

In collaboration
with Accenture



Shared Intelligence for Resilient Supply Systems

INSIGHT REPORT

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Foreword



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Supply chains today face a wide range of growing and significant challenges – from natural disasters, labour shortages and inflation to geopolitical tensions and global conflicts. During the depths of COVID-19, we witnessed the consequences of supply chains being unable to handle disruptions, leading to widespread impact. It's not just businesses that suffer. The most vulnerable in our global community are disproportionately impacted as shipping capacity is often allocated to the highest bidder, putting lives at stake when food supplies run scarce, medicines can't be delivered and basic commodities that people rely on every day are hard to find.

The World Economic Forum and Accenture recognized the urgent need for global supply chains to become much more resilient in the face of ongoing threats and disruptions. We saw a critical need to move beyond frameworks and partnerships to define and deploy a tangible solution to the resilience challenge. To this end, Accenture and the partners of the Forum's Supply Chain and Transport Industries communities joined forces with Everstream Analytics, EVERYTHING (now Digimarc) and UNICEF to champion and steer the Global Supply Resilience Initiative (GSRI). The GSRI is a pre-competitive consortium of shippers, carriers and technology partners that takes aim at a critical key to promoting resilience: system-wide visibility. The initiative looks to facilitate visibility across the global supply system by encouraging data sharing from public and private sources.

To bring this vision into reality, the founding team deployed an intelligence platform, with the initial use case focused on the supply of life-saving therapeutic foods used to treat acute malnutrition in the West Africa region. This intelligence is driving more timely and dynamic decision-making and planning processes between UNICEF's Regional Office in West Africa and its Central Supply Division in Copenhagen to maintain the effective supply and distribution of critical goods to those who need them, when they need them.

The GSRI has demonstrated the importance of open, non-competitive information exchange for supply system resilience. It has also become clear that organizational hesitations to data sharing are the primary barrier, not technical issues. However, the partner dialogues convened by the GSRI team have shown that organizations are becoming more comfortable in the collective action, especially when underpinned by clear governance and technologies that promote trust among participants.

The world finds itself at a pivotal moment, where committed partners have the potential to develop and contribute to a collaborative data framework that ensures supply resilience can be realized. We now need to harness the truly transformational value of shared intelligence for resiliency. This collaboration between the World Economic Forum, Accenture and our partners has shown what can be achieved, it has demonstrated a path forward, and that path requires leaders to engage and support for the greater good.

Executive summary

The value of data ecosystems in addressing systemic change and human-centric outcomes.

Supply chains, integral to the global economy and daily life, face escalating challenges from natural disasters, labour shortages, inflation and geopolitical tensions. The COVID-19 pandemic exposed their fragility and the sweeping consequences when they fail to adapt. As these networks provide basic necessities and underpin life today, it is crucial to understand the issues and develop effective strategies to ensure their sustainability and resilience.

This insight report, written by the World Economic Forum in collaboration with Accenture, explores the ways in which required resilience can be achieved. The current state of global supply chains calls for enhanced data sharing, building the visibility necessary to mitigate future disruptions more efficiently.

The Global Supply Resiliency Initiative (GSRI) is a coalition of partners seeking to facilitate data sharing to create resilient supply chains. The coalition is developing an open-source platform to enhance supply chain resilience through system performance visibility and disruption prediction, which serves multiple use cases across both the private and public sectors. The GSRI vision was validated through a pilot project with UNICEF, which used real-time system performance data to improve decision-making and support the timely delivery of ready-to-use therapeutic food (RUTF) in West Africa. In parallel, workshops and interviews were conducted to understand the potential challenges and keys to successfully mobilizing a diverse coalition of participants.

The experience of building and delivering the pilot for UNICEF surfaced several key challenges to data sharing. The sheer **quantity of data** available poses a significant challenge for companies in deciding what data to share and how to process it. Legacy systems, lack of interoperability and data

silos further complicate this. **Trust issues** arise due to the fear of data misuse and the potential loss of proprietary knowledge when sharing data, alongside legal and regulatory concerns. Finally, participants of such initiatives need to **perceive clear value**, balancing the benefits to their own businesses with the broader good.

It is vital to develop robust, scalable and collaborative data-sharing platforms to ensure the resilience of global supply chains. There are challenges in creating these platforms, but the team identified the following keys to success:

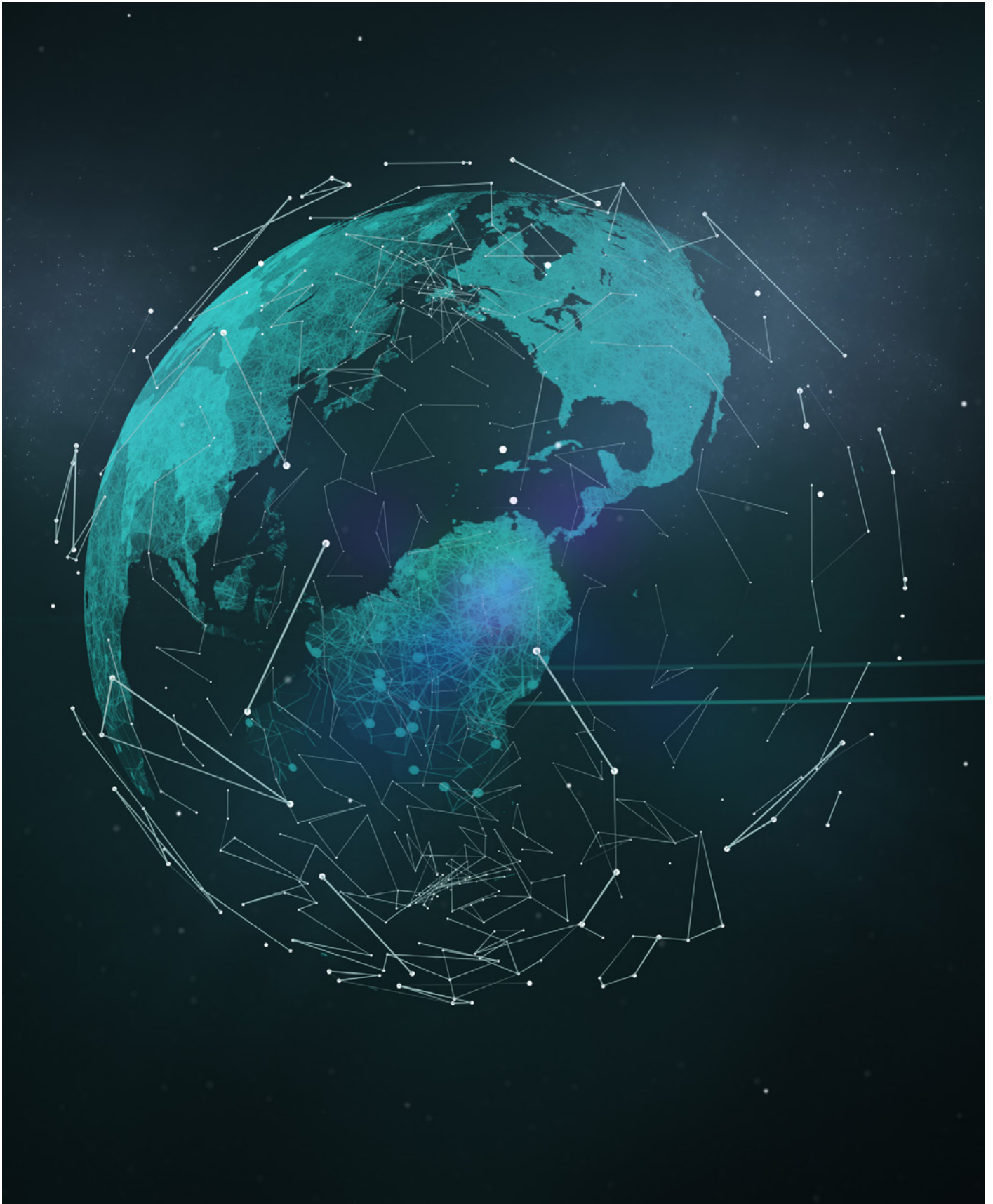
- **Compelling value proposition:** A compelling value proposition is crucial for data-sharing platforms, clearly articulating the benefits and expected value for all participants, which can vary based on their roles and business operations.
- **Optimal data approach and technology blueprint:** Data-sharing platforms require a robust data architecture capable of securely managing and integrating multiparty data at a global scale, with the use of appropriate technology like a decentralized data architecture, cloud and generative AI tools for scalability.
- **Clearly defined and transparent governance model:** A clear and transparent governance model, potentially led by a neutral body, is necessary for effective collaboration, as it outlines stakeholder roles, promotes accountability, and determines data disclosure and confidentiality rules.

Following the success of the UNICEF pilot, the GSRI is set to expand and scale; however, more support is needed. Only with the active participation of a broad and diverse coalition of champions will the concept be able to drive impact at scale.

1

Disrupted supply chains

Polycrisis is a major threat to the world and its supply chains.



The global supply system has been under strain for years, increasingly demonstrating its fragility and inability to respond to and power through disruptions. COVID-19 vividly illustrated this, but in reality, the recent pandemic was only an outlier in terms of intensity and breadth. Other disruptions before COVID-19 – including natural disasters such

as the Iceland volcano eruption, Hurricane Katrina and the Kobe earthquake – have upended supply chains, with the after-effects rippling across the world. While these disruptions trigger significant economic impacts in developed economies, they can have devastating impacts on humanitarian supply chains.



Getting supplies to children and communities has never been as challenging ... Multiple and concurrent emergencies, coupled with the current macro-economic context, are exacerbating problems in a supply chain already weakened by the pandemic. It's also highlighting the interdependencies that exist in the end-to-end supply chain, such as access to raw materials, shipping delays, rising inflation and soaring energy prices.

Etleva Kadilli, Director, Supply Division, UNICEF¹

The situation has only gotten worse as unforeseen events have grown more prevalent and intense. Today, the world grapples with concurrent challenges on multiple fronts: the combined repercussions of the Ukraine conflict, surging inflation, banking crises, sovereign defaults and the enduring aftermath of the pandemic. These interconnected crises perpetuate each other, resulting in a domino effect with widespread implications – and leading to a state of polycrisis in which the world now finds itself.² For instance, the war led to skyrocketing energy and food prices, thereby intensifying global inflationary pressures, which subsequently fuelled a pervasive cost-of-living crisis and incited significant social unrest across numerous countries.

The ongoing polycrisis – combined with mounting pressures from growing customer demand for sustainable products, pressure to become more energy efficient and a re-evaluation of geographic operational footprints – has rendered supply chains increasingly vulnerable, with significant consequences.

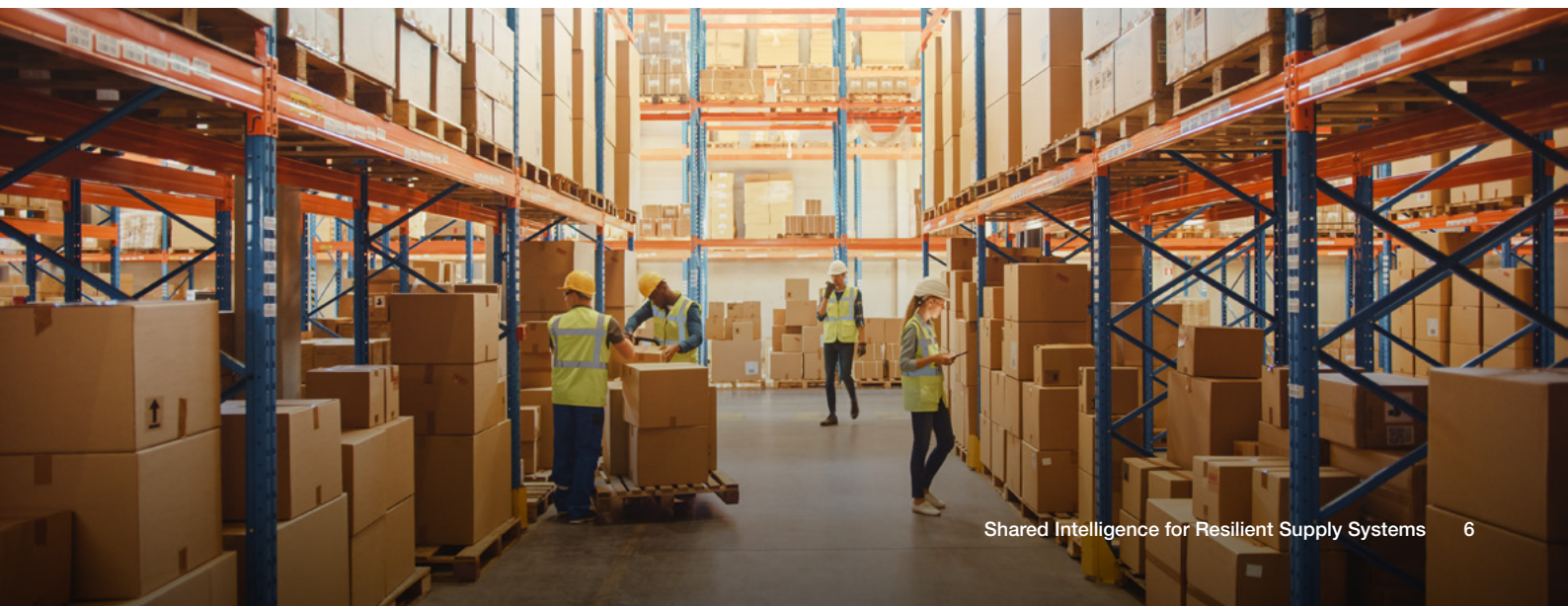
For example, according to one study,³ supply chain disruptions during the first year of the pandemic were estimated to have caused up to \$4 trillion in lost revenues. Furthermore, Accenture research⁴ found that supply chain challenges arising from a combination of COVID-19 and Russia's invasion

of Ukraine could result in a potential €920 billion cumulative loss to gross domestic product (GDP) across the Eurozone by 2023.⁵

In the context of supply chains serving humanitarian purposes, any failure or disruption can have devastating consequences. These supply chains play a critical role in providing essential goods and services to vulnerable communities during emergencies such as natural disasters, conflicts and pandemics. In the event of a failure or disruption, these vital supplies may not reach their intended recipients, potentially leading to loss of life and exacerbating the impact of the emergency.

Although quantifying the cost of such failures is challenging, figures from the World Food Programme⁶ illustrate how recent conflicts, economic shocks and overall supply chain failures have culminated in a food crisis of unparalleled magnitude. The scale of the current global hunger and malnutrition crisis, for example, is enormous, with an expected 345.2 million people projected to be food insecure – more than double the number in 2020. This constitutes a staggering rise of 200 million people compared to pre-COVID-19 pandemic levels. Additionally, more than 900,000 people worldwide are fighting to survive in famine-like conditions. This is 10 times more than five years ago, an alarmingly rapid increase.

“ More than 900,000 people worldwide are fighting to survive in famine-like conditions. This is 10 times more than five years ago, an alarmingly rapid increase.



1.1 | Unprecedented polycrisis demand supply chain resilience through visibility and shared insights

“ There are different types of visibility that can be broadly classified as “structural” and “dynamic” visibility.

With demands intensifying, supply chains need significant and enduring resiliency at scale, which requires greater visibility across operations and ecosystems. Organizations must develop new capabilities that 1) help them assess where they're vulnerable, and 2) enable them to see exactly what's occurring across their supply chain – from their customers, to their own facilities, to their suppliers and their suppliers' suppliers. With these insights, organizations can subsequently make quick, fact-based decisions to head off negative impacts from disruptions.

This applies not only to individual supply chains but also to entire supply systems that serve specific commodities. For instance, a collective network of various supply chains, each contributing to humanitarian efforts, works together to deliver crucial food and medical supplies. This network forms an overarching supply system for these commodities. Creating visibility and shared intelligence across supply system nodes can help build system-level resiliency across interconnected supply networks, thereby delivering transformational social and economic impact.

What does “visibility” mean? There are different types of visibility that can be broadly classified as “structural” and “dynamic” visibility.⁷

One could think of **structural visibility** as an X-ray that gives a company a structural snapshot

of its operations at a point in time or over a certain period and helps uncover hidden issues. Understanding exposures based on locations of suppliers, manufacturing, distribution and customer facilities, along with the transport modes and routes over which the supply network operates, forms the foundation of structural visibility.

Dynamic visibility, on the other hand, is more like a real-time video that enables a company to monitor and respond to events in real time. Indication of real-time positions of inventory and other raw and finished goods, along with the performance of supply chain assets and visibility into real-time risk and alerts, drive dynamic visibility.

From a broader supply system perspective, structural and dynamic visibility provide transparency into ongoing supply system stability and performance. Such visibility gives organizations earlier awareness of events, such as weather, labour action or regional conflict that could disrupt supply and drive faster, more accurate decision-making and planning processes. When such insights are shared, at scale, across organizations, the overall supply system can avoid excessive costs, inefficiencies and complexity that can dampen operational and financial performance while creating the resiliency the system and its participating partners need to effectively respond to disruptions.

② Building supply system resilience

Developing a scalable visibility platform for shared intelligence: the case of GSRI and the UNICEF pilot.



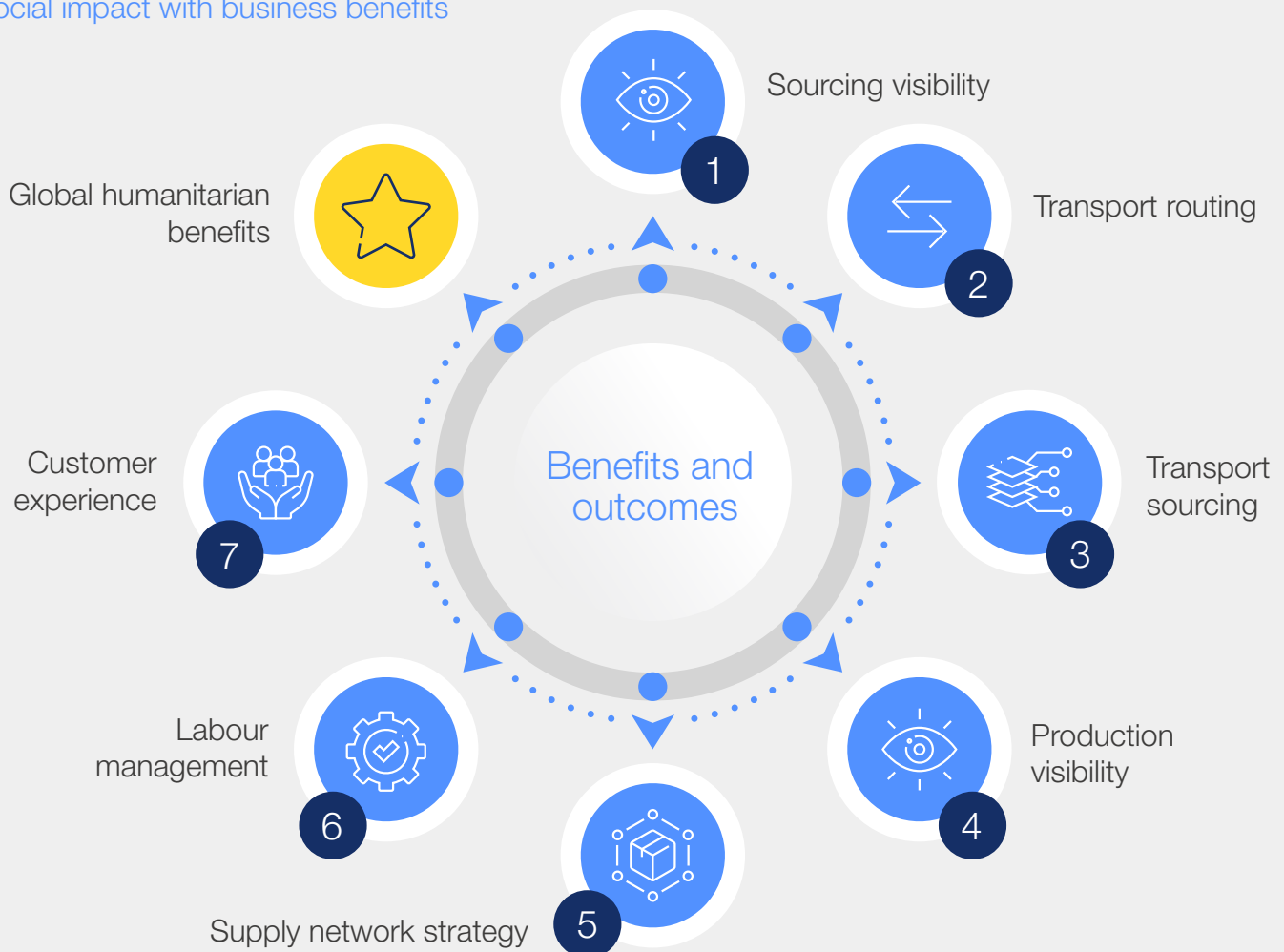
Recognizing the increasingly clear need for collaboration and data sharing to build supply chain resilience, the Forum and its partners⁸ launched the [Global Supply Resiliency Initiative](#) (GSRI), which complements the Forum's recently launched [Resilience Consortium](#). The GSRI was designed to create, at scale, an open-source, pre-competitive platform using elements of near-real-time, anonymized, aggregated public and private data to provide visibility of system performance and indicate current and anticipated disruptions.

The initiative set forth a vision that sought to create a broad, cross-industry utility that supports a variety of use cases across both private and public sector actors. The vision would support the urgent humanitarian challenges that initially compelled the group to act, in addition to creating operational capabilities that support a variety of elements of the supply chain, including goods visibility, routing and network design (see Figure 1).

FIGURE 1 The GSRI's vision and potential use cases

WHY: GSRI value proposition

Social impact with business benefits



- 1 Identification of potential threats enables **procurement teams to improve supply continuity** and **avoid** the high costs associated with last-minute procurement or holding excess inventory to protect against disruption.
 - 2 Early visibility of risks enables **earlier positioning of assets out of harm's way, diversion recommendations for load balancing** and congestion management.
 - 3 Predicting **potential lost capacity and diversions** enables sourcing teams to identify alternate transport to meet impacted demand or potentially enhance **logistics-sharing solutions**.
 - 4 Early detection of **potential supply chain disruptions** enable production teams to **plan factory capacity use** to avoid cost variability arising from rapid capacity shifts or excessive inventories.
 - 5 Visibility on supply chain disruptions and related trends would allow a **better view of network footprints and inform development strategies**, including international expansion, production location and distribution strategy.
 - 6 Ability to **anticipate disruptions of seasonal workflows and disruptions** enables better forecasts for both production and recruitment.
 - 7 Ability to **warn customers of potential delays earlier**, increasing customer satisfaction and identifying alternate sources of supply more quickly.
- Data sharing and supply system transparency** across the value chain facilitates **global citizenship** so that the **right products are delivered to the right place at the right time**, solving for both **humanitarian and for-profit outcomes**.

2.1 Think big, start small and scale fast

The team recognized that it must start smaller, with a pilot phase that sought first to:

- Prove the value that visibility, transparency and shared intelligence can generate for complex, interconnected global supply systems
- Confirm the technical feasibility and verify the availability of required data
- Establish a public-private sector coalition to develop and deploy a digital supply system visibility platform.

The question was, of the myriad use cases where such a visibility platform could be important, what could be a value-generating test case? The founding partners agreed that prioritizing a “humanitarian” use case would be impactful – as it

could be sufficiently narrowly scoped and framed to address the urgent need for consistent access to essential goods. In this case, this meant focusing on the distribution of food, sanitary and healthcare products to the world’s most at-risk populations.

A near-real-time view of system-wide performance, highlighting potential disruptions or bottlenecks across the distribution system, could enable humanitarian organizations to take swift, even pre-emptive, action to maximize the delivery of essential goods that preserve and protect lives. [UNICEF](#) signed on to test and pilot the dashboard – specifically to help UNICEF’s supply chain practitioners make better decisions while planning and delivering ready-to-use therapeutic food (RUTF) to treat severe acute malnutrition in West Africa (see Figure 2).

FIGURE 2 UNICEF’s ready-to-use therapeutic foods supply chain

Pilot scope summary – UNICEF RUTF supply chain visibility





The pilot phase kick-off codified the vision and goals of the GSRI (see Figure 3). The objective was to establish the GSRI's broad impact statement while also codifying how the pilot's priorities, focused on the humanitarian case, could drive and facilitate broader, longer-term outputs and eventually drive system-wide impact.

The pilot was successfully launched in December 2022. This pilot dashboard, configured on the Everstream Analytics platform, provided visibility within the UNICEF RUTF supply chain flows and

potential disruptions within these to enable more-informed decisions in supply chain operations. UNICEF RUTF decision-makers now have visibility of ongoing supply system congestion, as well as a stream of relevant risk-based alerts. Increased visibility also provides earlier awareness of events that could disrupt supply and is already driving more dynamic decision-making and planning processes within UNICEF's Regional Office in West Africa and its Central Supply Division in Copenhagen. This ultimately helps enable the swift delivery of RUTF to the vulnerable populations that need it most.

FIGURE 3 GSRI programme impact and priorities

The team has built a consensus around a common impact statement, along with key inputs



Impact statement

Resilient supply chains that enhance equitable access to essential goods for vulnerable communities



Long-term outputs

Global supply system dashboard (GSSD) enabling data ingestion and visibility (open access to near real-time data indicating disruption)

Data models and intelligent response: information needed to identify impact of the disruption

Predictive analytics: insights to support strategy development and proactive response

Dashboard adoption and deployment playbook

An engaged and aligned community willing to collaborate for common good impact



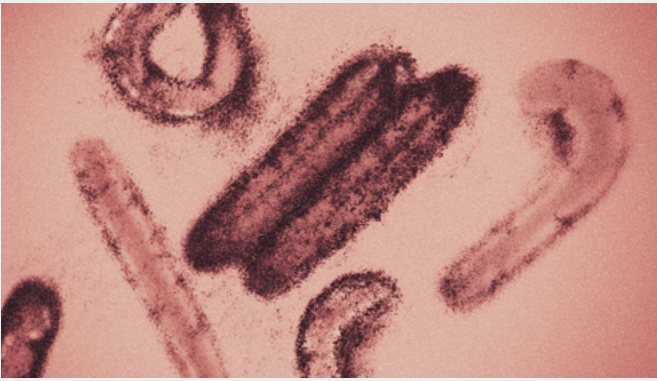
Current priorities

Development of roadmap, timeline, features and data sources for a more complete view of the global supply system

An established public/private partnership proof-of-concept for humanitarian use case in West Africa

Establishment of neutral, sustainably funded entity that governs the GSSD as well as the relationship between partners and users

Development of trust-based, pre-competitive data sharing framework and consortium charter



Equatorial Guinea

When the border in Equatorial Guinea was closed due to the Marburg Virus (similar to Ebola), GSRI users (in both local and regional offices) received an alert to the closure, triggering a mitigation plan, re-planning and advocacy (e.g. for a humanitarian corridor).



Togo

In the face of reports on the presence of terrorists and sporadic attacks in Northern Togo, in-region teams were generally aware of the risk points and were monitoring and assessing steps forward. The alert from the GSRI visibility platform both clarified the situation and triggered action to adjust routing through the region.



Nigeria

In Nigeria, local teams were aware of the impacts of recent terrorist attacks and the risks based on their local knowledge but did not have visibility of the fact that other regions were impacted as well. UNICEF operated three warehouses and one “critical corridor” in the impacted regions, and the GSRI platform enabled decision-makers to increase monitoring and strengthen mitigation plans.

“ Through a series of more than 20 bilateral discussions and two group dialogue series sessions, a robust perspective on the obstacles and keys to the successful scaling of the initiative was gained.

The pilot platform certainly met the goals the founding partners set for the GSRI. The pilot proved the value of insights from aggregated, shared intelligence by improving supply chain operations and decision-making in the UNICEF supply chain. It also demonstrated how transferable learnings can boost supply chain resilience for additional commodity supply chains.

Yet, while the pilot showed the impact visibility can have in humanitarian use cases, a broader and more diverse coalition of participants would be needed to achieve the scale to achieve the broader vision. Therefore, the Forum and Accenture led a series of dialogue workshops and bilateral

interviews with prospective partners across a wide variety of sectors, including logistics players, technology platforms and non-governmental organizations (NGOs). The goal of this effort was to both gauge support for the GSRI as well as evaluate and gather input on partners’ existing data-sharing initiatives and the value and opportunities participating generates for their organization. There was also an exploration to better understand the internal and external risks and barriers that would hinder data sharing. Through a series of more than 20 bilateral discussions and two group dialogue series sessions, a robust perspective on the obstacles and keys to the successful scaling of the initiative was gained.

3

Unlocking supply chain visibility: lessons from the UNICEF pilot and key challenges ahead

Three major obstacles make gaining visibility across the supply chain difficult.



The UNICEF pilot demonstrated the compelling value that shared intelligence (aggregated elements of data from multiple participants) and actionable insights can generate, improving visibility and enabling dynamic response. The pilot also revealed

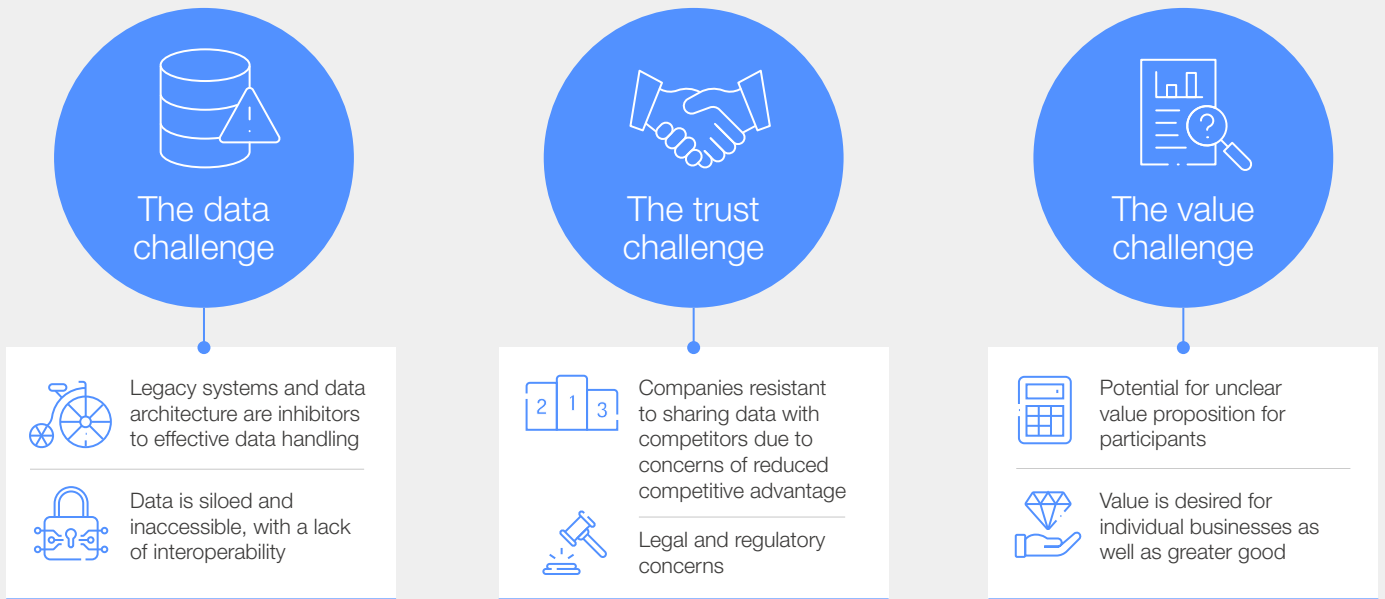
some of the challenges other organizations will likely encounter in pursuing a similar approach. Figure 5 details three of the most significant potential obstacles that organizations seeking greater visibility through data sharing must overcome.



Companies often spend hundreds of millions, if not billions, on building ERP systems to get full transparency on everything in their company. However, the moment the cargo goes out of the company, it's like a black hole.

Erwin Verstraelen, Chief Digital and Innovation Officer, Port of Antwerp-Bruges

FIGURE 5 The most significant challenges to data sharing



3.1 The data challenge

“ Most companies are not prepared ... many have antiquated legacy systems and data architectures and have been slow to adopt data standardization and interoperability.

The data to generate deep visibility exists across supply chains – in fact, there's so much data that organizations often struggle to generate concrete and actionable insights from an ocean of data. According to Accenture research,⁹⁴⁷ zettabytes of data were created in 2020 alone, and by 2035, it is predicted that 2,142 zettabytes of data will be created each year. This can present a significant challenge for companies in determining what data they share and how to make sense of it.

Companies need to be prepared to handle this quantity of data and manage it responsibly. However, the problem is that most companies are not prepared. This is primarily because many have antiquated legacy systems and data architectures and have been slow to adopt data standardization and interoperability, which make managing, accessing and sharing the right elements of data extremely difficult. Multiple participants noted the

broad use of tools like Excel in the maritime space, demonstrating the lack of digital maturity in the sector that transports over 90% of goods globally. In some cases, some players in an ecosystem have advanced technologically far more than others, meaning the capability to exchange data is not evenly developed across players.

In today's digital age, a major complicating factor is that valuable data often remains siloed within proprietary systems, inaccessible to departments and organizations that could use such data to generate insights for strategic advantage or social good. A lack of interoperability not only limits the potential impact of this data but also creates barriers to innovation and collaboration.

These challenges will only be compounded as data is shared and aggregated across a variety of partners and scaled to the global supply network.



3.2 The trust challenge

Despite the increasing importance of data sharing for achieving greater transparency in supply chains, globally scaling platforms beyond proofs of concept remains exceptionally challenging. Such efforts

typically require effective and trusted collaboration among fierce competitors, which falls apart all too easily when parties do not have a shared “common purpose” beyond singular commercial interest.



You can still compete in the marketplace, but building lasting resilience is a team sport. Data-sharing enables collective action for the common good while keeping commerce flowing.

Julie Gerdeman, Chief Executive Officer, Everstream Analytics

On the one hand, organizations understand that sharing data can increase their competitiveness and lead to new opportunities. On the other, they fear that sharing data could lead to potential data misuse, a loss of control of proprietary knowledge, and ultimately, compromised competitive advantage in the long run. Indeed, Gartner predicts that through 2023, organizations that can instill digital trust will be able to participate in 50% more ecosystems, expanding revenue-generation opportunities.¹⁰

supply chain data exchange. Despite making significant headway in onboarding a sizeable segment of global freight carriers, the underlying commercial construct eventually proved to be incompatible with the value each participant sought. To build trust with partners and stakeholders, it is essential for organizations to create the right coalition at the start, with clear goals and intentions for shared value.

One such example is the recent decommissioning of TradeLens,¹¹ which was one of the highest-profile deployments of enterprise blockchain to facilitate

Then there are the very real legal and regulatory uncertainties and fears of violating or being perceived as having violated anti-trust or collusion regulations.



Where competitors are involved, there is a risk that data partnerships and the use of trusted third parties could lead to implicit collusion between businesses, i.e. agreements that would limit open competition by e.g. fixing prices. This would be the case when data on competition-relevant information such as on production capacity would be shared in a rather closed environment.

Organisation for Economic Co-operation and Development (OECD)¹²

This is why employing the concept of “safe harbours” before moving forward with data-sharing is critical. It helps to increase legal certainty by ensuring all parties are complying with regulators

and providing transparency into what is being shared going forward. Active engagement at this stage by participants’ legal counsel is also vital when initiatives involve data-sharing among potential competitors.

3.3 The value challenge

Most often, the disagreements or failure of a shared intelligence platform is attributed to a lack of clearly defined value for each participant. For the players

to participate, they need to know at the outset how they are benefiting.



Give a little, get a lot. It needs to simplify participants' lives, and it also needs to give them something more than they feel that they are giving.

Peter Swartz, Co-Founder and Chief Science Officer, Altana AI

Participants not only seek to create value for the broader good, such as improving supply chain visibility and transparency but also want to create value for their own businesses. This value could be in the form of access to new markets, insights into consumer behaviour, increased operational efficiency or media and marketing exposure.

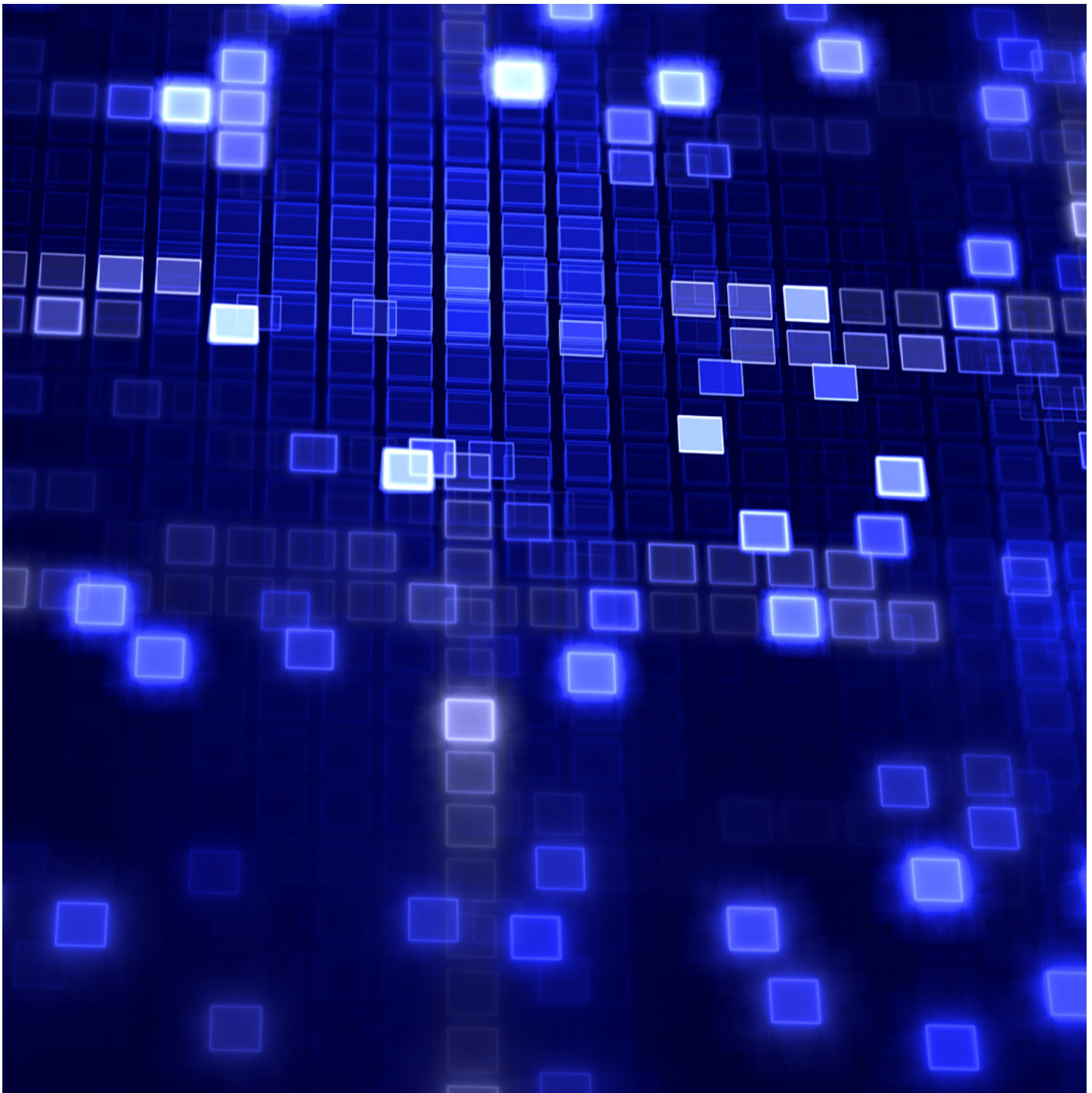
For example, one executive participating in the GSRI was clear about achieving a balance between purpose and profit when it comes to supporting

data sharing across humanitarian supply chains. They stressed that while their company is a strong advocate of humanitarian efforts, they still have a board they are accountable to for financial performance – especially given there are real costs to the business in focusing on such efforts. Their point was that if the company shares data on their supply chain, they need to be very clear on how value and benefits are distributed to the company and other players in the ecosystem.



4 Enabling resilience: the imperative of scalable data-sharing platforms for global supply chains

Three keys to developing and scaling visibility across supply chains.



In today's world, marked by numerous challenges, creating a scalable, collaborative data-sharing platform is crucial for resilience, enabling dynamic and effective operation of global supply chains.

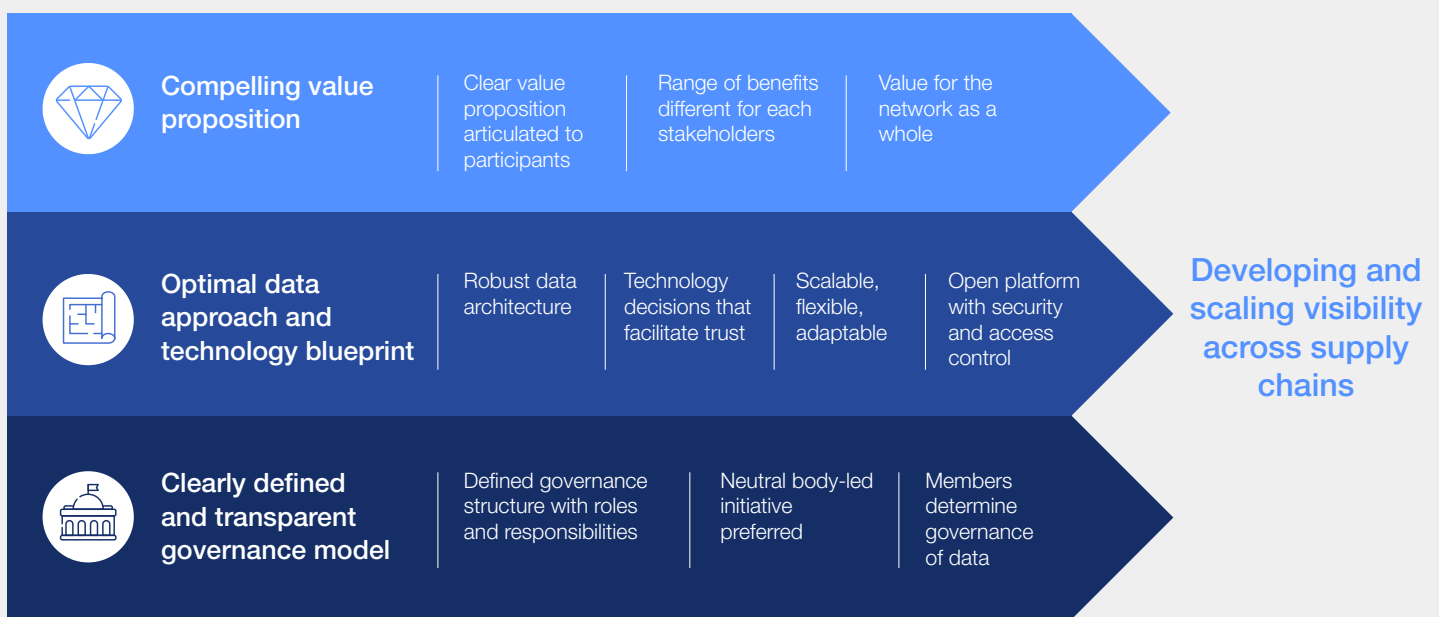
However, while the benefits of such a platform are myriad, the challenges to developing and scaling it are formidable. These platforms must be developed,

administered and overseen appropriately and in a way that embodies accountability, verifiability, relevance and interoperability to ensure it benefits all stakeholders equally. To that end, the GSRI research and experience have identified three critical factors in the success of a data-sharing platform that provides the visibility organizations need to create greater supply chain resiliency (see Figure 6).

“ You have to improve transparency in the supply chain because that is the foundation you can build on towards improved operational efficiency, which drives an opportunity for innovation, in that order. Transparency first, operational efficiency next, innovation last – not the other way around.

Erwin Verstraelen, Chief Digital and Innovation Officer, Port of Antwerp-Bruges

FIGURE 6 Critical factors in the success of a data-sharing platform



4.1 Compelling value proposition

As noted, the value delivered by data sharing for all participants is a critical concern. If the value isn't there, the proposal is dead on arrival. Therefore,

any data-sharing effort must clearly articulate, at the outset, how participants will benefit and the type and amount of value they can expect to get.

“ The purpose of the company is to conduct trade. The only thing that we would do with regard to data-sharing would be seen through the lens of the risks that might be presented to the company as well as the benefits that the company may gain from that data-sharing.

Frank Clary, Vice-President, Sustainability, Agility

Thus, the GSRI sought from the beginning to understand the range of potential benefits, not just to humanitarian organizations but also other participants in running their supply chains more efficiently. Benefits range from an improved customer

experience, a more robust supply network strategy and more effective labour management to sourcing and production visibility, more efficient transport routing and more forward-looking transport sourcing. Sometimes the benefit is more altruistic.



At times we participate in data-sharing initiatives without expecting much in return, as we believe in larger purpose and enhancing the industry for the general good.

Poh Yuen Kam, AVP (Platform) Group Commercial, PSA

It is clear there is an opportunity for a win-win arrangement that benefits the vulnerable populations the GSRI pilot sought to support and provides the visibility, responsiveness and efficiency that leads to increased value for all the participants in the supply chain. A well-designed value statement does not have to be predicated on a

give-and-take view of value but, rather, is accretive in value to the entire network.

That said, the value that could be accrued would likely not be the same across participants and would be dependent on roles in the ecosystem and their business, as illustrated in Figure 7.

FIGURE 7 The value of data-sharing to participants



All participants

Can react more quickly or often even anticipate disruptions in the supply system of both essential and non-essential goods and identify and resolve bottlenecks to achieve network continuity and balance. International bodies and trade associations can go further by seeking to coordinate and balance the activities of dozens of constituent partners across the sector.



NGOs, operators and humanitarian organizations

Can take advantage of network visibility to target funding and investment to relieve specific bottlenecks, with a level of precision and focus that is currently impossible. For example, one of the early efforts in the GSRI involved mapping a small piece of the cold-chain supply system and targeted specific facilities, even specific freezers, that presented high systemic risk to the network. The benefits of scaling such visibility across an entire region's local supply chain infrastructure could be enormous.



Government and public bodies

Use the platform's supply system view to inform decisions on trade policies, operations of transport nodes and key industries.



Logistics players

Track volatility in trade flows and lead times across routes to gain earlier visibility for network optimization, investments and redeploy resources.



Customers

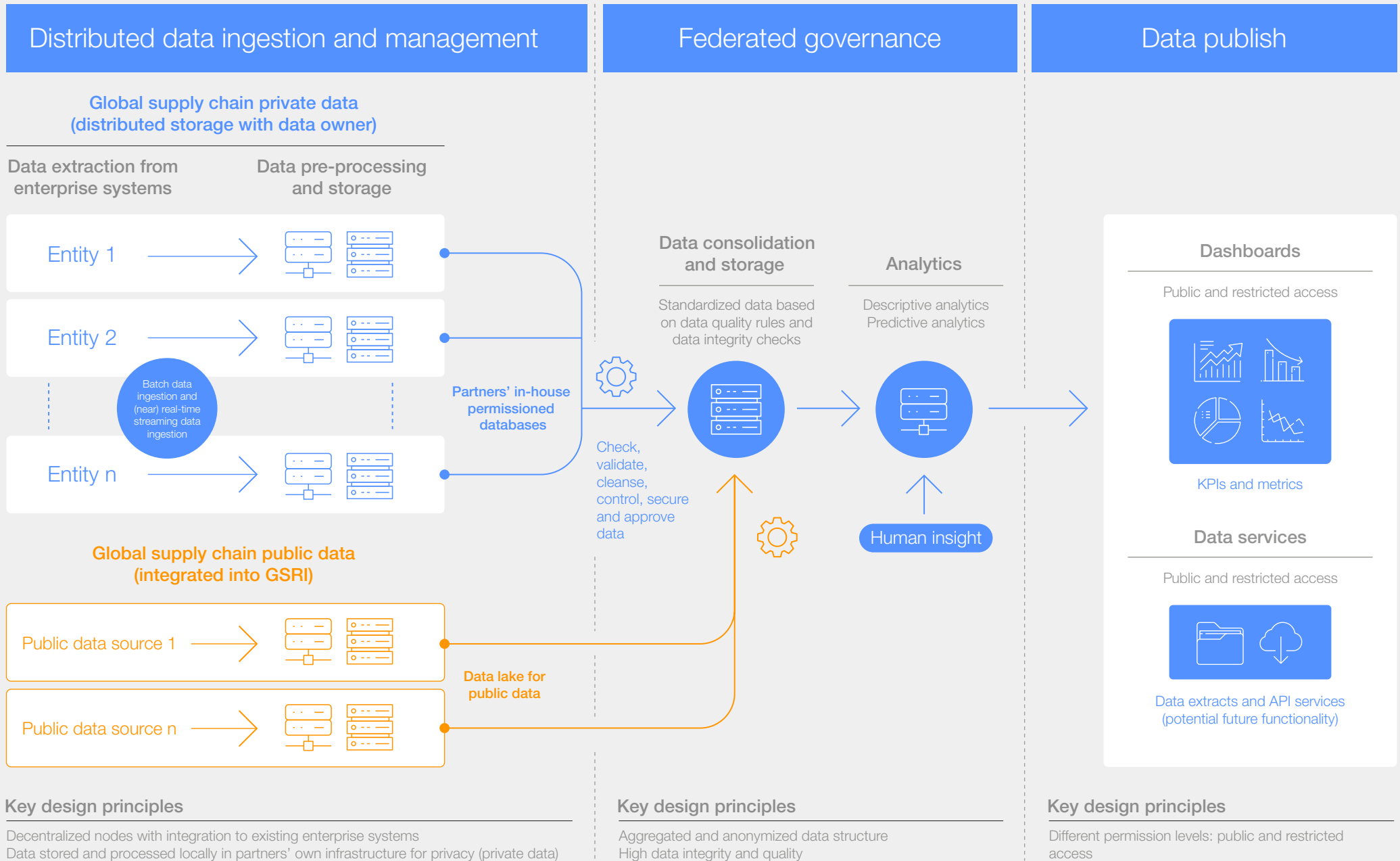
Better understand volatility in trade flows to reconfigure sourcing and distribution points or adjust manufacturing and inventory levels as necessary to maintain service levels.

4.2 Optimal data approach and technology blueprint

It is known that many companies continue to struggle to effectively use the vast amounts of data at their disposal because it is often siloed and inaccessible, in different formats and stages of completeness and inaccurate. In fact, according to Accenture research, 95% of global executives agree that new data architectures and strategies are required to manage the dramatic changes to their organizations' data landscapes. These data challenges are only exacerbated by the limitations of many companies' legacy systems.

This is why a robust data architecture is required to design for and anticipate the complexities of managing multiparty data at the scale of global supply chains. The architecture created for the scaled GSRI includes robust layers for data management, federated governance and publishing. Figure 8 provides an example of such a framework.

FIGURE 8 | An example of distributed and federated data architecture



“ Organizations must be cognizant of the fact that the creation of policies and regulations regarding generative AI will significantly lag the pace of the technology’s development.

While trust is ultimately a human emotion, technology decisions can either ameliorate or exacerbate concerns. In the design for the GSRI, the team sought to use a decentralized, federated data architecture to facilitate trust and transparency among participating organizations. The above blueprint is designed to address the trust and technology concerns uncovered during the pilot phase and in interviews with extended participants, three of which are discussed here:

- **Open access with embedded control:** The proposed solution should include a robust data management layer that facilitates data ingestion and ensures data integrity, enabling data capture from multiple sources. The final solution may include two versions: a public one and a secondary one with advanced features that will have restricted access. Private data sources could be kept within the data contributor’s premises, while publicly available non-proprietary and open access data provided by data contributors can be housed under a common data lake, structured in the required format. This approach balances data privacy with the need for comprehensive and reliable data, providing organizations with a trusted data ecosystem.
- **Decentralized:** The proposed decentralized architecture should be designed to enable a data extraction and sourcing layer to be deployed on a partner’s premises with permissioned access to the partner’s in-house database. This would allow data to be stored and processed locally on the partner’s infrastructure, eliminating the need for central data storage and processing. The architecture should be able to communicate with the data contributors through application programming interfaces (APIs) securely and reliably to access disparate legacy technology platforms and data formats. This should include the functionality to structure data in the required format to facilitate data aggregation and harmonization for integration with other data sources.

- **Data governance:** The Federated Governance layer is critical to ensuring all the independent and autonomous data being shared by data contributors could work together. Through the virtual database, the heterogeneous independent data sources stored in different partner premises as well as public data, should be virtually pulled in and integrated to pass it to the downstream systems in the form of an aggregated and anonymized structure based on the data quality rules and integrity checks.

To achieve scalability and reach, it is also essential to use appropriate technology that can effectively handle the complexity and scale of the data being shared. This requires a careful assessment of the technology landscape and the selection of the tools and platforms that can best meet the needs of all stakeholders. The platform must be designed to be flexible and adaptable, capable of evolving over time to meet changing needs and priorities – this is why the cloud is a key element of the overall technical solutions supporting data-sharing. Emerging generative AI tools, as well, could play an important role, especially in enhancing the pace of intelligence generation across the network. Furthermore, organizations must be cognizant of the fact that the creation of policies and regulations regarding generative AI will significantly lag the pace of the technology’s development, making it even more critical for organizations planning to use the technology to have their own robust practices and principles in place.

Additionally, because decentralized and anonymized data platforms are a more effective, secure and privacy-aware method for data-sharing and governance, the platform shouldn’t be managed by a singular entity. Rather, it should function as an open platform, granting all partners the flexibility to engage to the extent they wish, but with robust security and access control features, including identity-based access, authentication, encryption and system auditing.











4.3 Clearly defined and transparent governance model

Success in creating supply system visibility requires effective collaboration and trusted data sharing among diverse and often fiercely competitive participants. Ambiguity regarding roles and responsibilities, combined with a lack of trust, can lead to suboptimal decision-making and hinder the ability to respond appropriately. This is why a well-defined governance structure is crucial. It clarifies the roles and responsibilities of stakeholders, promotes accountability and cultivates transparency. It also ensures that all participants have the same status and that there can be no power plays. By establishing a robust governance

model, stakeholders can enhance the efficiency and effectiveness of supply chains, resulting in improved outcomes for all players involved.

Governance was a key focus of the GSRI as the project team set out to identify how best to organize and mobilize. Core to this effort was a market scan the team conducted to understand and evaluate different forms of data-sharing governance among supply chain partners that currently exist. These forms fell into four broad archetypes based on what type of player in the value chain leads or organizes the initiatives (see Table 1).

TABLE 1 Various archetypes of collaboration/data-sharing initiatives

Archetype	Examples	Description	Use cases
 Logistics players-led	Carrier-led 	Carrier-oriented platforms and standards bodies generally focused on ocean freight .	<ul style="list-style-type: none"> – Near real-time shipment visibility – Paperless documentation and trade
	Port/airport operator-led 	Port and airport community systems deployed independently at several terminals globally	<ul style="list-style-type: none"> – Port-specific cargo flow visibility – Traffic planning and control – Paperless documentation and trade
 Cargo owner-led	Company-led 	Focused and sometimes blockchain-powered solutions by companies for upstream and downstream material traceability .	<ul style="list-style-type: none"> – Product traceability across the value chain – Automated financing and payables management – Supply chain coordination
	E-commerce player-led 	Platforms led by e-commerce players for business-to-customer (B2C) supply chain visibility for their own customers.	<ul style="list-style-type: none"> – Near real-time shipment visibility – Smart routing and demand forecast
 Tech provider-led		Platforms by tech companies geared towards shippers for visibility across all transport modes .	<ul style="list-style-type: none"> – Shipment visibility across all modes – Intelligent risk monitoring powered by predictive and/or prescriptive analytics
 Neutral body-led		Standards and platforms led by international bodies to facilitate industry-wide standardization for data exchange.	<ul style="list-style-type: none"> – Cross industry data-flows – Supply chain collaboration

“ By building a shared visibility platform among key supply partners, Microsoft has been able to improve traceability, visibility and trust among supply chain participants.

There are several examples of data-sharing networks built by logistics players, such as carriers, ports and third-party logistics providers (3PLs). In most cases, the stated purpose of these arrangements is to provide focused visibility to a specific set of lanes, ports or a carrier’s network. A good example is NxtPort, which serves as the digital port infrastructure for the Port of Antwerp-Bruges. By creating digital platforms that facilitate lower-friction data exchange among parties, NxtPort helps make the port faster, safer and more efficient.

In other cases, specific shippers (the companies whose goods are being carried on the network, such as a consumer goods manufacturer) have experimented with solutions that focus on providing visibility on material traceability, for instance. However, these efforts rarely focus on (or have the mandate to look at) broader solutions. In one

example, Microsoft has been working with Accenture to improve supply chain resiliency, traceability and predictability with blockchain. By building a shared visibility platform among key supply partners, Microsoft has been able to improve traceability, visibility and trust among supply chain participants.

In governance situations where technology providers take the lead, leaders are taking steps toward system-wide visibility – for example, in the visibility networks of [Project 44](#). Such platforms seek to aggregate data signals from carriers, logistics providers and other sources and bundle these to provide visibility to their customers. These networks generally focus on (and sometimes are limited by data-sharing agreements) providing load-specific visibility to a customer’s individual loads rather than aggregating data to share system-level insights about the flow of goods through the system.



A fourth common governance archetype is one in which a neutral body is responsible for providing visibility. By eliminating the competitive motivations among participants and using proper governance to maintain a pre-competitive orientation, these bodies are best positioned to drive industry-wide standardization and encourage open data exchange among participants.

Given the scope and scale of the GSRI vision to enact truly system-wide change, the team agreed the neutral body-led archetype was the most viable path to incubate and scale the initiative. This is also the governance model favoured by most of the extended GSRI participants – those currently engaged or that have been engaged in some sort of data sharing with other organizations.

These players also wanted to participate in a platform where the governance of data is predetermined by all contributing members. While having complete visibility throughout the entire supply system is essential, determining what information should be disclosed and what should be kept confidential is critical. Therefore, it was essential to implement a governance model that enables users to regulate and oversee their data, as well as address potential conflicts of interest and power disparities.

[The Centre for Humanitarian Data](#) offers an excellent example of a governance model that addresses many of the concerns discussed in this report. Its primary objective is to enhance the use and effectiveness of data in humanitarian work, and it operates based on the principles (see Figure 10) that consider governance as well as other issues discussed earlier.

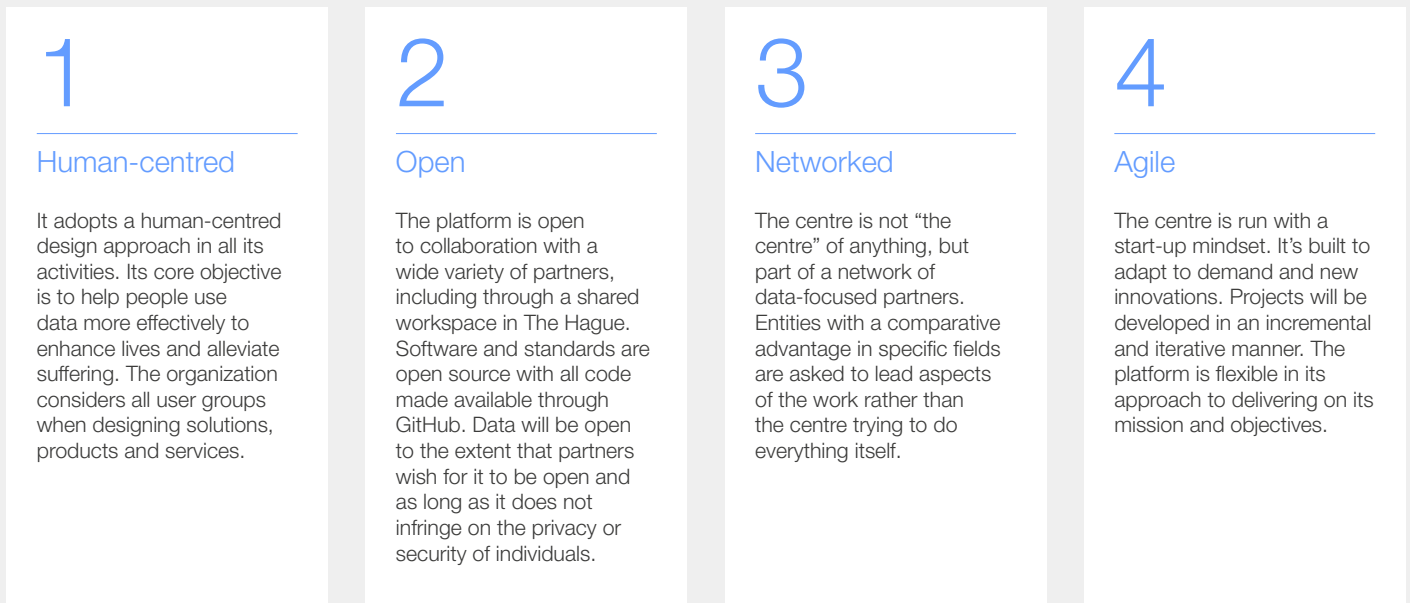


If you want companies like ourselves to contribute openly to this type of process, it has to be managed by an objective, neutral party, preferably someone that is now organized through either the UN or another NGO.

Ragnar Dalen, Executive Vice President Corporate Development, Scan Global Logistics A/S

FIGURE 9 Principles for effective governance

The Centre for Humanitarian Data has built a platform based on four key principles:



Conclusion

In today's increasingly interconnected yet unpredictable world, the criticality and frailty of global supply networks become more apparent each day. From the global disruptions stemming from the COVID-19 pandemic that continues to unfold to more recent events, such as the devastating food system impacts resulting from events in Ukraine, it is increasingly clear that the world needs a better answer to supply system resilience and agility.

However, even prior to the COVID-19 pandemic, the challenge of poor global visibility of the movement of goods was a significant challenge with real impacts. The lack of near-real-time, end-to-end visibility across the global supply system makes it challenging to plan, anticipate risk and optimize decisions and resources. The humanitarian sector, in particular, has felt this acutely during COVID-19, ultimately with a real human cost. The GSRI initiative, with its collaborative data-sharing platform at the core, demonstrated how visibility can benefit organizations – with the positive impacts that UNICEF experienced from the GSRI pilot providing proof of the value visibility can deliver across a supply system, as well as to individual participants.

Now is the time to build on what the GSRI has accomplished – to take the next steps to scale the approach the GSRI has shown to work. Doing so will require any scaling efforts to clearly demonstrate the value an initiative will provide to participants; an optimal approach to data and technology that encourages participation by offering robust data-sharing agreements and policies around the collection and storage of anonymized and aggregated data; and the right governance model that articulates the roles and responsibilities of each participant and safeguards the privacy of participants' data. All three elements must be in

place to promote trust and transparency among participants. This trust is essential to building a sustainable coalition that can achieve its goals.

That said, building global, cooperative institutions will take time, and success is anything but assured. Fully functional, resilient supply chains are a public good that both fuels economic activity and supports people and societies as we know them today. Policy-makers are beginning to act, for example, through the United States Department of Transportation's launch of the [Freight Logistics Optimization Works \(FLOW\) initiative](#), which aims to facilitate the smooth exchange of data among supply chain participants.

Despite the signs of progress, policy continues to lag behind the acute needs of markets and humanitarian needs. Interested institutions should increase engagement to shape national and international policies that can and should influence data sharing. Arrangements such as FLOW along with some of the other public-private examples described previously, can serve as models for the next generation of data-sharing, with an eye to fostering a new vision for supply chains that equitably and responsively address the needs of a diverse global community.

There has never been a more urgent need to create more resilient supply chains and systems. As the GSRI has demonstrated, organizations around the world have the collective power to make this happen. The value, technologies and approach are all there. It is up to the relevant players to come together to improve visibility across critical supply systems to minimize future shocks to the systems and deliver transformational economic and social impact.

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Endnotes

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