impact of worst-case scenarios by identifying the key resources involved and defining the actions to be taken to guide operations until business resumes. Despite the wide deployment of this approach in the French industry, the effort to reinforce and renew it remains necessary because risks and activities change, and the continuity management system is often poorly maintained.

In addition to the work to be carried out on the BCP of companies, it is also necessary to broaden the scope of intervention to the Supply Chain by working on scenarios impacting sourcing zones, critical suppliers and key logistics hubs in collaboration with each player in the definition of action plans and the means necessary for their implementation. This can only be done on a part of the Supply Chain, within the framework of a strong partnership relationship that must be managed over time.

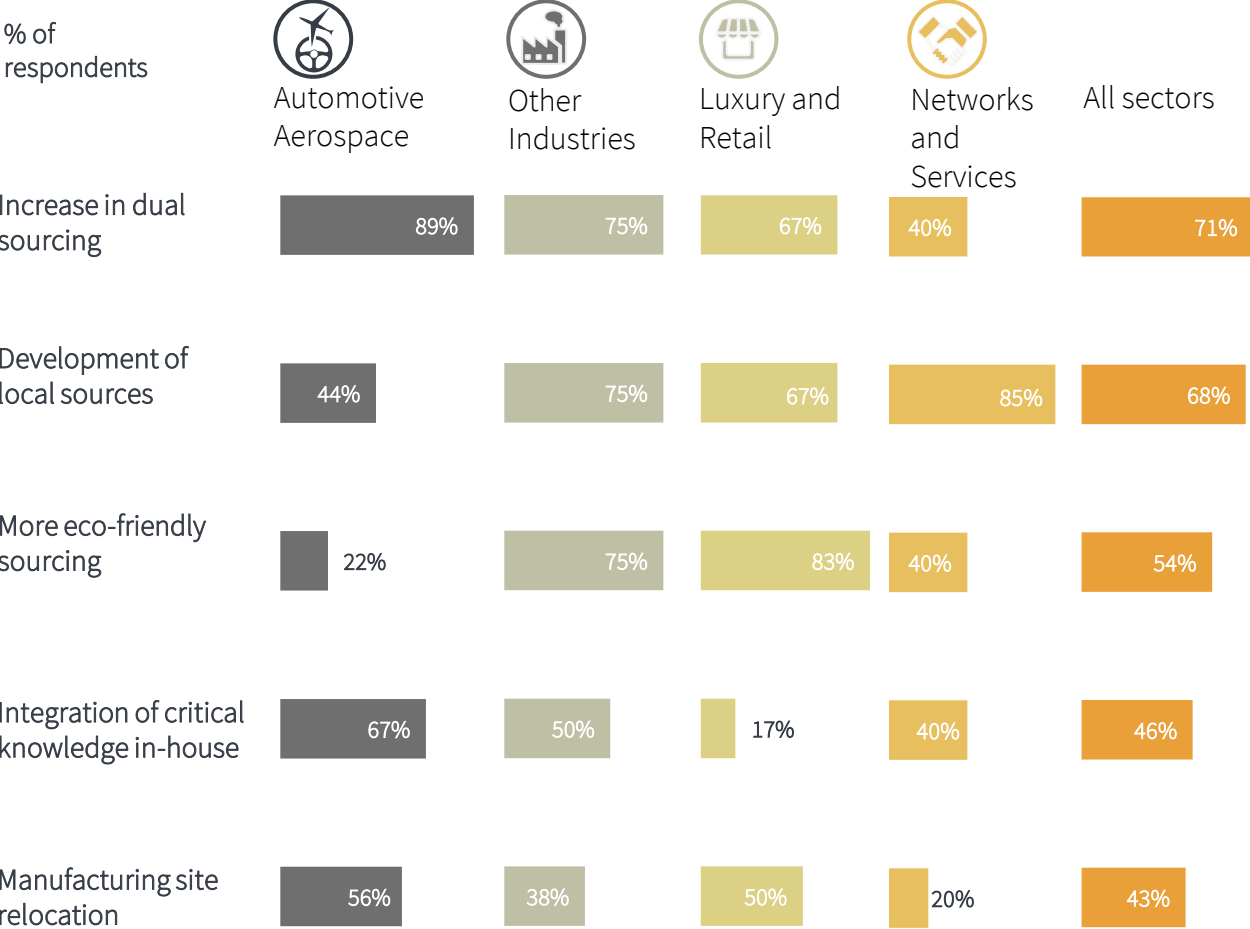
In any case, the BCP is becoming a key axis of the suppliers' risk assessment, revealing their maturity and their ability to reorganize quickly in the face of crises that could impact their production. Suppliers must ensure that their critical suppliers have properly defined these plans by providing methodological support, or even by working with them on the risk scenarios for which they must prepare.

To a lesser extent, and after having carried out a certain number of actions on these subjects in 2021 and 2022, some companies are still planning to work on opening alternative logistics and implementing additional safety stocks at certain critical links in their Supply Chains.

Source: 4th Supply Chain Risk Barometer - KYU

WHAT SOLUTIONS FOR THE SUPPLY CHAIN

A diversified and responsible Supply Chain



Already present in our last barometer, the trend of increasing dual sourcing is confirmed, with a significant share of local sources. The "nearshoring" strategy is thus adopted by many companies. These "local to local" sources of supply positioned in countries close to consumer areas have many advantages :

- Diversification of supply sources, in order to guarantee a minimum level of production if one of the sources is cut off;
- Reduction of the replenishment time, allowing to reduce the inertia of the Supply Chain and thus to avoid the generation of overstocks in the face of very uncertain markets and the deterioration of supplier relations;
- Reduction of the supply-related carbon footprint (scope 3 of the company's carbon footprint).

The environmental performance of the Supply Chain is also a key factor of structural transformation. Most companies plan to work on more respectful sourcing, driven by increasingly stringent regulations in this area.

Another area of transformation concerns the integration of critical know-how to limit dependence on expert suppliers. In the luxury goods industry, this trend has already begun, and the manufacturing industry is following suit, particularly in the key areas of embedded electronics, energy storage and artificial intelligence.

Lastly, the relocation of Manufacturing sites is a priority for high value-added industries seeking to diversify their industrial facilities in order to limit their regional dependence in the context of major technological developments, such as the electrification of the automotive industry.

Source: 4th Supply Chain Risk Barometer - KYU

WHAT SOLUTIONS FOR THE SUPPLY CHAIN

Relocate? Sure, but not at any cost

The pace of offshoring had slowed significantly before the health crisis, due to the rising cost of labor in emerging countries, advances in robotization in developed countries and rising transportation costs, which made the competitive advantage of offshore production less obvious.

A trend towards relocation was already observed, to regain competitiveness, to escape the geopolitical tensions between the United States and China, or to get closer to consumer markets by moving from globalized production to multi-local (*glocal*) production.

In most cases, relocation does not target the country of origin, but rather neighboring countries to find cheap labor (Philippines, Vietnam, Malaysia), outside of China to avoid US taxes on Chinese production, or close to consumer markets to be more responsive while remaining in areas where the cost of labor remains attractive (Eastern Europe or the Mediterranean basin for Europe, Mexico for North America, Southeast Asia for Asia).

By highlighting the fragility of the industry, the health crisis has amplified this trend by leading companies to rethink their Supply Chain in order to be less dependent on a geographical area, sole suppliers, the know-how of their partners, available capacities and transport times.

The war in Ukraine has both strengthened the conviction that it was necessary to relocate certain production to be less exposed to the jolts of geopolitics and annihilated the hopes of a rapid reindustrialization of a Europe faced with a brutal increase in energy costs.

Paradoxically, if the situation were to persist, we could even see a new wave of offshoring of energy-intensive industries (iron and steel, chemicals, food processing, etc.) to areas where energy is less expensive, such as the United States or Asia.

Until we can claim energy independence, relocation will only be viable for products for which the share of energy and labor is relatively low, know-how is mastered, and skills are available, and/or with massive government support!



WHAT SOLUTIONS FOR THE SUPPLY CHAIN

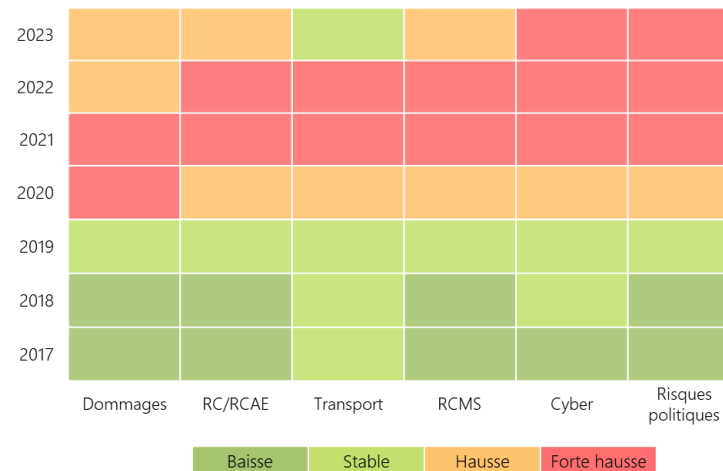
Insurance: fewer and fewer solutions...

Although a large part of the risks to which the Supply Chain can be exposed have never been really insurable (strike at a customer's site, bankruptcy of a supplier, earthquake destroying transport infrastructures, cyber attack at a service provider's site, quarantine of a city following an epidemic...), it is clear that the insurance solutions previously available to cover operating losses resulting from damage to a client or supplier site (fire, flood, machine breakdown, etc.) are less and less accessible and increasingly out of step with company needs.

After almost 5 years of uninterrupted premium increases by insurers, initially to recover their results and continued due to the Covid crisis, the shortage of capital and inflation have led to an increase in rates and a decrease in reinsurers' capacities, leading insurers to keep more risks on their balance sheets and to be even more selective in the choice of their clients.

Insurance policy renewals at the end of the year were again tense. They resulted in premium increases, capacity reductions, increases in deductibles and exclusions, particularly on lines exposed to the consequences of climate change (in 2022 the cost of natural disasters is estimated at €115 billion for insurers, half of which for Hurricane Ian alone).

Insurance premium trends



Source : courtiers, FFA, AMRAE, KYU

"For the past five years, we have had to deal with an insurance market governed by the triptych of declining capacity - deductibles - rising premiums, compounded by inflation".

Oliver Wild - President of the French Association for Enterprise Risk and Insurance Management (AMRAE)

WHAT SOLUTIONS FOR THE SUPPLY CHAIN

Risk financing: innovating to reduce dependence on the markets

No more sweet talk about partnerships and supporting the development of companies. Four years of tensions and misunderstandings between insurers and their clients will have ended up convincing the most credulous that insurance is not the be-all and end-all of P&L and balance sheet protection for companies.

In a market that imposes double-digit premium increases, deductible hikes, capacity and coverage reductions, more and more exclusions and less and less flexibility, it is necessary to find new solutions.

The disengagement of insurers is both an additional risk in case of insolvencies with domino effects on the Supply Chain and an opportunity for companies to reappropriate their insurance policy, to rethink the level of their retentions and to give themselves the means to be less dependent on the volatility of financial markets.

This requires an improvement in risk management to gain visibility, identify and value the main crisis scenarios, put in place prevention and business continuity measures,

and be able to size coverage needs as accurately as possible (guarantees, capacities, deductibles). In a tough market, this gets back to the basics of insurance by transferring only the residual risks after years of easy money and insurance largesse.

For small and medium-sized companies and large corporations that have the means, it is an opportunity to explore the possibility of implementing alternative financing solutions in addition to traditional insurance.

For those who do not yet have such solutions, the 2023 Finance Act should facilitate the creation of reinsurance captives in France by creating a tax-free provision to meet the costs.

In a context of shortage of cyber insurance capacity, European companies have decided to join forces by creating their own mutual insurance company.

In both cases, it is a way to facilitate the participation of other insurers by self-insuring its frequency risk and transferring only the intensity risk, while optimizing its budget.



WHAT SOLUTIONS FOR THE SUPPLY CHAIN

5 key points to implement tomorrow's Supply Chain





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RISK & INSURANCE

Performance underpinned by resilience

- Mapping your risks and anticipating their progression.
- Reducing your exposure
- Optimizing your risk transfer
- Making business continuity a competitive strength



SUPPLY CHAIN

Reinventing your Supply Chain

- Transforming the Core Model to gain in agility
- Boosting efficiency and collaboration on the value chain
- Simplifying by leveraging Lean Management
- Using Data to forecast and manage



SUSTAINABLE TRANSFORMATION

Engage, explore, act

- Leading a sustainable transformation plan
- Building responsible channels
- Reducing your environmental footprint
- Energizing the circular economy

OUR COMMITMENT



Through our participation in the UN Global Compact, we aim to advance practices in terms of respect for human rights, labor standards, environmental protection and the fight against all forms of corruption.

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