

In collaboration
with Kearney



A Global Rewiring: Redefining Global Value Chains for the Future

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Foreword



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The global economy faced unprecedented challenges in 2022; inflation, labour and resource shortages, logistics bottlenecks and energy price surges continue to dominate the news. As we enter a fourth year of constant disruption – fuelled by the COVID-19 pandemic, geopolitical tensions and the global impacts of climate change – it has become clear that manufacturing companies will not be able to go “back to normal”. Instead, they need to continually navigate this new environment of turmoil and volatility. For the first time in decades, they are operating in a business environment that is marked by scarcity and competition for supply. We are moving into a supply-constrained world and the global economy is changing to reflect this. These days, value chain resilience is on top of the agenda for every C-suite executive.

Resilience is defined as the ability of an object or process to recover quickly from difficulties and return to its original state. In view of the above-mentioned trends – the constant state of disruption and uncertain outlook – resilience can no longer be the main target. Indeed, manufacturing companies cannot return to their original state

because it is not well-suited to cope with the new reality. Instead, they should move forward and go beyond resilience. To navigate future disruptions and uncertainty, firms need to embrace a new vision and mindset and change their approach to fundamentally redesign their global value chain configuration and operations end-to-end. As individual firms start this process, the cascading effects will lead to significant changes in manufacturing hubs and locations, geographical supply and demand concentrations and global flows of components and goods. For the first time in over three decades, global value chains will rewire as manufacturing companies are adapting to a new supply-constrained reality.

By working closely with our community, the World Economic Forum, in collaboration with Kearney, has identified five trends that will dominate this rewiring. This white paper will provide an overview of its precursors, with a perspective on five dominating trends and their implications for global value chains. We trust this will support the global manufacturing community in shaping strategies beyond resilience and building the value chains of the future.

Executive summary

Global value chains will collectively start to rewire in response to the new supply-constrained paradigm. Five trends dominate this rewiring.

Current macroeconomic developments make it clear that returning to a pre-COVID-19 “normal” is not in sight. Manufacturers are facing headwinds in the form of double-digit inflation, labour shortages and energy scarcity, along with new regulations that are driving an increasing imperative to reduce waste and emissions. These headwinds impose new constraints on operations, drive complexity and unveil hidden vulnerabilities, fundamentally changing the balance of supply and demand in the process. It is no surprise that global value chain failures are becoming more commonplace in such a challenging business environment.

To monitor disruptions and their implications on global value chains on a recurrent basis, the World Economic Forum, in collaboration with Kearney, has developed a quarterly-issued “Global Value Chain Barometer”. The September 2022 issue indicates increases in disruption events that are driven by climate-related (up by 96%), technological (up by 113%) and geopolitical (up by 311%) megatrends. The resulting value chain breakdowns are at the forefront of executive board discussions around the world. Value chain resilience has become a C-suite topic. This attention to operations is one consequence of an ongoing redefinition of globalization that has been caused by a fundamental shift in the balance of supply and demand. For the first time in 80 years, generating supply is increasingly becoming a constraining factor for manufacturers’ success.

This is not a reversal of globalization. Manufacturers still face global competition, and, thanks to digital technology, the world is as interconnected as it has ever been. According to the United Nations Conference on Trade and Development, in 2021, global trade levels for goods surpassed pre-COVID-19 levels by 15%. Meanwhile, Kearney’s FDI Confidence Index found that foreign direct investment in the same year was approximately 12% above 2019 levels. It is, however, a transition to the next stage of globalization. In this new era, winning strategies for manufacturing companies will no longer revolve solely around achieving economies of scale through outsourcing or developing markets at all costs. Customers expect product availability at all times and not being able to guarantee quick delivery in this volatile business environment can equal a lost sale. As a result, industry leaders have started to build value chain resilience through new strategies like global diversification and supply management.

In a supply-constrained world with continuous disruptions, firms are re-evaluating how their global value chains are configured. Reacting via continuous adaptation alone – i.e. through a series of incremental improvements following disruptions – will not be sufficient for manufacturers to be adequately prepared for the paradigm shift. In addition to adaptation, leaders will redesign their value chains from the bottom up and end-to-end in response to the new supply-constrained paradigm. This redesign will be marked by a new mindset and philosophy of global value chain operations. Manufacturing leaders will look to balance resilience with performance and sustainability to ensure service quality and long-term business continuity. As a result of individual firms starting this redesign, value chains will rewire globally as supply bases, manufacturing hubs, transport flow and customer markets shift to reflect these changes.

Kearney and the World Economic Forum’s Shaping the Future of Advanced Manufacturing and Value Chains platform brought together operations and supply chain executives, public sector and academia leaders to identify the trends that will dominate this fundamental rewiring of global value chains. Manufacturing leaders have started to move:

- From global to globally connected multi-local value chains
- From “doing” digital to “being” digital across end-to-end operations
- From economies of scale to economies of skills
- From regulatory compliance to innovative sustainability
- From cost-driven to customer-value-driven.

The reconfiguration of global value chains will impact how manufacturing leaders instil resilience into their global operations. The Forum’s resiliency compass is a guiding framework with transformative approaches and strategies along eight supply and demand dimensions of value chain resilience to support manufacturers in the redesign of their global value chains.

The World Economic Forum will continue providing a neutral space for leaders from across industries, the public sector, civil society and academia to understand and anticipate these trends and their implications, share best practices and knowledge, and help incubate new collaborations and partnerships that support manufacturers to navigate the five trends.

How value chain disruptions redefine globalization

A new global economic mega-cycle has begun that will be characterized by value chain disruptions, resource competition and climate change.

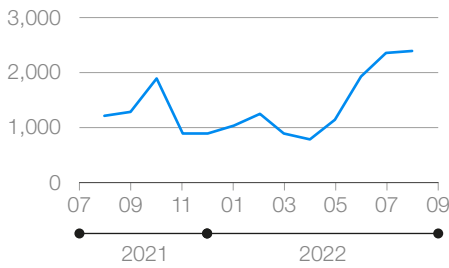
Inflation and shortages – of labour, raw materials, logistics capacities and energy – dominate the media and boardrooms. As they struggle to recover from COVID-19 and related disruptions, battered value chains face unprecedented macroeconomic volatility, leaving manufacturers around the globe trying to find a balance between safeguarding margins and ensuring delivery capability. At the same time, the shortages brought by the past few years have raised public attention to global value chains and impacted customer expectations and perception of global value chains. As global value chains and their impact on societies and the environment have entered the greater consciousness and vocabulary, this has brought about higher scrutiny and calls for stronger regulation that will significantly impact manufacturers' networks.

To add to these challenges, the mega-trends driving value chain disruption – geopolitical tension, climate change and technology shifts – show no sign of slowing down.

In view of these changes to supply and demand, a return to pre-COVID “normality” is not in sight. The September issue of the World Economic Forum's [Global Value Chain Barometer](#) – a quarterly news bulletin developed by the World Economic Forum in collaboration with Kearney to monitor the impact of disruptions on global value chains – shows a significant increase in risk events related to all three mega-trends driving global value chain disruption (see Figure 1). Climate-related risk events are up by 96%, technological disruptions increased by 113% and disruptive events driven by geopolitical tension have skyrocketed by 311% compared to 2021.



Climate-related disruptions¹



Trends



Digest

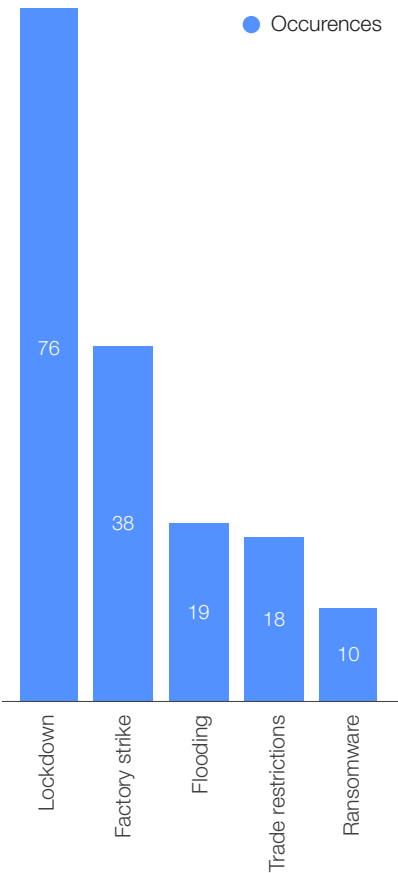
Climate-related disruptions

- **Heatwaves in China and Europe** are leading to droughts, wildfires and water shortages, causing a significant increase in climate-related disruptions in 2022 Q2 and Q3.
- Current data indicates that the number of extreme weather effects and related disruptions **will increase into Q4.**

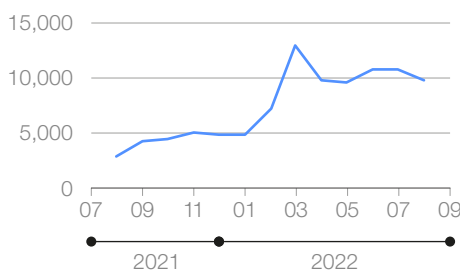
Most severe* disruptions (Q3/2022)

- Natural gas flow cuts to Europe
- Security situation in Taiwan, China
- Heatwaves across China and Europe
- Wildfire spread across Europe
- Strike risk at US West Coast ports

Most frequent severe* disruptions (Q3/2022)



Geopolitical disruptions¹



Trends

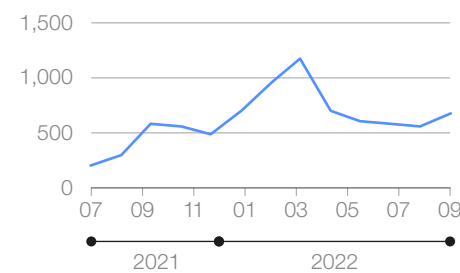


Digest

Geopolitical disruptions

- **Covid-related lockdowns and the Russia-Ukraine conflict** are causing elevated geopolitical disruption throughout the year.
- Due to further escalations in the ongoing conflict and the security situation in Taiwan, China, the **overall geopolitical disruption climate is expected to increase significantly.**

Technological disruptions¹



Trends



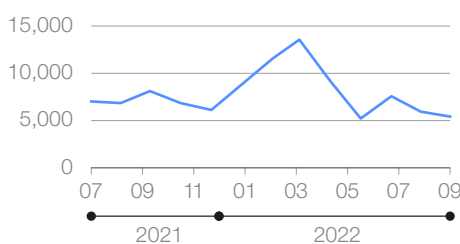
Digest

Technological disruptions

- Ransomware and phishing attacks have increased significantly due to the escalation of geopolitical conflicts.
- Following this peak, **cyberattacks remain elevated**, with ten severe ransomware attacks in Q3 driving the technological disruption climate.

Impact of overall disruption trends on operations

Operational disruptions¹



Trends



Digest

Current implications

- The past year has shown a significant increase in operational disruption, peaking in the wake of the **escalation of the Russia-Ukraine conflict.**
- Following the 2022/Q1 peak, **operational disruption levels have stabilized at a medium level** in the past month as manufacturers have been continuously adapting to challenges, showing a downward trend.
- However, high inflation and energy prices remain a challenge. Furthermore, increases in the three megatrends above indicate the **next wave of operational disruptions.**

* Severe disruptions are defined as events with a significant impact beyond single geographies or industries
 Note: 1) Source: Everstream Analytics

92%
of executives expressed positive sentiment towards reshoring

Apart from being more common, recent disruptions have also been much more systemic than those of the past: COVID-19, the Ukraine conflict and climate change have simultaneously impacted multiple connected and unconnected global value chains. These systemic events are nearly impossible to anticipate, and no one knows where the next “black swan” event will come from – particularly as the impacts of climate change are accelerating globally. Extreme weather effects alone are estimated to have caused \$2.56 trillion in economic damages between 2000 and 2019,¹ and there is no sign of this trend slowing down. For example, the frequency of heat waves in the US has tripled since the 1960s, while the average heatwave season has increased by 49 days to more than 70.²

This “new normal” has put a perpetual strain on global value chains configured for a much more favourable business environment: they were not designed to handle this degree of volatility. The resulting increase in value chain failure has triggered a rethink. After years of following a cost-focused paradigm revolving around outsourcing and economies of scale, firms have begun to consider reshoring considerable parts of their production capacity and supply base to build resilience and ensure better supply availability. For example, in a recent survey, 92% of executives expressed positive sentiment towards reshoring.³ At the same time, governments are considering new industrial policies and strategies to reduce their dependency on other countries for key products like pharmaceuticals and semiconductors.^{4,5}

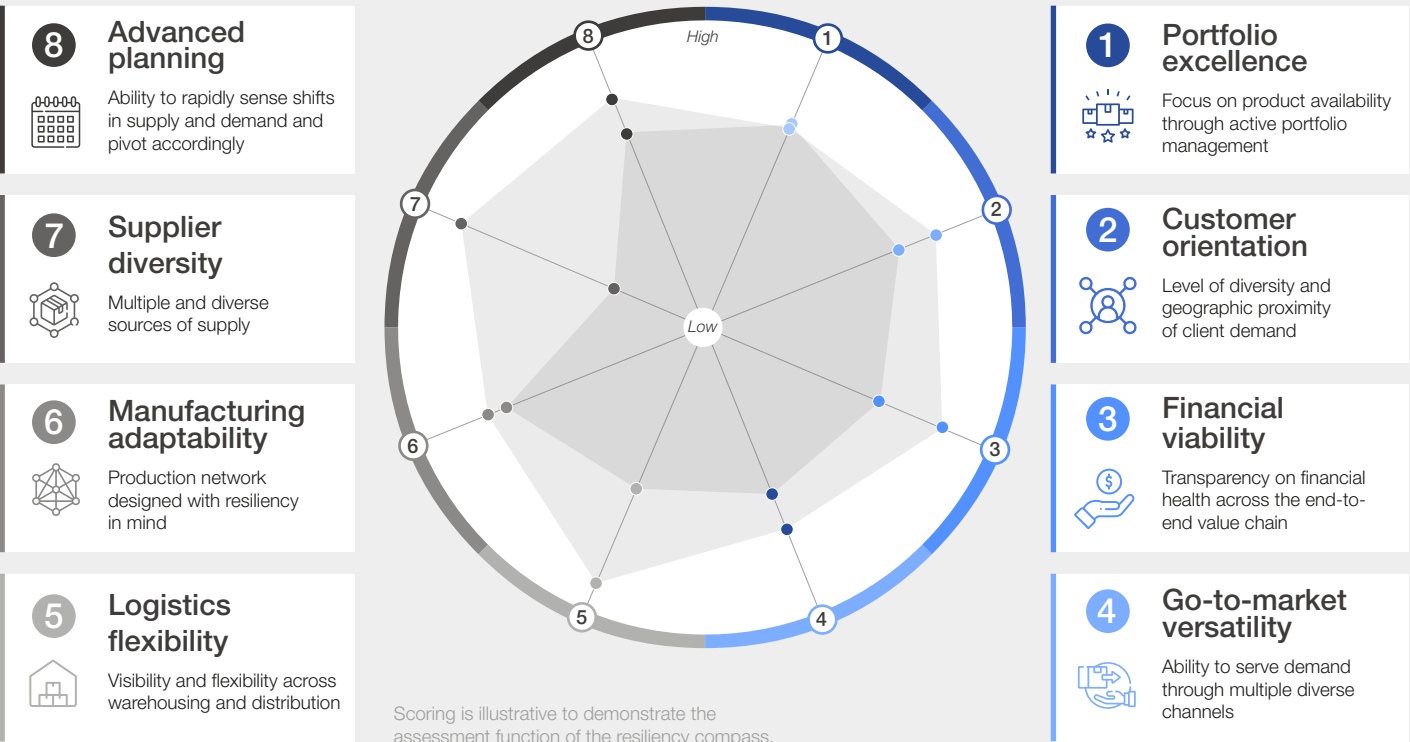
After 80 years of growth and abundance, a new mega-cycle of the global economy has begun.

This will be characterized by disruptions, climate change and competition for resources – the world is increasingly moving towards a supply-constrained world. In this new reality, firms are still challenged by generating demand for a product, but a new major challenge is ensuring critical supply, manufacturing the product and getting it to customers on time. With customers being used to unfettered choice and short lead times, not being able to meet these expectations could equal a lost sale. These challenges require global value chain leaders to think differently about their operations and adopt new philosophies, strategies and approaches to manage global value chains. Consequently, resilience leaders have already started to pivot and focus on their upstream value chains by employing strategies that boost supply security.⁶

As leaders change their strategies to respond to the supply-constrained economy, the configuration of global value chains will change. From discussions with manufacturing executives, public sector representatives and leading academics, five trends have been identified that will dominate the global reconfiguration of value chains. This white paper explores these trends and how they will affect global value chain configurations and manufacturers’ strategies in response to the transition towards a supply-constrained paradigm.

As this reconfiguration of global value chains will impact how manufacturing leaders instil resilience into their global operations, this white paper also presents transformative strategies and approaches along eight dimensions of the resiliency compass (see Figure 2) to support manufacturers in this redesign.

FIGURE 2 The resiliency compass, scaling resilience around eight dimensions



Rewiring in a supply-constrained world

Leading manufacturers are evaluating and fundamentally redesigning their operations strategies rather than only making step-by-step adjustments.

Value chain breakdowns and shortages are the new markers of a supply-constrained world. Due to shortages of components and labour,^{7,8} port congestions⁹ and increasing cross-industry competition for rare resources like rare earth metals and semiconductors, manufacturers' revenues and profitability will no longer be constrained by generating demand but by generating supply. Firms that are unable to navigate this shift will find themselves unable to meet their customers' demands due to structural constraints and value chain breakdowns. Customers, however, are now used to short lead times and high product availability, which can create a welcome opportunity for more resilient competitors to win market share. As a result, firms are reviewing their global value chains and moving away from old tenets driven by cost, cash and service optimization that were rooted predominately in "lean" principles and economies of scale. These configurations often neglected the need to build resilience and redundancies to achieve higher margins.

The supply-constrained world calls for a new approach to global value chains. Firms are reconsidering their value chains with resilience, sustainability and performance in mind. Winning strategies build these characteristics in at the design phase – not as secondary objectives to cost optimization. From consultations with manufacturing executives, public sector representatives and leading academics, it can be seen that leading manufacturers are already starting to re-evaluate how their value chains are configured by diversifying their supply base, reshoring manufacturing capacities and establishing parallel manufacturing networks. At the same time, governments are increasingly incentivizing the development of domestic manufacturing capacity in critical industries.^{10, 11}

Both these developments will significantly impact the availability and flow of materials, components and goods, and manufacturing hubs around the world. The first subtle signs can already be observed in maritime trade data, which is a good predictor of global economic development. During the past two years, the number of active shipping ports has decreased from 980 to about 910, while the size of container ships – before always expanding to achieve

higher economies of scale – has already stagnated for a longer period of time than after the global recession in 2008/2009.¹² Furthermore, for the first time in years, the average distance travelled by cargo vessels has decreased. This could indicate that trade flows are becoming shorter and more diversified for the first time in decades. Yet, this is not a reversal of globalization.¹³ On the contrary, the economy is still global: in 2021, trade volume surpassed the pre-COVID-19 levels of 2019.^{14,15} FDI flows have also surpassed 2019 levels, growing by approximately 12% from \$1,473 billion in 2019 to \$1,647 billion in 2021.^{16,17} In fact, thanks to digital technology, the world is as interconnected as it has ever been. Firms still face global competition for markets, talent and investment, while competition for scarce resources has increased in response to successive shortages and cross-competition between industries.

The transition to a supply-constrained economy is expected to add to global disruption levels, which are already significantly elevated. This will challenge traditional methods for building resilience, in which incremental improvements are implemented following disruptions. Resilience is built continuously as the global value chain reacts to disruptions, usually emerging stronger from the challenge. Although this continual adaptation to disruption is critical for firms to build resilience where it counts, firms that pursue it as a single strategy run significant risks. In an environment where disruption is a constant, this puts perpetual strain on value chains and decision-makers. Furthermore, it does not guarantee that value chains will adapt quickly enough or be adequately prepared for the shift to a supply-constrained paradigm.¹⁸

As a result, firms should evaluate and fundamentally redesign their operations strategies rather than making only step-by-step adjustments. This means reconfiguring their value chains to put resilience and – in light of the climate crisis – sustainability at the core of their business agendas. Importantly, any redesign involves going beyond product and network perspectives to reconfigure operations from end-to-end. As individual manufacturers embark on this journey, global value chains will collectively start to rewire in response to continued supply constraints.

2

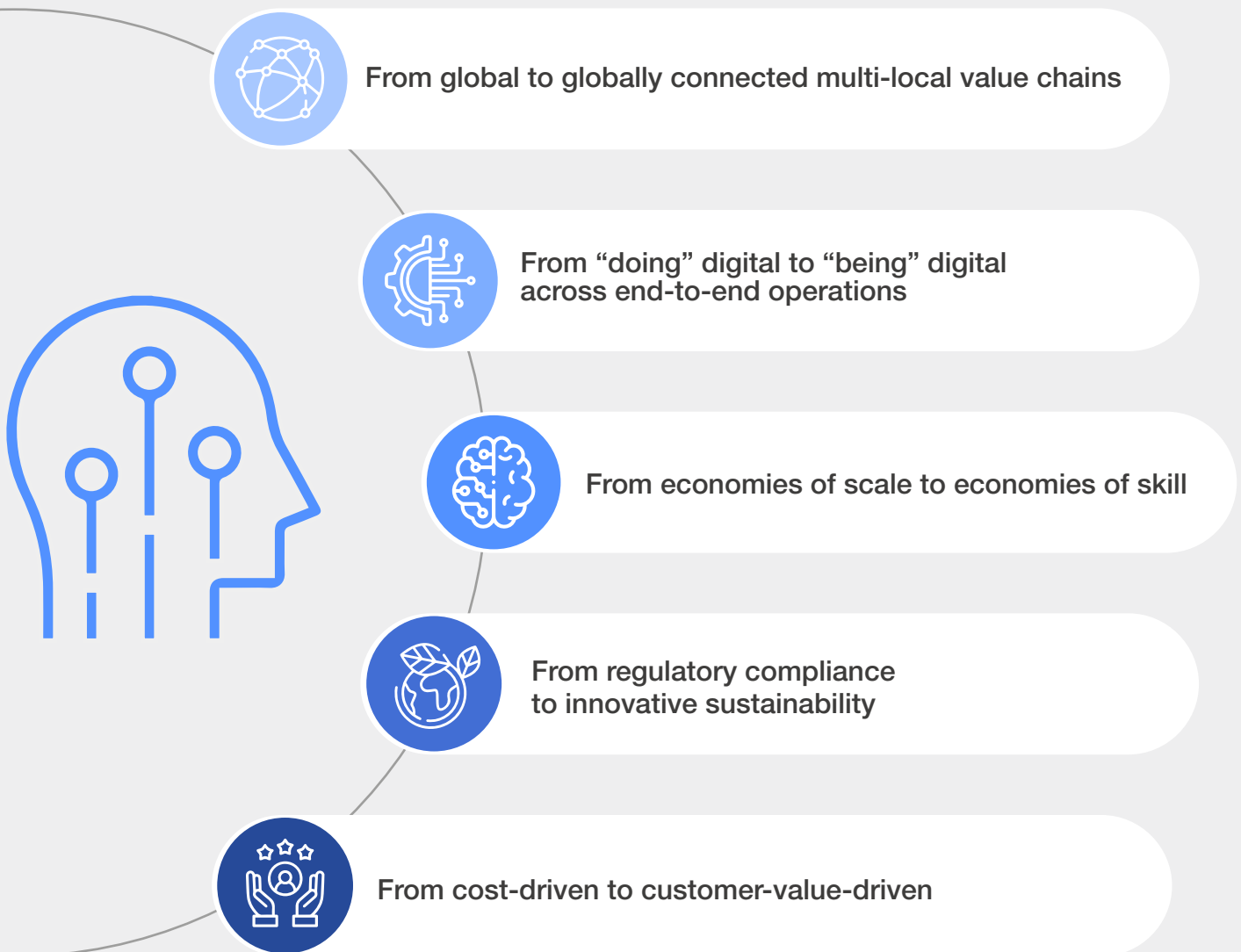
Five trends that dominate the rewiring of global value chains

The rewiring will bring a new mindset about global value chains and how they operate.

Leading manufacturing and supply chain players are already rethinking their value chain strategies to prepare for the seismic shift on the horizon. Through consultations with senior operations and supply chain executives, as well as public sector and academia leaders, five connected trends have

been identified that will dominate as the rewiring of global value chains continues (see Figure 3). This section describes these trends and discusses benefits, challenges and the future outlook for each of them. Examples of firms that have started to react for each specific trend are also highlighted.

FIGURE 3 Five trends that dominate the rewiring of global value chains



2.1 From global to globally connected multi-local value chains

Description

As companies across industries are confronted with shortages and congestion, they are starting to explore strategies to regain control of their supply base. Many firms are considering bringing supply and demand closer together by producing “in the region, for the region” for key products and markets. Increasing discussions about “reshoring”, “nearshoring” and “friendshoring” are testament to this development. For example, in a recent survey, 92% of executives expressed positive sentiment towards reshoring and nearshoring.¹⁹ Nevertheless, trade statistics have yet to reflect this nascent trend and it will take time for manufacturing capacity and sources of supply to move. Geopolitics and trade regulations will also play a major role in making the shift. For example, the 2021 United States Executive Order *Ensuring the Future is Made in All of America by All of America’s Workers* aims to support domestic manufacturers to stay competitive globally, partly by increasing local content requirements.²⁰ Similarly, the European Union is planning to review regulations to build resilience and strengthen domestic supply in critical industries, one prominent example being the *Pharmaceutical Strategy for Europe*.²¹ Consequently, there is value for manufacturers in staying closely aligned with relevant government sources, as they could decide to incentivize or de-incentivize supply base and location decisions. However, decades of globalization cannot be undone within the span of a few months, and certain raw materials and resources will still only be available in certain geographies. Indeed, a complete reversal of globalization seems highly unlikely.

Benefits

Rather than having one value chain spanning the globe, supply chain executives are now looking to build supply chain redundancies for key products

Example

One manufacturer that has already started to reflect this trend in their strategy is Schneider Electric. Its “power of two” strategy has been designed to reinforce the firm’s business continuity plan by ensuring production

and markets by establishing a set of multi-local value chains that largely operate independently within their own geographies. Multi-local value chains will enable manufacturers to bring supply and demand closer together, better serve local markets through shorter lead times, navigate trade barriers and import quotas, improve compliance with local content regulations and be more robust to external shocks affecting the transport system by bringing supply and demand closer together.

Challenges

Multi-local value chains are challenged by reduced economies of scale and increased costs. However, making use of emerging technologies and building economies of skills can help to manage the cost differential. Furthermore, as the physical flows within global value chains become increasingly localized, organizational structures will change to reflect these changes. Multi-local value chains also depend on regional coordination along each step in the chain, which can lead to higher headcounts and overhead costs. These new value chain setups also carry the risk of decreased standardization and more isolated thinking between localized value chains, which in turn could reduce global flexibility and opportunities for innovation, while increasing exposure to risk from limited data-sharing capabilities.

Outlook

As multi-local value chains start to proliferate in response to a new, supply-constrained world, staying globally connected through standardization and best practice sharing will be critical for firms. In this context, new technologies will help coordinate and align networks of multi-local value chains, allowing manufacturers to better control the costs associated with localized operations.

processes in at least two relevant regions, implementing strategic and systematic double-sourcing and deploying central coordination teams in each key region to facilitate cross-region collaboration.²²

2.2 From “doing” digital to “being” digital across end-to-end operations

“ Digitalization can help to build visibility and traceability, ensuring business continuity and alignment between multi-local value chains.

Description

While digitalization has long been seen as a driver of value chain efficiency, many companies have yet to embrace its benefits fully. In a supply-constrained world, these firms will be strongly incentivized to finally embark on the journey. As manufacturing companies move to more complex multi-local setups, they will not be able to compete if they fail to digitalize their value chains or put in sufficient digital investment. Rather, digital thinking needs to be at the core of value-chain decision-making. Leading manufacturers do not “do” digital through high-profile, small-scale projects and one-off initiatives; instead, ingraining digitalization into how they operate enables them to “be” digital. When designing their value chains, they will naturally look to technology and select the digital solutions that best fit their needs.

Benefits

Technology is particularly important to control cost pressures when moving to multi-local value chains. It enables firms to drive efficiency, ensure business continuity and reduce labour costs in new, higher-wage markets. Automation and digitalization technologies achieve this in different ways. Firstly, judicious use of automation in manufacturing processes can help to offset cost differentials and decrease exposure to labour shortages, which is particularly important when relocating to markets with high labour costs or ageing populations. New manufacturing technologies, such as additive manufacturing, can also help with mass customization to better serve customer preferences in local markets. Secondly, digitalization can help to build visibility and traceability, ensuring business continuity and alignment between multi-local value chains. Visibility identifies upstream supply risk, while traceability can help firms quickly react to disruptions and mitigate their impact.

Example

An example of a firm that has started first initiatives to “be” digital is Siemens: due to the global electronics shortage, they were facing a challenge in allocating scarce components across their factories. As part of a company-wide factory digitalization initiative, Siemens created

Challenges

However, both approaches bring their own risks. Overinvestment in automation can lead to an over-reliance on electronics to keep production lines running and increases in overall energy consumption – a challenge when the cost of power is high. Firms must find ways to navigate this delicate trade-off between efficiency gains and dependency on energy and electronics. Digitalization also creates attack surfaces by opening manufacturers up to cyber threats like phishing and ransomware. Between 2019 and 2020 alone, malware attacks and ransomware incidents increased by 358% and 435%, respectively.^{23,24} As a result, many companies have started to build cyber resilience into their digitalization strategies.²⁵ As value chain data becomes even more critical for manufacturers’ success, the digital and physical value chains will converge in the question of where the servers hosting this data will be physically located, a decision that can have significant value chain impacts as geopolitical tensions rise.

Outlook

Overall, technology is an integral tool for navigating the rewiring, but transitioning from “doing” digital to “being” digital requires strong commitment, a thorough change management approach and a supporting culture. Leading manufacturers that have started this process have realized that digitalization is as much about people as it is about process, and that technology should amplify, rather than override, the human touch. This means that the digital talent to enable the technological shift will be ever more important for manufacturers.

a data-driven tool to quickly find stock of critical components across its business units. The resulting visibility has enabled stock to be allocated flexibly throughout multiple factories, avoiding production line stoppages due to missing components.

2.3 From economies of scale to economies of skill

Description

As global value chains rewire towards globally connected multi-local value chains, manufacturers will move towards smaller, localized batch sizes and duplication in their manufacturing networks and supply base. As a result, economies of scale based on cost reduction and improved efficiency will be harder to achieve, meaning organizations will need to identify additional ways of boosting performance and gaining a competitive edge. A main differentiator will be economies of skill: the key technologies that enable efficient multi-local value chains – artificial intelligence, automated planning tools, additive manufacturing, and automation – require highly skilled workers to be fully used. Talent, however, is scarce. For example, in 2020, there was a shortage of approximately three million cyber professional positions.²⁶ The “war for talent” is far from over, and leading manufacturers have started to secure the essential skills needed to rewire their value chains. However, creating global teams has become easier than ever before: In the wake of COVID-19, many firms have started to pivot from a location-based working model to one that is more employee-centric. With new communication technologies and ways of working, teams are more likely to be built around individual members and their skills rather than where they are located.

Benefits

Economies of skill can create competitive advantage for manufacturers, through boosting innovation capability to improving productivity and efficiency. They also help to unlock the benefits of technology and enable manufacturers to “be” digital. New ways of working allow manufacturers to deploy the right configuration of skills by employing expert teams wherever needed, ensuring that specialist digital talent is available globally and avoiding the isolated thinking and lack of standardization that can come with multi-local value

Example

An example of a firm that has started to reflect this trend in their strategy is Ford Otosan. Ford Otosan has designed a comprehensive digital curriculum for its manufacturing and office staff to unleash their full potential. As well as courses on industry 4.0, analytics and digital tools, it offers training in digital competence and self-

chains. This approach can also change how teams engage with each other and improve supplier and customer relationships.

Challenges

A key challenge in building economies of skill is availability of talent. Increasingly, firms will move closer to education hubs focused on digital and manufacturing expertise to be even closer to talent sources. Leaders have already indicated that they will put an even stronger emphasis on access to talent in future location decisions. Furthermore, they will begin investing more in internal training programmes and partnerships with key education institutions to ensure that high-talent recruitment pools are available to build the skills required to navigate the rewiring. As competition for talent increases, retaining established talents will also be a bigger challenge. Ensuring a cultural fit, cultivating a sense of purpose and belonging and providing competitive compensation and benefits can help to boost tenure.

Outlook

Value chain leaders themselves will be affected by this trend. Navigating the rewiring requires a move away from the historic prioritization of short-term margins to a longer-term, more sustainable mindset on how to approach problems, calculate business cases and lead teams. As a result, leaders have started branching out beyond traditional operations skills into areas like ecology, geopolitics, macroeconomics, data analytics and digital technology. With a new generation of talent that values diversity, inclusiveness and sustainability entering the labour market, leaders will need to bridge the gap between generations and cultures to secure talent and get the best out of their teams. Failure to align with these new values will prevent firms from attracting top talent and thus deprive them of a key differentiating factor.

“ With a new generation of talent that values diversity, inclusiveness and sustainability entering the labour market, leaders will need to bridge the gap between generations and cultures.

2.4 From regulatory compliance to innovative sustainability

Description

Climate change will significantly increase the intensity and frequency of extreme weather effects. Even if the Paris Agreement is met and global warming is limited to 1.5°C, it is estimated that extreme heatwaves will be roughly eight times more likely and that there will be twice as many agricultural droughts and heavy precipitation events. If the increase rises to 2°C, heatwaves that would usually have occurred every 50 years are expected to become 14 times more frequent, arriving every three to four years.²⁷ In view of these accelerating trends, governments, investors and end consumers are pushing for more stringent regulation around decarbonization in global value chains. As a result, manufacturing leaders are moving away from merely complying with legal and regulatory requirements. Instead, they have started to innovate around sustainability in their end-to-end operations.

Benefits

As leading manufacturers build sustainability innovations into their global value chains, they are starting to see a positive return on investment. Firstly, by going beyond compliance, they minimize environmental and social risk in the value chain. Secondly, they can make use of improved visibility and transparency to further streamline their processes. Thirdly, they benefit from positive brand perception. A strong sustainability brand can help manufacturers tap into new customer segments or attract a new generation of talent, which finds purpose in working on sustainability-related work.

Example

One enabling initiative that has recently been founded in response to this trend to promote data sharing and drive the net-zero agenda is the Estainium Association.²⁹ Estainium, structured in the working groups “Technology and Infrastructure”, “Standards and Norms Carbon Capture” and “Use, Storage and Compensation”, aims to help its members achieve their net-zero targets.

Challenges

Sustainability is challenging because it cannot be achieved by a single company alone – it requires cooperation between all members of the value chain. Consequently, a key concern for manufacturing leaders is combining technology and digital skills to establish value chain transparency to map out their end-to-end emission footprint.

Although many sustainability innovations help manufacturers to reduce waste and improve energy efficiency, they often require significant investment. As a result, the sustainability imperative will change the cost structures of many products and make manufacturing highly regulated components unattractive. This will significantly impact the supplier landscape and manufacturers’ location decisions. The rise of sustainable solutions will also lead to a spike in demand and cross-industry competition for specific raw materials such as rare earth metals, forcing prices up. For example, future prices for lithium and cobalt more than doubled between 2020 and 2021 in response to high demand from electric vehicle battery manufacturers.²⁸

Outlook

With significant impacts on supply bases and cost structures, firms will decide how much they are willing to invest in sustainability innovations and how to measure the returns gained. As sustainability moves to the core of business cases, decision-making processes will become less cost-centric and more about managing these trade-offs to ensure long-term growth and customer value.

By defining common reporting standards, metrics and technologies, it helps its members to share data across verticals and calculate their carbon footprint, including scope 3 emissions. Equipped with these insights, manufacturers can start collaborating with their suppliers to reduce their environmental impact – or select more environmentally friendly alternatives.

2.5 From cost-driven to customer-value-driven

“ Customers expect global value chains to perform better and to be more resilient and sustainable – in a much more challenging environment.

Description

The “old” value chain logic of optimizing for cost, cash and service is at risk of falling short in a supply-constrained world. Difficult market conditions make costs much more volatile and difficult to plan. Reliably reaching target service levels is much more demanding, given constant disruption. On top of that, customers’ perceptions and expectations of value chains have changed. Despite the challenging environment, customers still expect on-time delivery, innovative products and customization options at the lowest possible price. At the same time, the impacts of the global economy on societies and climate have become more salient and global value chains are under higher public scrutiny. As a result, customers call for a stronger commitment by manufacturers to sustainability. Customers expect global value chains to perform better and to be more resilient and sustainable – in a much more challenging environment.

Benefits

Firms that are able to meet these expectations will be able to realize significant benefits. Apart from the inherent advantages of building resilient and sustainable value chains, they will be able to further boost customer loyalty and brand recognition. Leading manufacturers will be able to win market share from their competitors as they are able to deliver on time also in challenging circumstances, and as customers pivot towards more sustainable choices. Driving customer value also helps firms build a closer relationship with their customers, enabling them to anticipate changes in preferences and pivot accordingly.

Challenges

Strategies to drive customer value in a supply-constrained world are challenging because they will require a new approach to forming business

Example

The household appliances manufacturer Arçelik provides an example of a manufacturer that has started to drive customer value in the design process in response to this trend. Arçelik has introduced a modular product architecture to increase commonality and allow more substitution in its product design. Rather than managing a large

cases and decision-making. Firms will encounter many trade-offs they need to navigate. For example, a frequently employed strategy to ensure demand fulfilment is to build resilience by creating redundancies through dual-sourcing and nearshoring parts of the supply base. Moving supply closer to end customers helps to improve service reliability, adds flexibility and enables manufacturers to react to changing customer preferences quicker. However, it also results in higher complexity and lower economies of scale, which can lower margins – at least in the short term. Managing the increased costs and complexity while quantifying the benefits of creating additional customer value will be a key competency in the supply-constrained paradigm. Ideally, firms will be able to identify win-win situations in which they can reduce costs while also meeting their customers’ expectations for sustainability and resilience. Leading manufacturers have started to instil resilience and sustainability principles within their network and product design processes, which enables them to cater to customer expectations earlier. For example, “resilience-by-design”, in which research and development (R&D) and operations teams are brought together to focus on sustainable inputs and common components, is becoming more critical in new product development.

Outlook

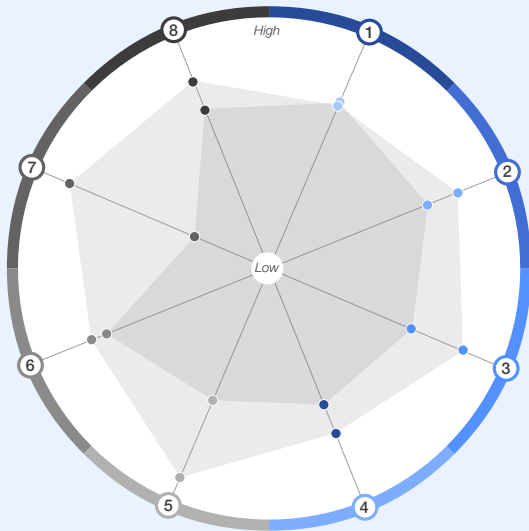
Manufacturing executives and leading academics indicate a common theme that global value chains are moving away from being a cost-optimized demand fulfilment function towards being a strategic differentiator driving customer value. Yet, to meet customer expectations and ensure long-term retention and growth, value chains will encounter trade-off decisions between cost, performance, resilience and sustainability. As a result, manufacturers will have to explore the challenging question of how much margin they are willing to invest in sustainability and resilience to meet their customers’ expectations and ensure long-term growth.

volume of components, it is moving to fewer, more interchangeable modules. Apart from being able to tailor products in line with specific customer requirements to react to changing preferences, this has simplified spare parts management and significantly reduced lead time, procurement complexity and tooling costs.

The resiliency compass³⁰ is a guiding framework to support manufacturers in redesigning their global value chains. Drawing from the eight dimensions of the resiliency compass,

manufacturers can identify transformative strategies and new perspectives on the demand (see Figure 4) and supply side (see Figure 5) to prepare for the rewiring.

FIGURE 4 Selected transformative demand-side strategies around the resiliency compass



Scoring is illustrative to demonstrate the assessment function of the resiliency compass.

1 Portfolio excellence

- Radically reduce complexity of product portfolio and innovate on product specifications
- Focus on component commonality within portfolio to allow for substitution

2 Customer orientation

- Use technology to include customer preferences in product design
- Build demand sensing capabilities to tailor manufacturing schedules to changing preferences

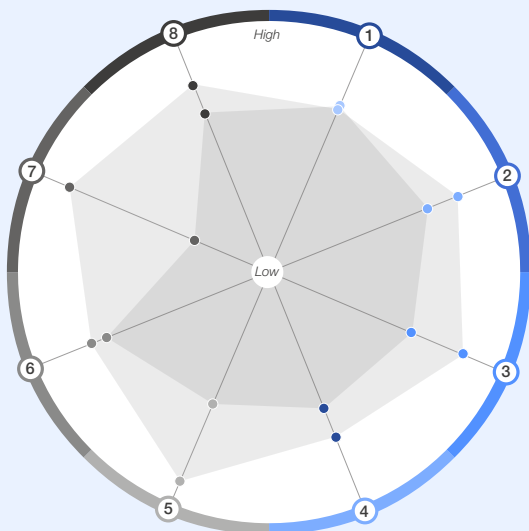
3 Financial viability

- Quantify and include the value of resilience and sustainability for business cases
- Improve financial stress-testing tools to account for cost differentials in rewiring

4 Go-to-market versatility

- Build an omnichannel strategy to optimize fulfillment options
- Move value chains closer to key concentrations of customers

FIGURE 5 Selected transformative supply-side strategies around the resiliency compass



Scoring is illustrative to demonstrate the assessment function of the resiliency compass.

5 Logistics flexibility

- Co-invest with other manufacturers to build jointly used logistics infrastructure
- Build logistics control towers to build end-to-end flexibility

6 Manufacturing adaptability

- Redesign from a centralized network to multiple smaller, geographically dispersed manufacturing sites
- Explore additive manufacturing for mass customization

7 Supplier diversity

- Nearshore and diversify the supply base for strategic products
- Implement agile supplier qualification methods

8 Advanced planning

- Invest in upstream and downstream value chain visibility and make use of the power of data
- Build internal planning and tech expertise through targeted trainings

3

Way forward

The five dominating trends make it clear that collective thinking on global value chains will change.

“ The rewiring will bring a new mindset about global value chains. In light of the supply-constrained paradigm, manufacturers will be expected to move forward and embrace this new philosophy.

As a core paradigm of globalization is redefined, global value chains will alter in response. Five trends will dominate this rewiring, showing that even as global value chains become more localized, the interconnectedness of globalization will not disappear. As leaders reshape their value chains, manufacturers worldwide will begin to feel the impact and ripple effects of the collective rewiring. Indeed, a different perception of the role of operations is already emerging today in boardrooms, the media and collective consciousness.

The rewiring will bring a new mindset about global value chains and how they operate. In light of the unfolding supply-constrained paradigm, manufacturing leaders will be expected to move forward and embrace this new philosophy. In the near future, they will be based around multiple connected but highly localized value chains rather than one single global value chain. These multi-local chains will rely on more local suppliers and customers, served by manufacturing “in the region, for the region”. To manage the resulting complexity and cost implications, data analytics and automation technology will become second nature to manufacturers, enabled by specialist teams recruited globally, trained internally and deployed flexibly. As manufacturers undergo this transition, they will seize the momentum and

ingrain sustainability at the core of their localized operations. All of this will require careful trade-off management between performance, sustainability and resilience to drive value for the customer. Still, this re-design is needed to ensure long-term business continuity and will set up manufacturers to succeed in the new supply-constrained world.

Transformative strategies around the eight dimensions of the resiliency compass are offered as support to navigate this redesign. These strategies can help manufacturers reshape their value chains in response to the five dominating trends and become better equipped to deal with the new reality. The World Economic Forum in collaboration with Kearney will continue to work closely with public sector representatives, leading academics and stakeholders across industries to provide a unique and neutral setting to discuss each of these trends in a pre-competitive space. Collaborative approaches will be explored within the community alongside options for partnerships that support manufacturers to navigate these five dominating trends. As an immediate next step, manufacturers can look to the strategic outlook of the [World Economic Forum's Global Value Chain Barometer](#) to understand the impacts of the rewiring and derive key actions for the redesign of their global value chains.



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