



3RD SUPPLY CHAIN RISK BAROMETER

The Supply Chain in the face of uncertainty

Study conducted in partnership with



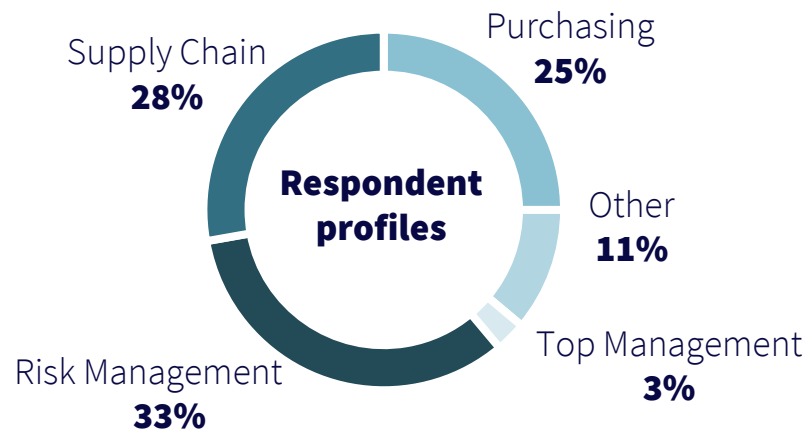
50 ANS D'INTELLIGENCE COLLECTIVE POUR UNE SUPPLY CHAIN DURABLE







SCOPE OF THE STUDY

A large panel representing the diversity of the Supply Chain

We sent our questionnaire to more than 600 Supply Chain, Purchasing and Risk managers and obtained nearly 100 responses, which we supplemented with interviews in order to obtain direct testimonies of what some companies went through at the height of the crisis and decided to implement to improve their control.

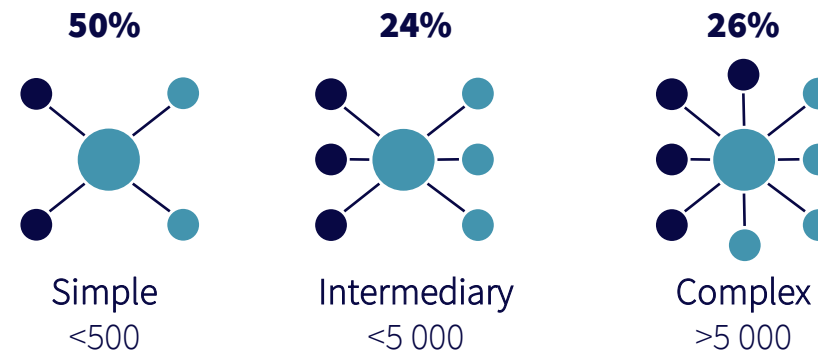


15 sectors of activity split into 4 main clusters

-  Aerospace / Defense & Automotive **35 %**
-  Other Industries **23 %**
-  Luxury & Retail **21 %**
-  Networks & Services **21 %**

Supply Chain profiles

In number of upstream and downstream partners



PRESENTATION OF STUDY PARTNERS

Management consulting

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

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



The grande école 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

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

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



AMRAE - Enterprise 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.



01 INTRODUCTION

Foreword, study scope & Top 10 risks in 2021

02 STORMY RECOVERY

A look back at current crises

03 HIGH-RISK CROSSING

Risk mapping

04 ROUTES OF CONTROL

Exploring ways to improve





01

INTRODUCTION

COVID-19 has severely disrupted global Supply Chains and the economic recovery is now hampered by shortages and bottlenecks at all levels of value chains and logistic flows.

Now more than ever, the Supply Chain is in the spotlight and the object of all the attention but also, increasingly, of criticism linked to its impact on the environment, society and the economy.

It is one of the core issues for companies, pushing them to regain control of this complex network of interdependencies in which - and thanks to which - they operate and develop their activities. Beyond mitigating the impact of Supply Chain interruptions, risk management is becoming a major lever for competitiveness and differentiation.

It is therefore urgent for companies to gain some insight into how they can accurately assess their vulnerability and strengthen their strategies and control systems. This third edition of KYU's Supply Chain Risk Barometer, produced in partnership with Arts & Métiers, AMRAE and France Supply Chain, aims to do just that.

EDITORIAL

Uncertainty, the global Supply Chain's new horizon

2021 was a year marked by uncertainty. This uncertainty is present in everyone's daily life, with the waves of the COVID 19 pandemic producing strong fluctuations in demand for consumer goods and investment projects.

Despite this, from a macroeconomic point of view, the recovery is well underway in almost all sectors, with a growth rate of about 7% in France, above the world average of 5.9%.

Supported throughout the year by consumption and by the colossal stimulus plans implemented in Europe and the US, this recovery was eroded at the end of the year by the impact of the n-th wave of epidemics, but also because of numerous supply disruptions.

As restrictions were eased, demand accelerated, but supply was slower to respond. The global Supply Chain has shown its limits in terms of responsiveness in an uncertain environment, and it is time to address this new challenge.

Companies can no longer consider the economic optimization of their operations as the only criterion for building their industrial plans.

On the one hand, because this unique prism no longer fulfils market requirements, with companies increasingly being expected to be accountable over their whole value chain.

On the other hand, because the quest for the economic optimum has generated too much complexity and a loss of flexibility at all levels. Suppliers are fewer, farther away and geographically concentrated, stocks are tightly limited with no decoupling points, logistic routes are unique...

Under these conditions, companies cannot absorb such jolts and they face a major investment challenge in the mid-term to build a more resilient Supply Chain, giving them greater agility while improving their environmental performance, their innovation capacity and their contribution to the development of local markets.



**Laurent
GIORDANI**

*Founding
partner*



**Thibaud
MOULIN**

Partner



TOP 10 SUPPLY CHAIN RISKS

- 1 LACK OF CAPACITY** Suppliers are under-capacity and cannot meet the increased demand. 
- 2 LOGISTICS CRISIS** Logistics operators are short of manpower to meet transportation needs. 
- 3 CYBER ATTACK** Suppliers are vulnerable to attack and systems are interconnected throughout the chain. 
- 4 SOURCING ISSUE** Many of the suppliers are far away from the factories and close alternatives have become scarce. 
- 5 NEEDS FORECAST** Companies lack reliable forecasts and cannot meet their markets' demand. 
- 6 HEALTH CRISIS** Lockdowns result in a local shutdown of business, leading to major disruptions. 
- 7 ECONOMIC CRISIS** Rising commodity, energy and wage costs are boosting inflation and complicating the recovery. 
- 8 NATURAL DISASTER** Global warming increases the criticality of disasters affecting many companies. 
- 9 QUALITY DEFECT** The pandemic has impacted the organization of companies and put their quality systems to the test. 
- 10 CSR CONTROVERSY** Expectations in terms of CSR are increasing and duty of care is a must. 





02 STORMY RECOVERY

Each sector has gone through the crisis in a very different way with more or less damage to the Supply Chain. As business picks up again, many companies face major challenges to meet demand and it is certain that in-depth transformations will have to take place to adapt the industrial models to this new environment.

Some sectors of activity have even seen their market completely disrupted following the COVID 19 crisis, with no hope of regaining their growth momentum in the short term and with radically new customer expectations.



70%

of respondents experienced more than 5 major crises in 2021

STORMY RECOVERY

Early signs of a new take off for Aeronautics

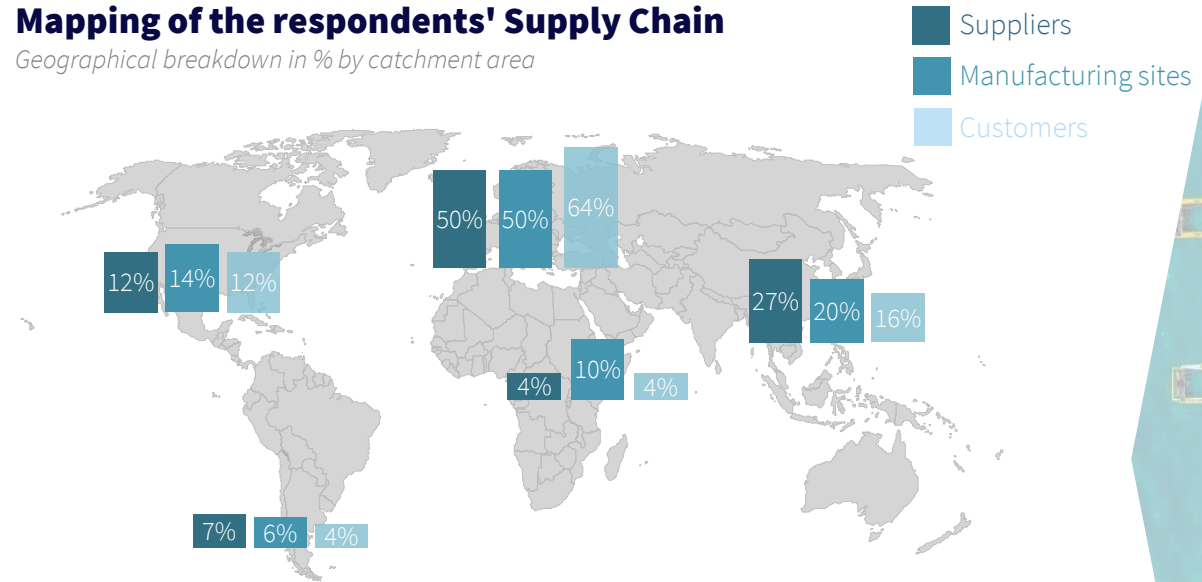


No other industrial sector has been more affected by the COVID 19 crisis than the aerospace industry. In France, sales fell by 28% and orders by 55% in 2020, resulting in the loss of 8,000 jobs. 2021 was a similar year, but the industry has gained new momentum, led by the main contractor Airbus, which received 771 gross orders for the year.

This new momentum is also marked by a wave of new hires, with 10,000 to 15,000 people expected by 2022, including 3,000 for the Safran group alone, and by an acceleration of the transformation of the sector. This will be achieved primarily through the implementation of new engine technologies, such as hydrogen, by 2030, as well as through changes in industrial processes, which will need to become more flexible and efficient, notably through the deployment of Industry 4.0 and automation, to enable greater planning flexibility.

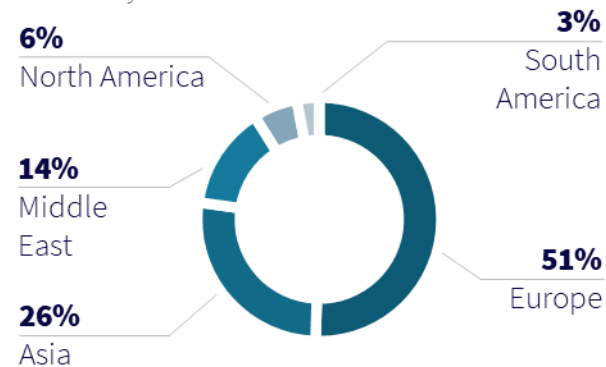
Mapping of the respondents' Supply Chain

Geographical breakdown in % by catchment area



Breakdown of respondents' turnover

Geographical breakdown in % by catchment area



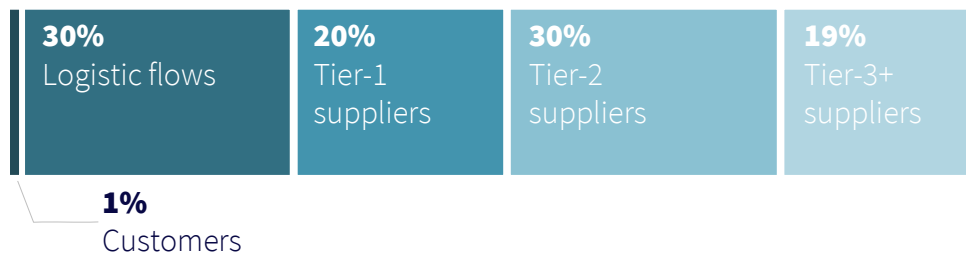
STORMY RECOVERY

Early signs of a new take off for Aeronautics

Nevertheless, this promising future should not mask the difficulties that companies in the sector are facing today, as the financial health of many companies is in peril and orders will not solve everything. The crisis has stretched the network of suppliers leading to a consolidation of the sector in France but also closures in countries where the government was not as protective.

The main customers fear a lack of industrial and human capacity, while orders are on the rise again. In the short term, the sector is also affected by stockouts and rising prices. In particular, companies are finding it tough to procure supplies of metals and chemicals and delivery times are being delayed.

Origins of crises in 2021



Focus on crises in 2021

Average number of crises
10 crises

Top 3 Causes Top 3 Impacts



STORMY RECOVERY

Automotive industry, how to accelerate in the middle of a curve



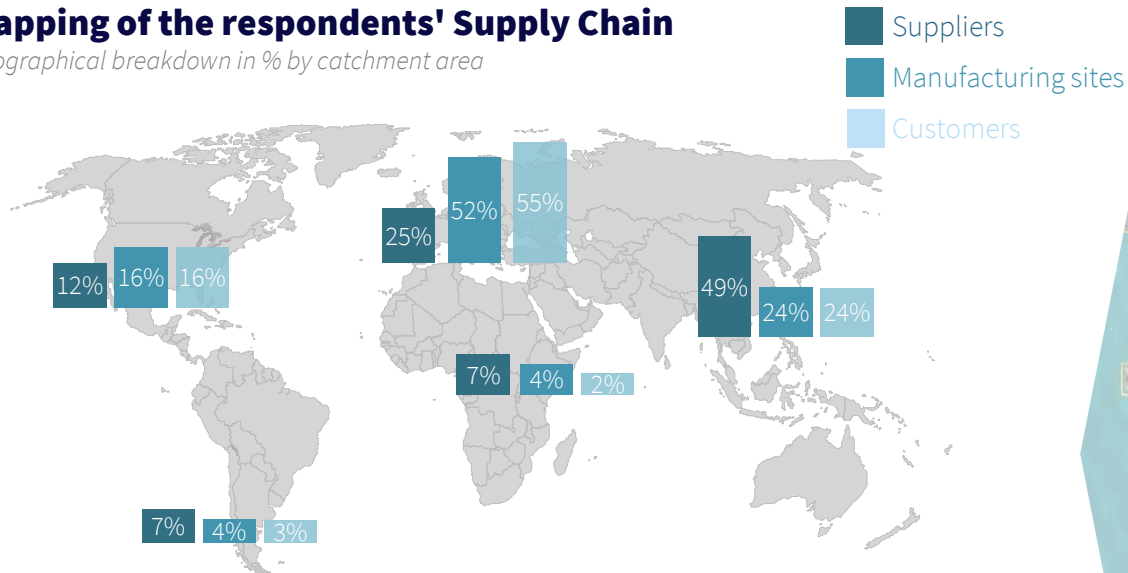
Among the sectors most affected by the shortages linked to the economic recovery, the Automotive industry has seen its global production fall by about 8 million vehicles for an estimated loss of revenue of more than \$200 billion.

In Europe, 9.7 million vehicles were sold in 2021, the lowest volume since the 1990s and a drop of 2.4% compared to 2020. In France, production reached 1.38 million units, down 37% on 2019.

This drop is partly the result of the semiconductor shortage, which has slowed production, but it is also linked to a change in consumer purchasing habits, customers holding on to their vehicles longer in anticipation of a better-priced electric solution.

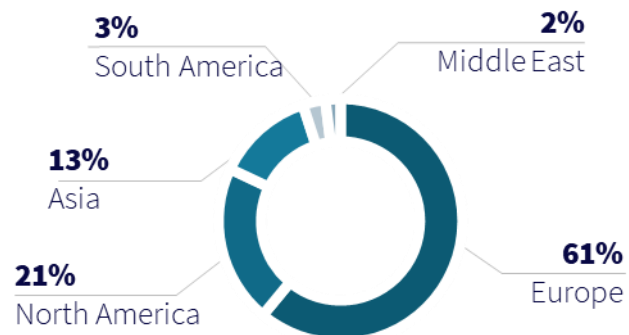
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Breakdown of respondents' turnover

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STORMY RECOVERY

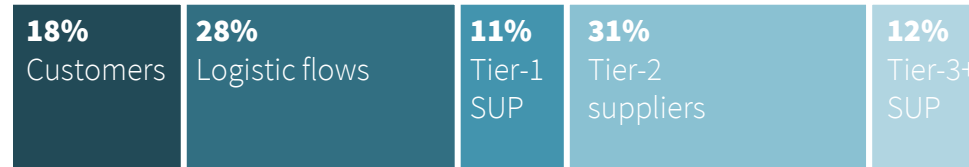
Automotive industry, how to accelerate in the middle of a curve

For the Supply Chain, these variations have major consequences. Smaller subcontractors, unable to pass on the increase in the price of materials and components to manufacturers, are threatened with bankruptcy. This was demonstrated by the bankruptcy of four well-known automotive subcontractors in Germany in the autumn.

French subcontractors are also under strong pressure, with material shortages and price increases on the one hand, and overstocks of finished products waiting to be consumed by manufacturers on the other, which are weighing on finances and forcing them to slow down production rates and reduce staff.

The Automotive industry will have to face the dual challenge of accelerating the transition of its Supply Chain to large-scale production of competitive electric models, while at the same time supporting its suppliers in the face of a very deteriorated financial situation and a shortage of manpower.

Origins of crises in 2021



Focus on crises in 2021

Average number of crises
14 crises

Top 3 Causes Top 3 Impacts



STORMY RECOVERY

In other sectors, Manufacturers are chasing capacity

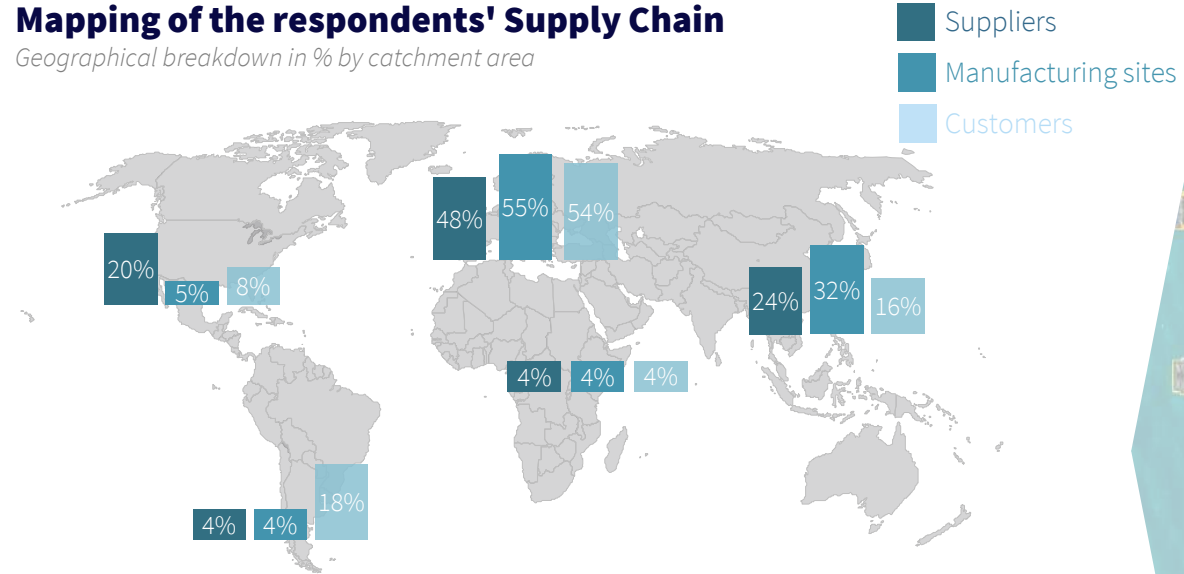


Clothing, chemicals, building materials, all Manufacturing sectors are affected by shortages, rising raw material prices, energy and transport costs.

The construction sector has been particularly affected because after the slowdown in production in the first half of 2020, demand for materials has picked up sharply, while stocks have dried up and capacity has remained stable. As transport prices soared, producing countries satisfied local demand before responding to export orders. The price of construction materials (steel, aluminum, copper, wood, glass, plaster, plastic, paint) increased by 20 to 50% and shortages multiplied, causing delays on construction sites.

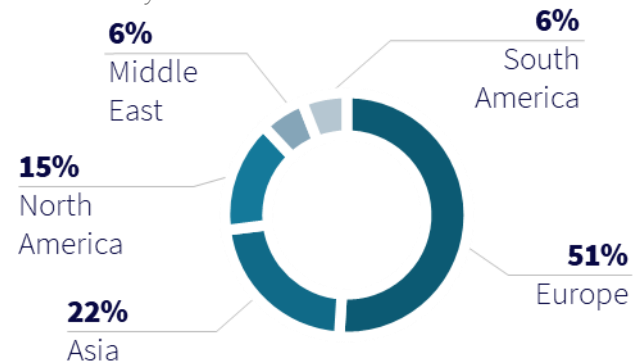
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Breakdown of respondents' turnover

Geographical breakdown in % by catchment area



STORMY RECOVERY

In other sectors, Manufacturers are chasing capacity

Manufacturers, craftsmen and construction companies have had to deal with an unprecedented shortage of timber that began in the US. Following the crisis and under the impulse of the stimulus plans, the demand for wood increased strongly for renovation and construction sites.

Factories were quickly saturated and the American markets turned to Europe, creating a strong demand for exports and higher prices.

In the textile sector, companies were also affected by the closure of suppliers' factories in Vietnam and Indonesia with a loss of about 10 weeks of production. Nike has suffered the consequences with sales growth limited to 5% against 15% initially expected.

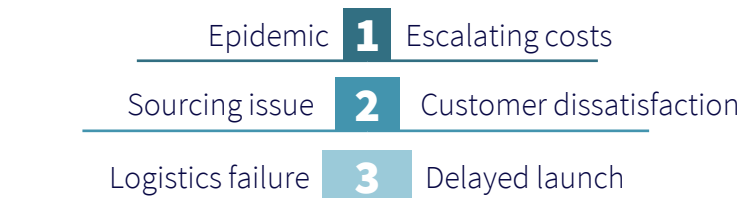
Origins of crises in 2021



Focus on crises in 2021

Average number of crises 5 crises

Top 3 Causes Top 3 Impacts



STORMY RECOVERY

Favorable winds for the Luxury and Retail sectors



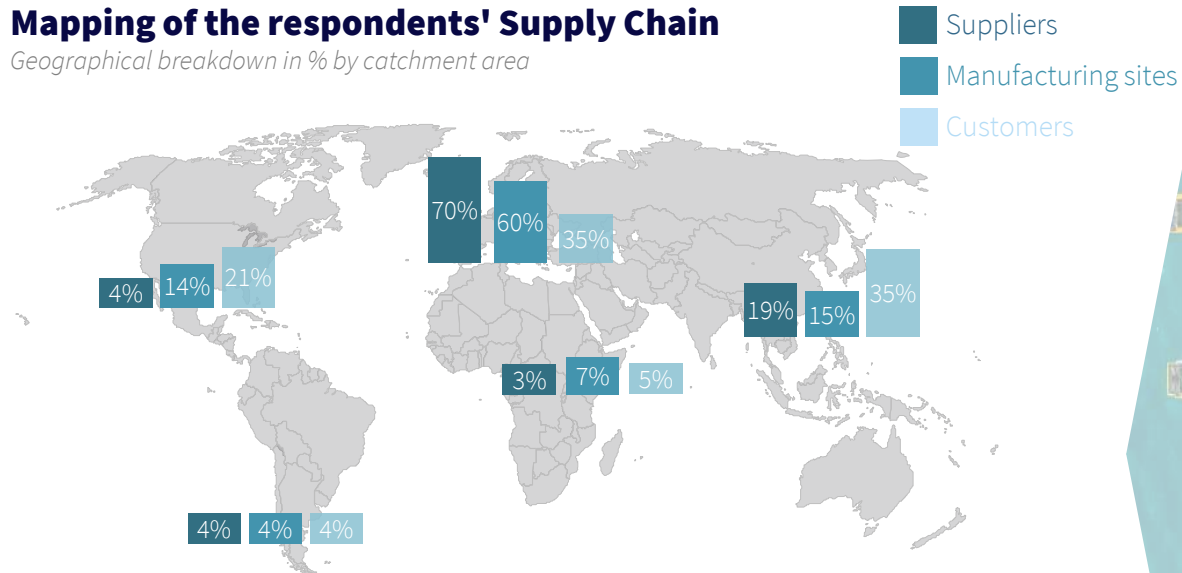
The Luxury sector is undoubtedly the one that has weathered the crisis the best and should even emerge stronger with a 30% increase in revenues in 2021, exceeding the record set in 2019.

Brands have benefited from a strong rebound in sales thanks to consumer income maintenance policies, which have even broadened the range of luxury customers, many of whom had saved money at the height of the crisis. The American and Chinese markets have driven this growth significantly. The future looks bright for French luxury brands in Asia, which represents an average of 40% of sales.

The pandemic has not been a smooth ride, however, and the more than 20% decline in the market in 2020 has weakened many small companies that are essential to the major brands. As a result, they have reacted and invested massively in acquisitions or equity investments to secure their know-how and capacities.

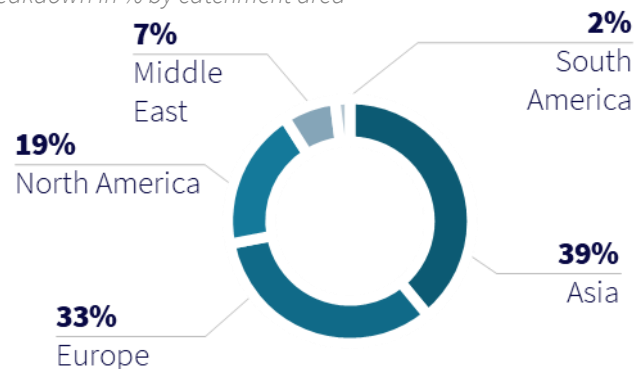
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Breakdown of respondents' turnover

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STORMY RECOVERY

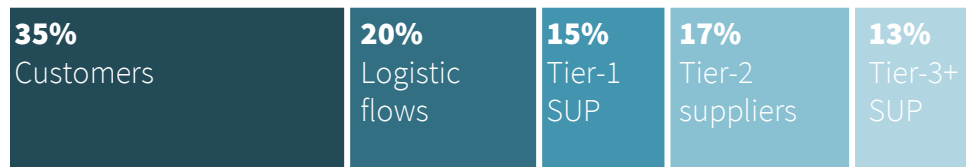
Favorable winds for the Luxury and Retail sectors

One of the growth drivers for Luxury has been the acceleration of sales via e-commerce from 12% in 2019 to 23% in 2020. And this acceleration has occurred globally in all Retail sectors.

The health crisis has spurred the digital transformation of Retail to the point where e-commerce now represents 13.4% of sales in France compared to 9.8% in 2019. Some sectors in particular have seen strong growth in the field in 2020 and 2021 such as clothing (+12%/+23%), furniture (+40%/+58%) and beauty/health (+9%/+58%).

However, Retail suffered from successive waves of COVID in 2021, and while demand recovery is strong, retailers are now facing raw material and labor shortages.

Origins of crises in 2021



Focus on crises in 2021

Average number of crises 7 crises

Top 3 Causes Top 3 Impacts



STORMY RECOVERY

Labor shortages in Services

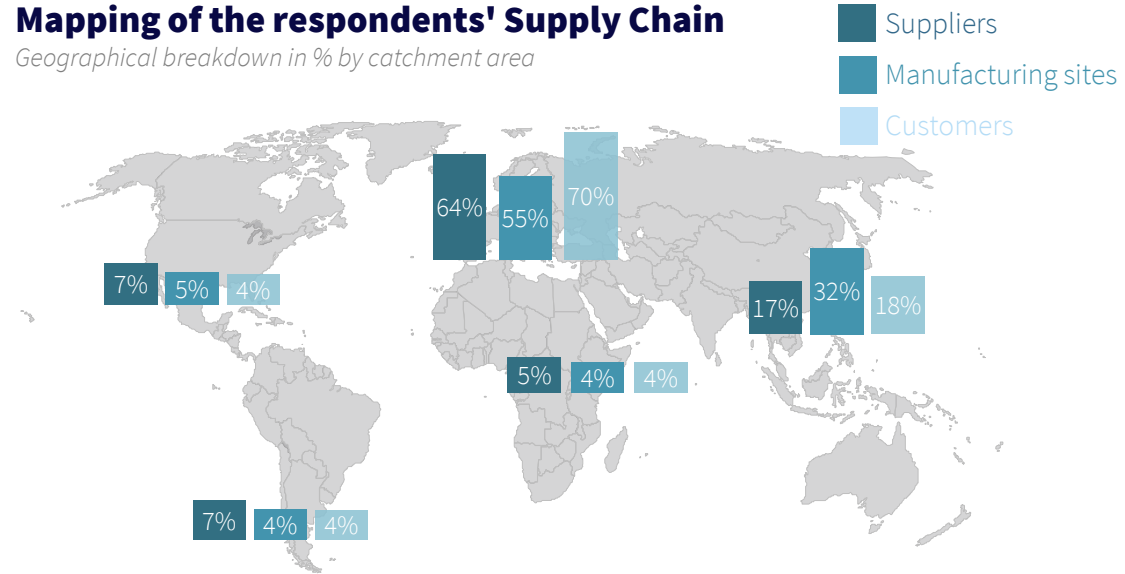


After having suffered numerous shutdowns during successive lockdowns, many sectors are facing a shortage of manpower. In the US, the trend is strong and we are now talking about a new phenomenon: the "great resignation". In total, more than 38 million Americans will have left their jobs in 2021 and more than 10 million job offers remained unfilled in September 2021. The departures are primarily in the low-wage, COVID 19-exposed service sector. This trend is also affecting China and much of Europe.

According to the Banque de France, 41% of companies in the service sector are struggling to recruit. In the retail, restaurant and hotel sectors, the Covid-19 pandemic has accentuated the exodus of foreign workers, while many employees who have been laid off or made redundant have found work in other sectors.

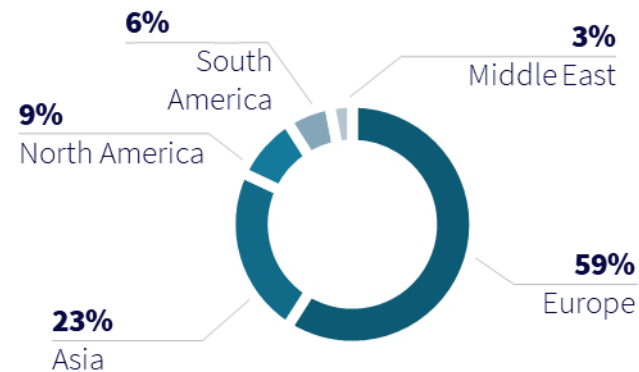
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Breakdown of respondents' turnover

Geographical breakdown in % by catchment area



STORMY RECOVERY

Labor shortages in Services

The problem is even more acute for transport companies. The whole of Europe is affected by a serious labor shortage, with an estimated shortfall of 400,000 drivers across the continent. Poland is the worst affected, with 124,000 vacancies, followed by Great Britain, Germany and France with a shortage of around 40,000 employees. The profession suffers primarily from a problem of attractiveness to young people linked to working conditions and salaries.

Employees' expectations have changed since the pandemic and competition for jobs is very strong, which allows them to access better-paid jobs. This is especially true since the current wage increases in service jobs may not be sufficient to attract the required workforce in the face of inflation.

Origins of crises in 2021



Focus on crises in 2021

Average number of crises
10 crises

Top 3 Causes Top 3 Impacts





03 HIGH-RISK CROSSING

After the pandemic, a period of great uncertainty is beginning for the global Supply Chain since the consequences of the disruptions it generated in 2020 and 2021 have not yet been resolved and could even be amplified in the short term.

Indeed, the Supply Chain of a very large number of sectors is still largely disorganized, whether it is at the level of logistic flows or production lines which are struggling to find the necessary manpower to meet Customers' needs.

Durably vulnerable, the Supply Chain could still be the weak link for companies to return to growth and this is why it must be the subject of all attention.

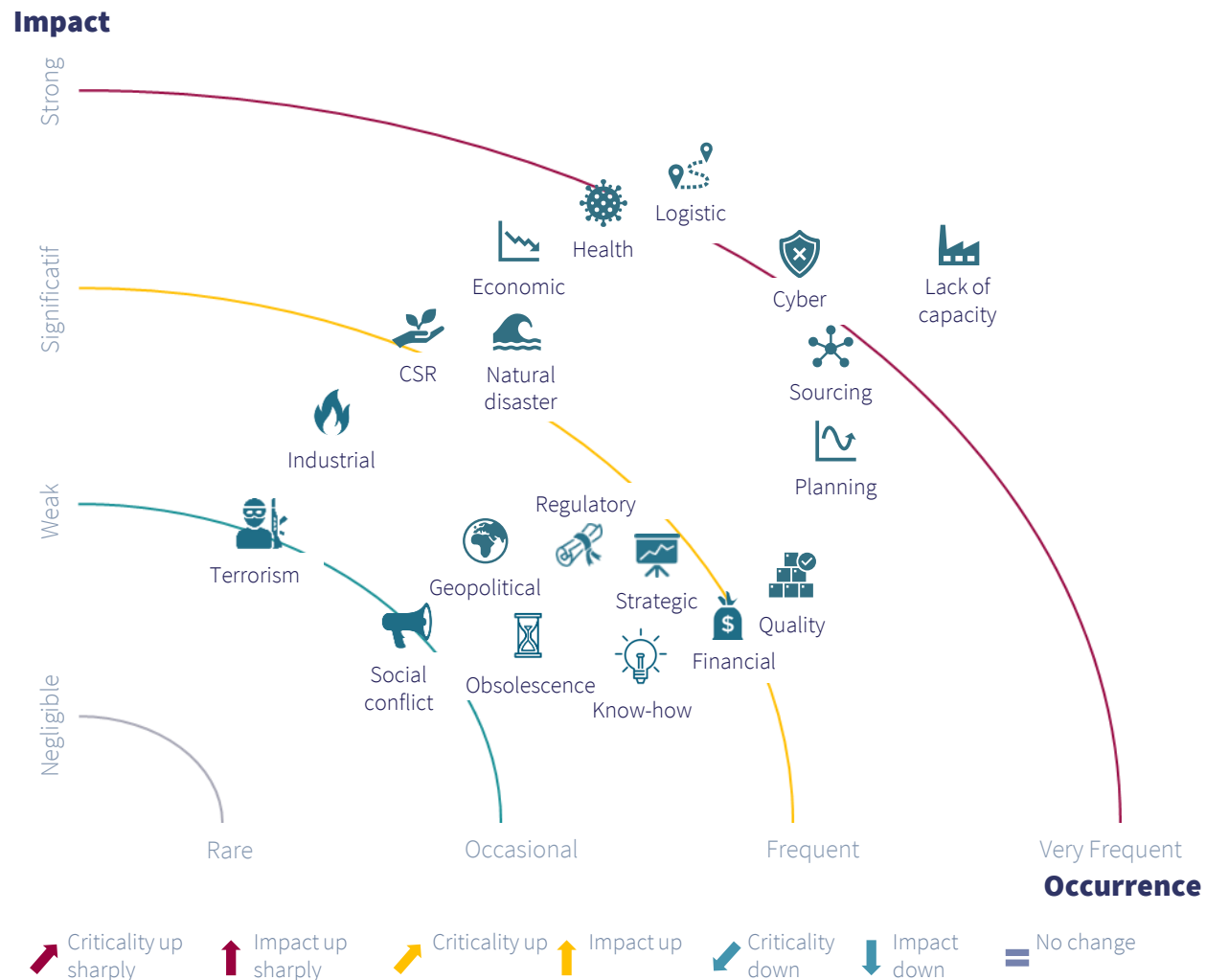


40%

of respondents consider capacity risk to be critical

HIGH-RISK CROSSING

2022 Risk Matrix



Source: 3rd KYU Supply Chain Risk Barometer

Trends in the top 10 risks

- Lack of capacity on the Supply Chain is the main concern of manufacturing sectors
- Congested logistics hubs and the lack of carriers will slow down the activity and degrade the service
- Cyber attacks are targeting all companies, including the smallest and most vulnerable links in the Supply Chain
- The closure of supplier sites will lead to major difficulties in sourcing Tier-2+ components
- Demand is still very uncertain and volatile, the Supply Chain must adapt to it in the long term
- The risk of new waves remains high with potentially major impacts on the Supply Chain
- The specter of an economic crisis seems to be receding thanks to public policies to support the economy
- Natural disasters represent a constant threat capable of stopping a whole part of the Supply Chain
- Quality risk remains an operational concern as production campaigns get underway again
- Supply Chain responsibility has become a key issue subject to increased stakeholder scrutiny

HIGH-RISK CROSSING

What happened to production capacity?

1



LACK OF
CAPACITY

Current shortages are a direct consequence of the impacts of the health epidemic on the Supply Chain and the semiconductor crisis is a good example.

The origin of this crisis is primarily linked to the shutdown of several foundries in the spring of 2020 in Taiwan (TSMC, which produces 50% of the world's semiconductors) and in South Korea (Samsung). Coupled with severe droughts in Taiwan (water is a key element in manufacturing), an unprecedented cold snap in Texas and a fire that hit a plant in Japan in March, production capacity in 2020 has dropped drastically.

At the same time, the demand for electronic products has risen sharply as a result of working from home. For example, more than 300 million PCs were sold in 2020 (+17% vs. 2019), while in other markets such as Automotive, demand decreased by 30%. In addition, Trump's threats to ban Chinese manufacturers from the US market forced the giants of the sector to buy massively in anticipation of possible sanctions (Huawei ordered \$23.4 billion worth of chips, or 2 years of reserves).

Automotive, electronic components, computer and telecommunication companies are all now fighting for the capacities of semiconductor manufacturers. Investments are being made to build new factories in the US and Europe in particular, but they will not see the light of day before 2023, while demand continues to grow, driven by 5G, IoT and AI needs.

Apart from this very particular crisis, the drop in demand in 2020 led to a global bullwhip effect in many sectors. Manufacturers first cleared their inventories and installed capacity could not keep up with the widespread increase in demand as the recovery took hold. We can cite in particular shortages in the furniture (IKEA) and clothing (Nike) sectors, notably linked to the lockdowns in Vietnam, but also those of construction materials.

If demand does not weaken due to inflation, capacity risk should remain at the top of the list of concerns in 2022.

"It takes at least 12 to 18 months to get a chip manufacturing plant up and running, plus another 12 to 36 months to develop a product that meets customer needs."

CLEPA - European Association of Automotive Suppliers

HIGH-RISK CROSSING

A huge logistical bottleneck

2

LOGISTICS
CRISIS

The world's logistic flows have been experiencing global congestion since the onset of the pandemic and it appears that this is not likely to improve, at least in the short term, the situation worsening in 2021 due to the strength of the economic recovery, labor shortages and an under-capacitated global transportation system.

At the heart of this system is maritime transport and the 20 million containers in circulation that carry about half of the world's trade, and China, which has 7 of the 10 largest container ports in the world.

When Western countries were locked down, consumers saved massively while increasing their online purchases of home supplies and electronics from Asia. With staffing levels reduced by health measures, ports and shipping companies could not cope with the influx of containers from production plants. Ports began to clog, delivery times lengthened and prices soared from \$1,500 to \$30,000 for a shipment from Shanghai to Los Angeles.

The resumption of growth in 2021 added to the tensions, which were compounded by a number of events, most notably the grounding of the Ever Given in the Suez Canal in March, the closure of the port of Yantian in May and the closure of the Nangbo container terminal in August for health reasons.

In addition to all these factors, there is a shortage of truck drivers, a profession that suffers from a general lack of attractiveness, despite significant hiring bonuses. As a result, containers can wait 7 to 12 days to be picked up, instead of the usual 2 or 3 days.

The situation is not expected to improve before the end of 2022, because despite global orders for container ships at record levels (6.4% of the existing fleet) and massive investments in port infrastructure in the US in particular (\$17 billion), the bottlenecks will only be able to be resolved very gradually and provided that there are no new jolts linked to new contaminations in China.

"The problems go far beyond the maritime sector; the entire Supply Chain has been disrupted. (...) many port terminals remain very congested, and there is a real deterioration in the quality of service."

Anne-Sophie Fribourg, vice-president of the maritime commission of TLF Overseas

HIGH-RISK CROSSING

From one epidemic to another: the Cyber threat

3



CYBER
ATTACK

The Cyber threat has never been so strong: there are on average 777 weekly attacks in the EMEA region (+36%) with a 93% increase in the number of ransomware attacks worldwide for an anticipated financial impact of \$6 trillion in 2021.

The pandemic has pushed companies to accelerate their digital transformation both for their own operations (teleworking) and in their relationships with their customers (e-commerce) and suppliers. The physical Supply Chain now requires more data exchanges than products!

Companies have in fact been exposed for a long time to the Cyber risk on their software Supply Chain. The successive attacks on the Solarwinds and Kaesya solutions, which respectively affected 18,000 and 1,500 of their customers worldwide, reminded all companies of their dependence on IT solution providers. The most recent vulnerability revealed last December in the Log4J software is keeping CIOs around the world busy as they are the target of millions of attack attempts via a flaw that could well be at the origin of the first global Cyber pandemic.

Even the best protected companies cannot escape the consequences of these attacks because if their systems are not directly impacted, it is their key suppliers who can be victims.

In the food industry, for example, the threat is great because small suppliers still have old production systems developed in the 90s and 2000s that are very vulnerable to cybercriminals. They have components that work with default credentials, and their support documentation is very often public.

And this situation is not likely to get any better as the vulnerability surface will grow exponentially via the deployment of IoT, which is expected to accelerate further with the arrival of 5G. At the heart of companies, the advent of Industry 4.0 will lead to the multiplication of interconnected devices in the Supply Chain, which measure, monitor and control production processes, flows and stocks of goods.

"If the attackers come to attack the Supply Chain, it is because the large corporations (...) have put resources into protecting their infrastructures (...) protecting your Supply Chain from attacks is extremely expensive and requires mobilizing the entire ecosystem."

Guillaume Poupard, Director General of the French National Agency for Information Systems Security (ANSSI)

HIGH-RISK CROSSING

In search of the lost supplier

The health crisis has revealed the dependence of French industry, and more broadly of Western industry, on certain geographical areas, the most important of which is the world's factory: China. The resilience of companies undoubtedly requires a rethinking of their sourcing schemes in order to have suppliers closer to the production plants.

Such strategic decisions should be facilitated by the escalating costs of transport, which have increased by a factor of 5 to 10, the catching up of wages in Asian countries, the increase in tensions in the Asia-Pacific zone and the shortages of materials and products.

In practice, after years of global sourcing and panel reduction to massify their purchases in order to reduce their costs and take advantage of captive suppliers, customers will have to take a difficult turn to diversify their supplies. In many sectors, the industrial fabric has become considerably poorer, particularly in Europe, or is not yet mature in neighboring regions. Moreover, in addition to the fact that certain products are simply not found outside Asia, the development of new sources represents a significant cost of qualification, the

4



SOURCING ISSUE

.rare suppliers mastering certain technologies are single sector, therefore difficult to convert, and the competition for purchases is likely to be fierce because the movement is massive.

The semiconductor crisis has led Europe to launch an emergency €6 billion recovery plan, while at the same time the Americans have mobilized \$50 billion and TSMC, the Taiwanese leader in the sector, has planned to invest \$100 billion over three years... Under these conditions, the automotive sector, which is in the front line on this issue, is not likely to find European suppliers capable of meeting its needs in the short term.

Thus, even if a recent survey of Purchasing decision-makers showed that this axis was a priority for a small majority of them, it is not at all certain that they will achieve results without much stronger measures at European level.

“Let’s be very clear, it is impossible to produce everything in Europe(...). We have to focus on strategic products: health equipment, lithium for our batteries, semiconductors that are extremely important for our car.”

Cristian Busoi, Chairman of the European Parliament's Industry Committee

HIGH-RISK CROSSING

Forecasting models adrift

When it comes to Supply Chain needs forecasts, it seems that today uncertainty is the only certainty. Will there be another variant? When and where will the new wave appear? What will be the consequences of the tensions in the China Sea? Will Russia invade Ukraine? Whatever the cause of the next crisis, it will have global consequences anyway because our economies are all interconnected.

Despite this permanent uncertainty of unprecedented magnitude, demand forecasting obviously remains at the heart of strategic and operational decisions for companies, and the importance of its accuracy is critical to size investments, manage operations and organize production.

After years of inventory reduction, the pandemic has removed the last buffers in Supply Chains that allowed for the absorption of some of this uncertainty. And while companies have invested for years in sophisticated data analytics to best forecast demand and manage bottlenecks, disruptions persist.

There are several reasons for this lack of reliability. On the one hand, statistical models do not take into

account the global environment of the Supply Chain and on the other hand, predictive analyses are generally based on historical data without contextualization. In other words, predictive models are not adapted to an increasingly uncertain environment because they do not take into account the specific context of each demand and market, neither to interpret historical data nor to project demand.

A recent example illustrates the consequences of the limitations of current forecasting models: an investigation revealed in June 2021 that a single Amazon UK warehouse was destroying 130,000 products per week (including Dyson air conditioners and Apple computers). And this practice has also been widely denounced in other sectors such as Luxury goods.

It seems more and more urgent that companies work to increase their visibility on their extended environment and the context of their markets, their suppliers and their customers, both to avoid shortages and to limit unsold products.

5



NEEDS
FORECAST

"Companies have realized that they should obtain more market data, connect to more market data and detect demand closer to the point of consumption more frequently."

Vikash Goyal, vice president of product strategy at Oracle

HIGH-RISK CROSSING

One wave chases another

Pandemic waves follow one another and companies and consumers alike are gradually getting used to living with the health restrictions that are imposed. Unfortunately, these restrictions are not harmonized across the Supply Chain and depend on each state, or even in some cases on each region within a country, leading to strict lockdowns here and reminders of barrier measures or the closure of public places there.

At the extreme, the zero Covid strategy chosen by China risks having serious consequences on the global Supply Chain and on the country's own growth. The Delta wave that has led to the three-week lockdown of the city of Xi'an since the end of December was a first example, as it directly threatened the production of RAM and especially flash storage memory. Indeed, as the market leader, Samsung produces 42.5% of its flash SSD memory modules there and Micron produces a large part of its RAM modules there. Subsequently, the outbreaks of Omicron have multiplied in China since early January, especially in Tianjin where the factories of Toyota and Volkswagen have had to close, leading to a lowering of the Goldman Sachs'

growth forecast for China from 4.8% to 4.3% for 2022, taking into account the risks linked to Omicron.

But the sector that is suffering the most from this pandemic remains the service sector, affected by both a drop in consumption and by increased absenteeism among employees, whether infected or in contact with the virus. The restaurant, tourism, sports and leisure sectors have been severely affected. In particular, the hotel industry has seen its revenue per available room fall by 20% compared to 2019 in France and by more than 50% in Germany, Greece, Spain and Italy. As a direct result, in France the hotel and restaurant sector lost 237,000 jobs between February 2020 and February 2021, according to the DARES.

When will the next wave come? If we are to believe the English scientific experts of the SAGE (Scientific Advisory Group for Emergencies) who advise the British government, a new wave is expected in the summer of 2022 when social interactions will be back to normal and the immunity conferred by vaccines will decrease.

6



HEALTH
CRISIS

"We are watching carefully what happens there, because Omicron has the potential to significantly change the situation in China, compared to 2020 and 2021."

***Guillaume Faury
CEO of Airbus***

HIGH-RISK CROSSING

The tide of inflation looms

Inflation is back with a record increase in consumer prices of around 5% in the Euro zone and 7% in the US. Even if France is relatively spared due to the maintenance of energy prices, inflation is still close to 3%.

The first explanation put forward by economists is that of a rise in raw material prices and transport costs linked to Supply Chain shortages. Added to this is the surge in energy costs, partly due to higher demand and geopolitical tensions between Ukraine and Russia, which is influencing gas prices. Finally, there are the escalating costs of labor, also due to the shortage that many companies experienced during the recovery after having reduced their workforce during the pandemic. The question is whether this increase is the beginning of a sustainable inflationary cycle or whether it is temporary as the ECB wants to believe.

In the US, inflation already seems to have taken off as the shortage of labor to meet the very strong demand driven by the significant support for household consumption has led to widespread wage increases. The FED has declared that it will

measures to curb inflation in 2022, notably by raising its policy rate to slow down activity.

Inflation can have harmful consequences for a number of companies, especially the smallest suppliers who are unable to pass on cost increases to their selling prices. In certain highly-competitive sectors, such as the Automotive industry, it appears to be very complicated to increase sales prices to end consumers. Equipment manufacturers and small companies that will have to deal with the concomitant increase in wages and materials could find themselves in very difficult financial situations.

Part of the answer will undoubtedly lie in the interest rate policies that central banks decide to implement, but also in the choices that companies make to maintain their prices while supporting their Supply Chain partners

7



ECONOMIC
CRISIS

"Inflation will stabilize and gradually decline over the course of 2022. It will fall less than we had envisaged, but it will fall. According to our December estimates, inflation will be 3.2% in 2022 (...) and significantly less in France."

Christine Lagarde
President of the ECB

HIGH-RISK CROSSING

A wave of climate disasters

Once again, 2021 was marked by large-scale climatic disasters resulting in damage estimated by insurers at more than \$250 billion, and of course, the Supply Chain was not spared from such increasingly devastating phenomena.

Besides the now familiarly recurrent tornadoes in the US, the most notable events for the global Supply Chain were the winter storm Uri, which affected Texas in particular, and the major floods that Germany, Belgium and China experienced during the summer.

The cold snap in Texas led to widespread power outages, bringing petrochemical plants to a standstill and causing a shortage of plastic raw materials. Prices for polyethylene, polypropylene, PVC and other chemical compounds soared, causing shortages and shutting down production lines in the automotive, electronics and building materials sectors.

In China, flooding in the Zhengzhou region caused significant damage to the railway lines linking the main mining regions of Inner Mongolia and Shanxi with central and eastern China. This severely

disrupted the coal transportation network, which generates most of the country's electricity. Other floods in October affected the mining regions and forced the Chinese authorities to make large-scale power cuts throughout the country, paralyzing part of the industry and once again reducing production capacity.

Beyond these one-off events with major consequences, global warming will pose key challenges to the Supply Chains of companies in many sectors, including the food industry.

For this sector and others, in the mid-term, climate change will considerably modify the ecosystems in the production areas and will also require numerous adjustments throughout the transport and processing chain to ensure the levels of productivity and quality expected.

8



NATURAL
DISASTER

"It's not the next big supply chain crisis. It's the next big supply chain crises, plural."

Jason Jay, Director of the Sustainability Initiative at MIT Sloan School of Management

HIGH-RISK CROSSING

Quality defects: icebergs in sight!

The risk of quality problems and product recalls is a major concern for companies as controlling an increasingly complex Supply Chain is a huge challenge.

This phenomenon is clearly visible in a sector like the Automotive industry, which is in the midst of a major and rapid technological shift towards electric vehicles, and is concretely reflected in spectacular product recalls. At the end of the summer of 2021, GM recalled the 141,000 Bolt vehicles sold since the launch of the model because of the risk of fire in the lithium-ion batteries. The battery supplier, LG, reimbursed GM for nearly \$2 billion in costs associated with the recall. Such an event is a major setback for GM, which plans to produce 1 million electric vehicles in 30 models by 2025.

For many other sectors, which had been relatively unaffected until then, the pandemic has highlighted the complexity of their Supply Chain and their lack of control or even their ignorance of it. Especially since COVID has undoubtedly exacerbated some of the factors at the root of the quality crises that manufacturers regularly experience.

Indeed, the multiple production stoppages, absenteeism of key personnel and extended delivery times have disrupted suppliers' operations, forcing them to produce discontinuously and at full capacity in order to cope with sharply rising demand.

As business picks up, manufacturers are questioning the ability of their suppliers to ramp up production at the same time as they hire new staff. The availability of human expertise in production control, special know-how and in the fields of engineering and maintenance is a major concern for certain technological sectors such as Aeronautics, Automotive and production equipment.

Even if the pandemic has caused an overall decrease in the number of recalls worldwide, this is primarily due to the slowdown in production and control activities. Companies are rightly concerned about potential major crises in the years to come and need to reinforce their controls throughout the Supply Chain.

9



QUALITY
DEFECT

"We are concerned about the quality of suppliers because in some countries they have lost skills and everyone is looking for the same profiles to meet the upturn in demand. There is a real risk of expertise not being available."

Risk Manager of a leading aeronautics group

HIGH-RISK CROSSING

The sustainable Supply Chain, a global challenge

10



CSR
CONTROVERSY

Issues related to health, the environment and human rights' protection in the Supply Chain are becoming more and more pressing for principals.

Firstly through the regulations that are imposed on them, in particular the law on the duty of care for which France is a precursor, but also in terms of the fight against corruption or the exploitation of conflict minerals. And perhaps in an even more visible way, via the media and social networks that regularly reveal indecent working conditions at the suppliers of renowned brands.

The Uighur forced labor scandal is the most recent example. It is now admitted that cotton fields and factories in the Xinjiang region of China use the forced labor of Uyghurs imprisoned in internment camps. In July 2021, the French justice system opened an investigation into four textile multinationals that allegedly benefited from these human rights crimes: Inditex (Zara), Uniqlo, Skechers and SMCP (Sandro, Maje).

While France has just adopted a resolution denouncing the genocide of Uyghurs by China, President Biden has banned the purchase of

products manufactured partly or totally in Xinjiang. Other brands are now being singled out by NGOs, including Apple, Bosch, Google, Nike, Nintendo and Volkswagen.

In terms of safety and labor rights, the Sino-American trade war and the pandemic have aggravated the situation, leading to major movements in the Supply Chain, particularly on the Asian continent. Companies have had to find new sources very quickly and the Singapore-based company Qima, which specializes in supplier audits, recently reported a "critical" situation.

Finally, awareness of the Supply Chain's environmental impact is heightening and if countries around the world are to meet their emissions commitments, it is essential that they develop sustainable practices in their logistic flows and in the production processes of their suppliers, first and foremost by improving their business visibility.

"As part of our efforts to advance the Biden-Harris Administration's priority of eradicating forced labor from U.S. Supply Chains, we are taking an important first step today."

***Alejandro Mayorkas,
Secretary of the US DHS***

HIGH-RISK CROSSING

Insurance: missing...



INSURANCE

Although a large part of the risks to which the Supply Chain can be exposed has 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 business interruption 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.

In a market that has already been feeling the strain for the past three years, the record cost of natural disasters (\$250 billion, including \$105 billion for insurers in 2021), the turmoil of the health crisis and the uncertainties weighing on the recovery have continued to worsen the results of insurers and reinsurers and have made underwriting conditions even tougher.

Insurance policy renewals at the end of the year were particularly tense. They resulted in premium increases, capacity reductions, increases in deductibles and exclusions that render certain coverages meaningless (deficiencies, product recalls, cyber, etc.), and even refusals to underwrite certain activities.

Beyond the sharp price hikes, which are brutal but explainable after years of decline and deterioration of results, it is the insurers' disengagement from major risks that causes incomprehension.

Today, the situation for companies is such that it is no longer a question of imagining how to insure their Supply Chain risk better, but rather of finding a way to insure themselves without excessively degrading current technical and economic conditions, or even of no longer insuring certain risks in view of the market conditions imposed.

"This is unheard of, we're in a virtual denial of service situation. You have a lot of insurers not responding. Others that are pulling out of the market."

Oliver Wild, President of the Association for Corporate Risk and Insurance Management (AMRAE)



04 ROUTES OF CONTROL

The crisis has put corporate risk management systems to the test in an unprecedented situation.

For many of them, it has been a full-scale crash test highlighting the weaknesses of current organizations and the need to gain in maturity.

Following these observations, the only way for companies to regain control of their Supply Chain is to strengthen their existing systems, implement new practices and transform their short- and mid-term industrial processes in order to become more resilient.

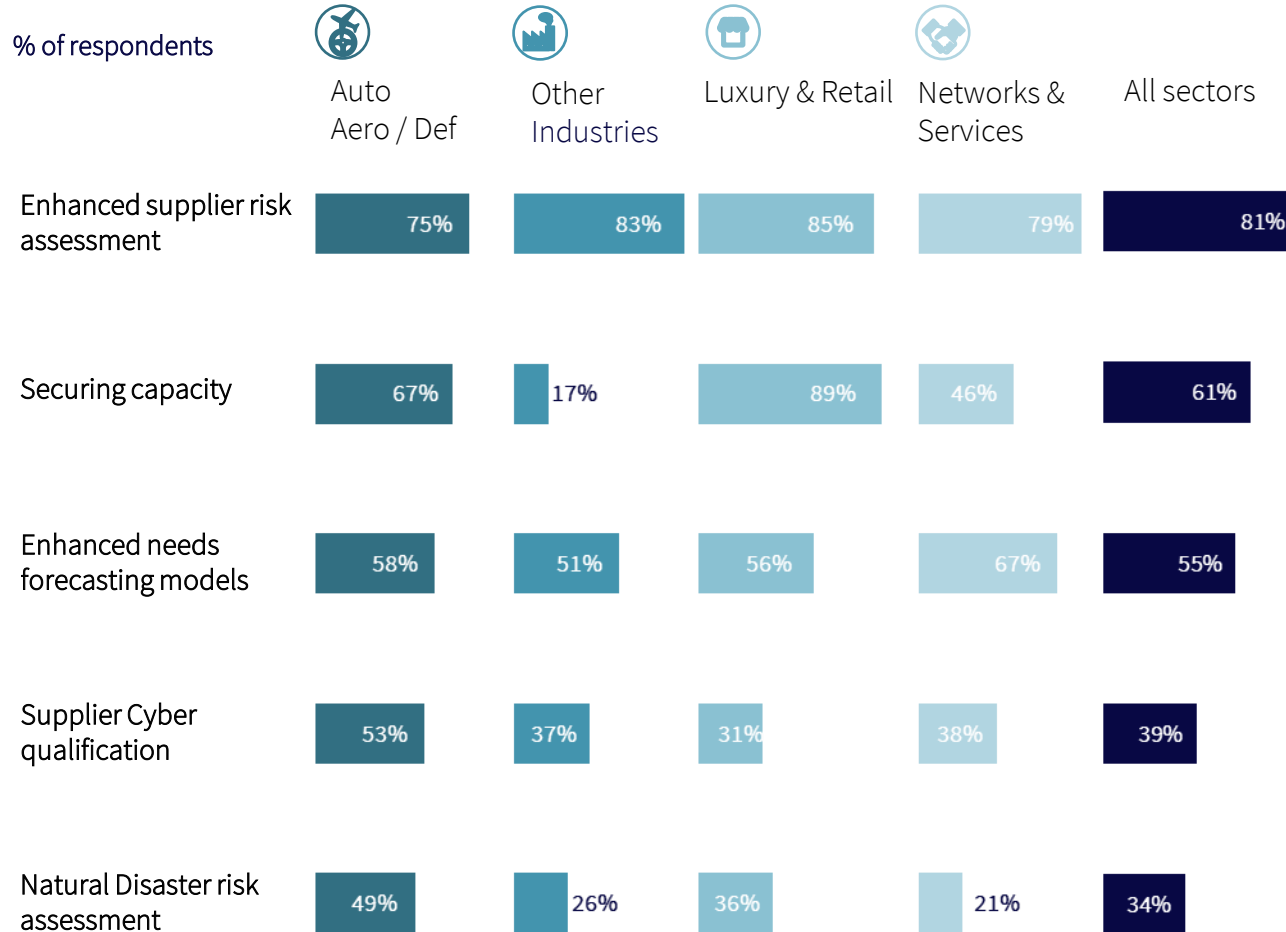


54%

of respondents target an agile and collaborative Supply Chain profile

ROUTES OF CONTROL

How to prevent Supply Chain risks?



Source: 3rd Supply Chain Risks Barometer- KYU

Priority should be given to improving knowledge of suppliers by conducting supplier risk assessments. This involves identifying and locating suppliers, understanding their activities, their environment and their context, and conducting much more systematic audits of their operations. Firstly from a QHSE point of view, to ensure their compliance in all areas, then on their resilience by assessing their financial health and the control of their own Supply Chain through their inventory, purchasing, logistics policy, etc. Integrated into the purchasing process, this mapping will eventually allow the panel to be purged.

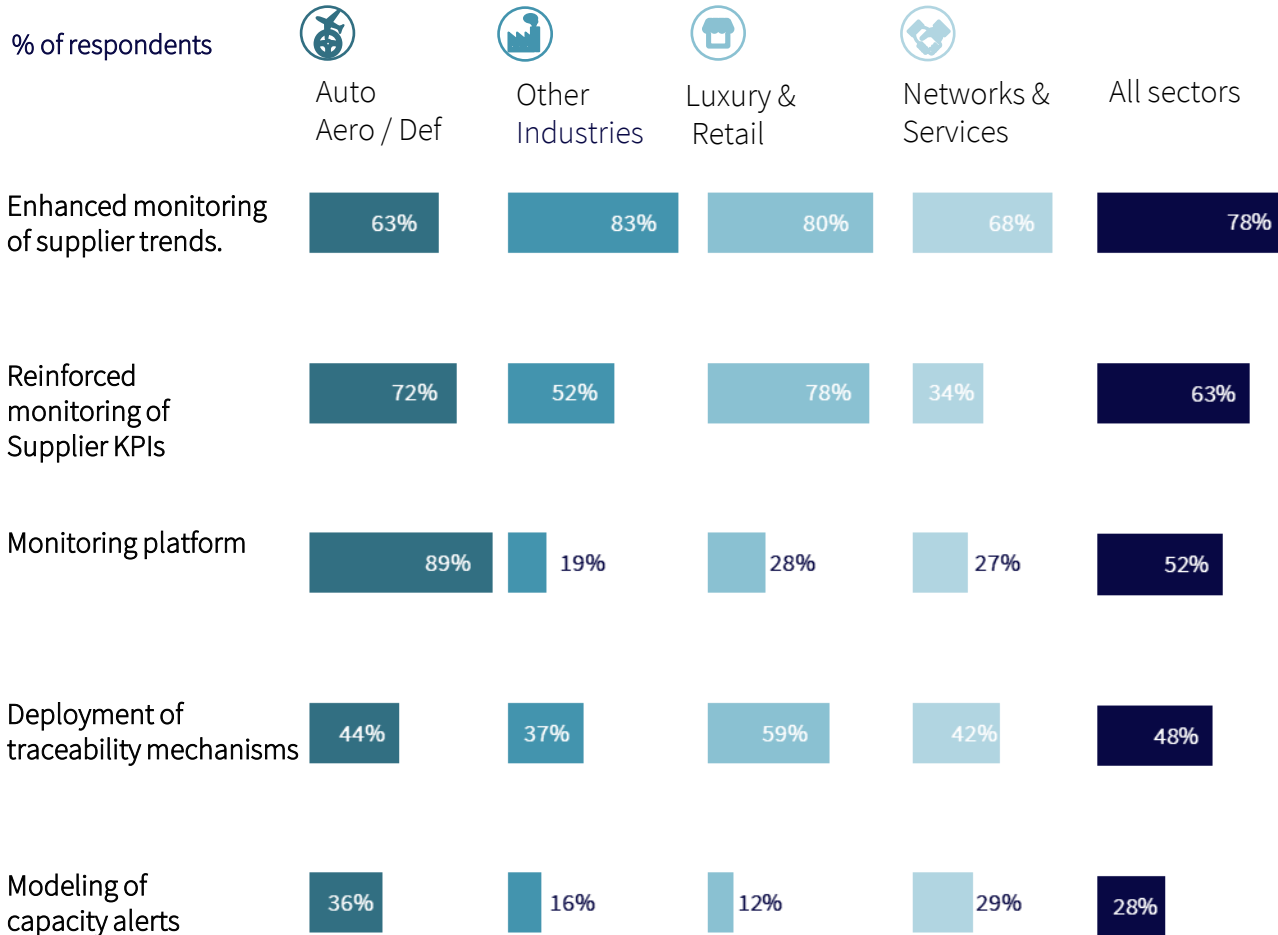
However, this will not be enough to prevent all future crises and companies must now secure their Supply Chain at all levels by repositioning stocks and capacity in order to absorb variations in supply and demand.

This is especially true as demand is becoming increasingly uncertain. While improving forecasting used to generate relatively marginal gains, it is now becoming a priority, as variations are so strong and lead to devastating "bullwhip" effects.

Finally, Cyber and Climate risks are also areas to work on in the years to come. The aim will be to map exposure precisely and to support suppliers so that they take protective measures in this area.

ROUTES OF CONTROL

Detect the crisis as soon as possible and monitor it closely



Source: 3rd Supply Chain Risks Barometer- KYU

The pandemic has shown many companies just how little they know about their Supply Chain. In the first moments of the crisis, everyone was trying to find out who their suppliers were in the Wuhan area, where their products were in the logistics chain and which ship could carry their precious goods to keep their production lines running.

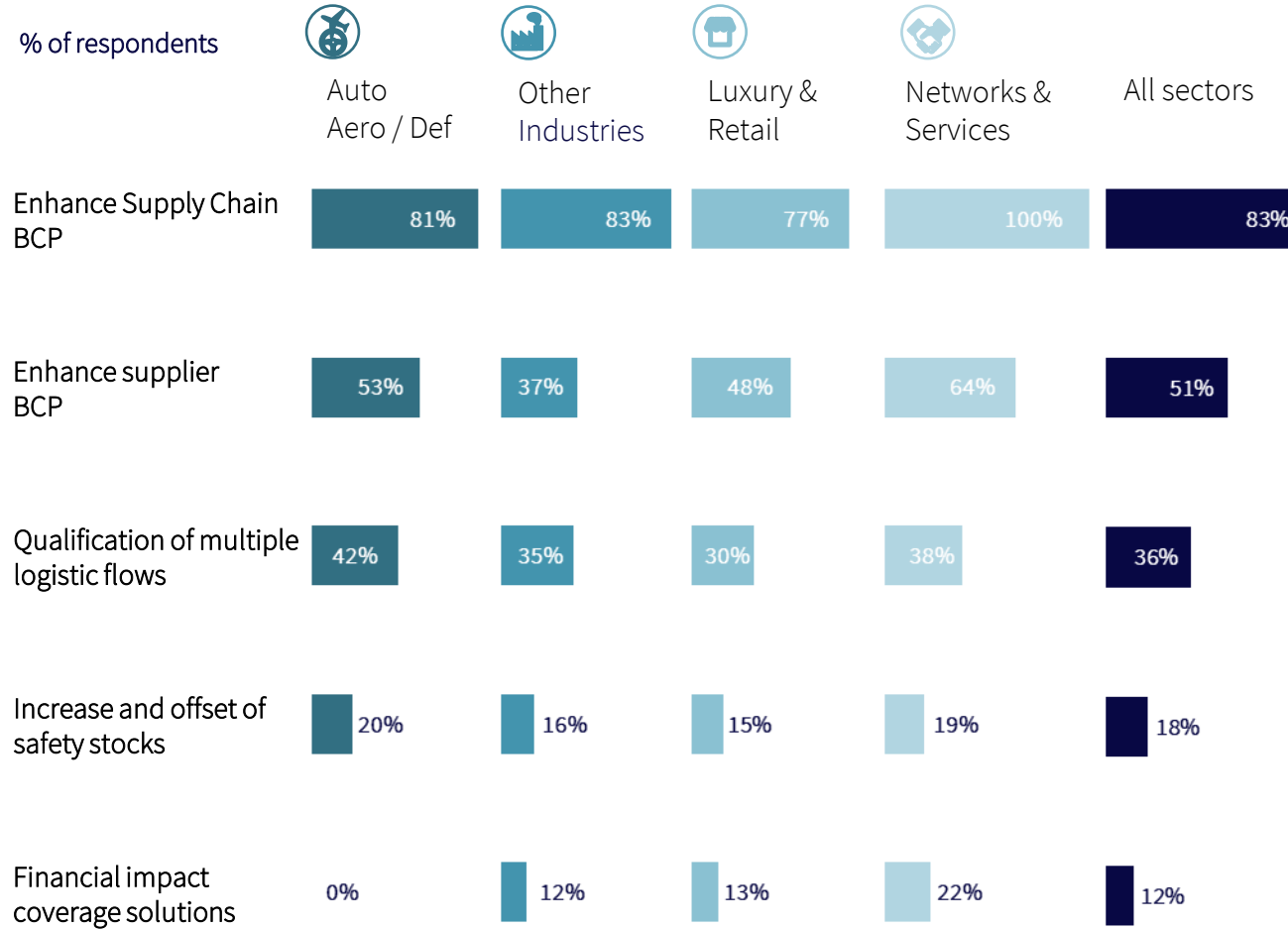
Since then, crisis after crisis has occurred and the same efforts have had to be made again and again. It is now imperative to invest in tools to detect crises at an early stage, or even to anticipate them and monitor them closely.

Monitoring suppliers' activities and trends in their performance and their environment is key. You need to be alerted as soon as something happens in the Supply Chain (major delays, a strike, a lockdown, a fire, etc.) so that you can act quickly. For the most advanced manufacturers, this translates into the implementation of "watchtowers" that permanently monitor sourcing zones, flows and logistics hubs, as well as the deployment of traceability devices that allow them to track products in transit and even oversee the proper transportation conditions for sensitive goods.

Eventually, with a strong collaboration between all its actors, the modeling of the Supply Chain could allow the detection of capacity alerts based on needs forecasts.

ROUTES OF CONTROL

Anticipate for better protection



Source: 3rd Supply Chain Risks Barometer- KYU

As the saying goes, if you want peace, prepare for war. As far as the Supply Chain is concerned, the Business Continuity Plan is undoubtedly the best adapted mechanism. However, it must be correctly used and this is unfortunately not yet the case for the vast majority of companies. Indeed, BCPs are limited to the activities of manufacturing sites or operations, cover classic scenarios of fire, and now pandemic, most often to meet people and property safety requirements.

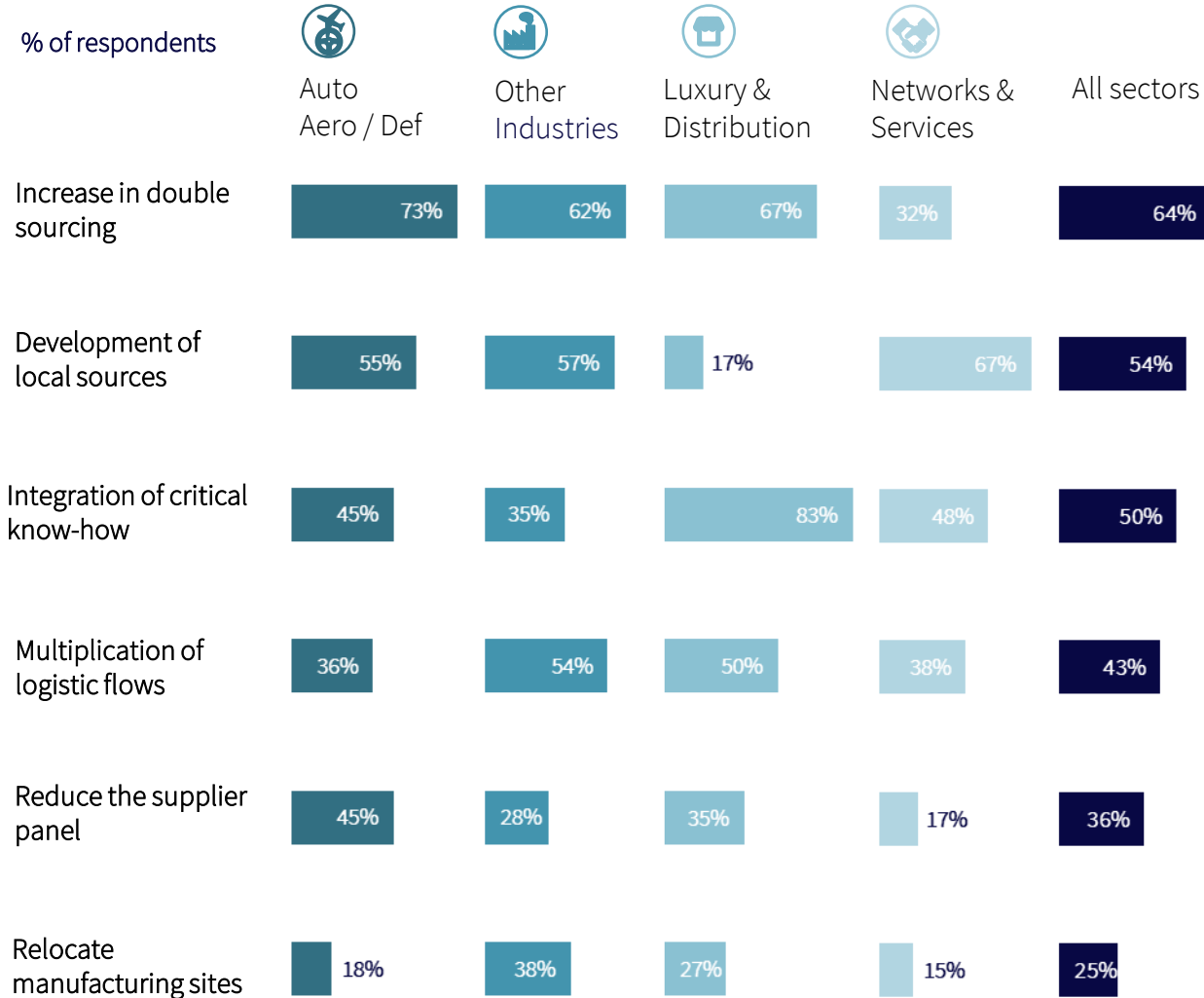
In the coming years, companies will have to work on building BCPs that cover their entire Supply Chain by working on scenarios impacting sourcing zones, critical suppliers and key logistics hubs in order to be able to react. Elaborating these BCPs will also enable them to measure the impact of each scenario and identify the counteraction means to be implemented, whether stocks, tools or alternative sources.

A majority of them also believe that an effort should be made to encourage suppliers to improve their business continuity.

Finally, no doubt as a reaction to the recent crises, companies will increase their logistics solutions to be able to supply themselves in the event of a bottleneck.

ROUTES OF CONTROL

Upgrade the Supply Chain structure



Source: 3rd Supply Chain Risks Barometer- KYU

Supply Chains will gradually transform to become more resilient in the coming years. First of all, companies will have to implement new sources of supply for their critical components in order to avoid new shortages like the ones they have experienced in the last two years.

For manufacturers and service providers, this search will focus on areas close to their manufacturing facilities and operations to limit their dependence on distant countries in Asia and elsewhere.

Another area of transformation, in the mid-term, is the integration of critical know-how, again to limit dependence on expert suppliers, on whom companies have relied too heavily to develop their products. In the Luxury goods industry, this trend has already begun and the Manufacturing industry should follow suit, particularly in the key areas of embedded electronics, energy storage and AI.

Finally, logistic flows will be the subject of major investments to open up new supply routes, providing multimodal solutions that offer greater flexibility and capacity in the event of localized congestion or a one-off increase in demand.

ROUTES OF CONTROL

Relocate? Sure, but not at any cost.

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

There was already a trend towards relocation, to regain price competitiveness, to escape the geopolitical tensions between the US and China, or to get closer to consumer markets by moving from globalized production to multi-local production (glocal!).

In most cases, relocation does not mean in the country of origin, but rather in neighboring countries to find cheap labor (Philippines, Vietnam, Malaysia), outside of China to avoid being taxed by the US for 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, South East Asia for Asia).

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

Relocating to a country bordering China will help offset the escalating labor costs of the past few years, double the sources of supply to anticipate possible shortages and avoid tensions with the US.

Relocating to an area close to customers opens up the possibility of providing products adapted to the specificities of local consumers and being more agile in responding to variations in demand.

Relocation to France will only be viable for products for which the share of labor is relatively low, know-how is mastered, skills are available, and "made in France" is an important selling point!



ROUTES OF CONTROL

Restructure your financial protections

Gone are the soothing speeches about partnerships and supporting the development of companies. Four years of tensions and misunderstandings between insurers and their customers will have convinced the most credulous that insurance is not the be-all and end-all of corporate income statement and balance sheet protection.

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.

Insurers' disengagement represents, at the same time, as an additional risk in the event of failure, with a knock-on effect on the Supply Chain, and an opportunity for companies to reappropriate their transfer policy, rethink their retention model and give themselves the means to be less dependent on the volatility of the financial markets.

This requires improved risk management to gain visibility, identify and value the main crisis scenarios, set up prevention and business continuity systems,

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

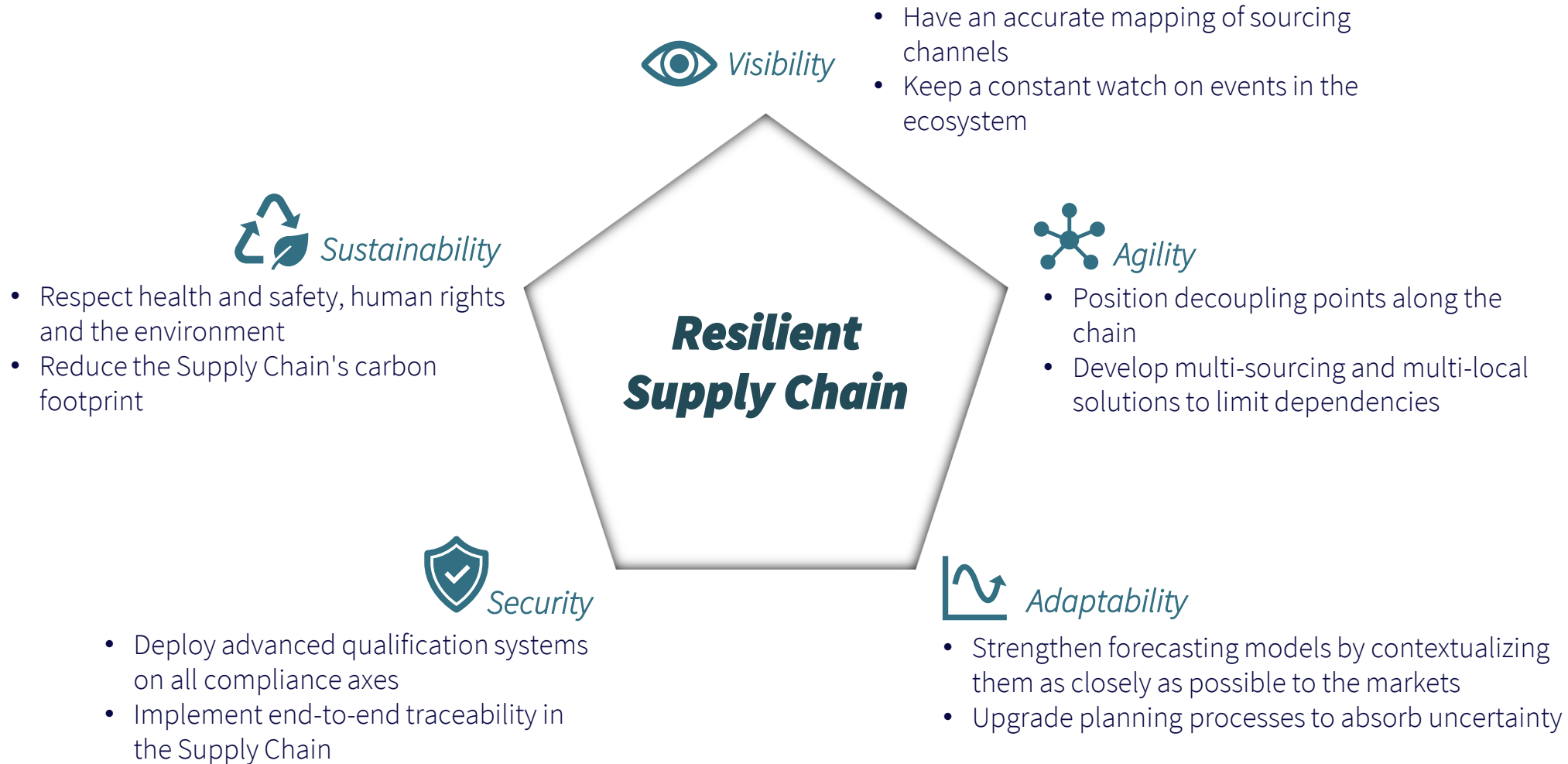
For small and large companies, this is an opportunity to explore the possibility of implementing ART (Alternative Risk Transfer) solutions of the captive type (insurance, reinsurance or captive compartment in an existing vehicle) or Structured Guarantees. In this way, a company could supplement the guarantees offered by insurers (e.g.: supplier failure without damage), to facilitate the participation of other insurers by self-insuring its frequency risk and transferring only the intensity risk, while optimizing its budget.

In the long term, in a softer market, the increased visibility on risks will help the company reconsider the transfer to insurers in a much more favorable position.



ROUTES OF CONTROL

5 key points to implement tomorrow's Supply Chain





KYU Associés is a consulting firm that supports its customers in France and abroad. Founded in 2002, KYU has over 70 consultants in Paris and Cologne.

OUR EXPERTISE AT THE SERVICE OF OUR CUSTOMERS



Control uncertainty.

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



Reinvent your Supply Chain.

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



Get involved, explore, act.

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

OUR COMMITMENT

Through our participation to the United Nations Global Compact, we wish to make the practices progress in term of human rights, labor norms, environment protection and fight against any kind of corruption.

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