POV

The New Frontier:

WHY TRANSPARENCY AND TRACEABILITY

are Essential for Sustainable Supply Chains
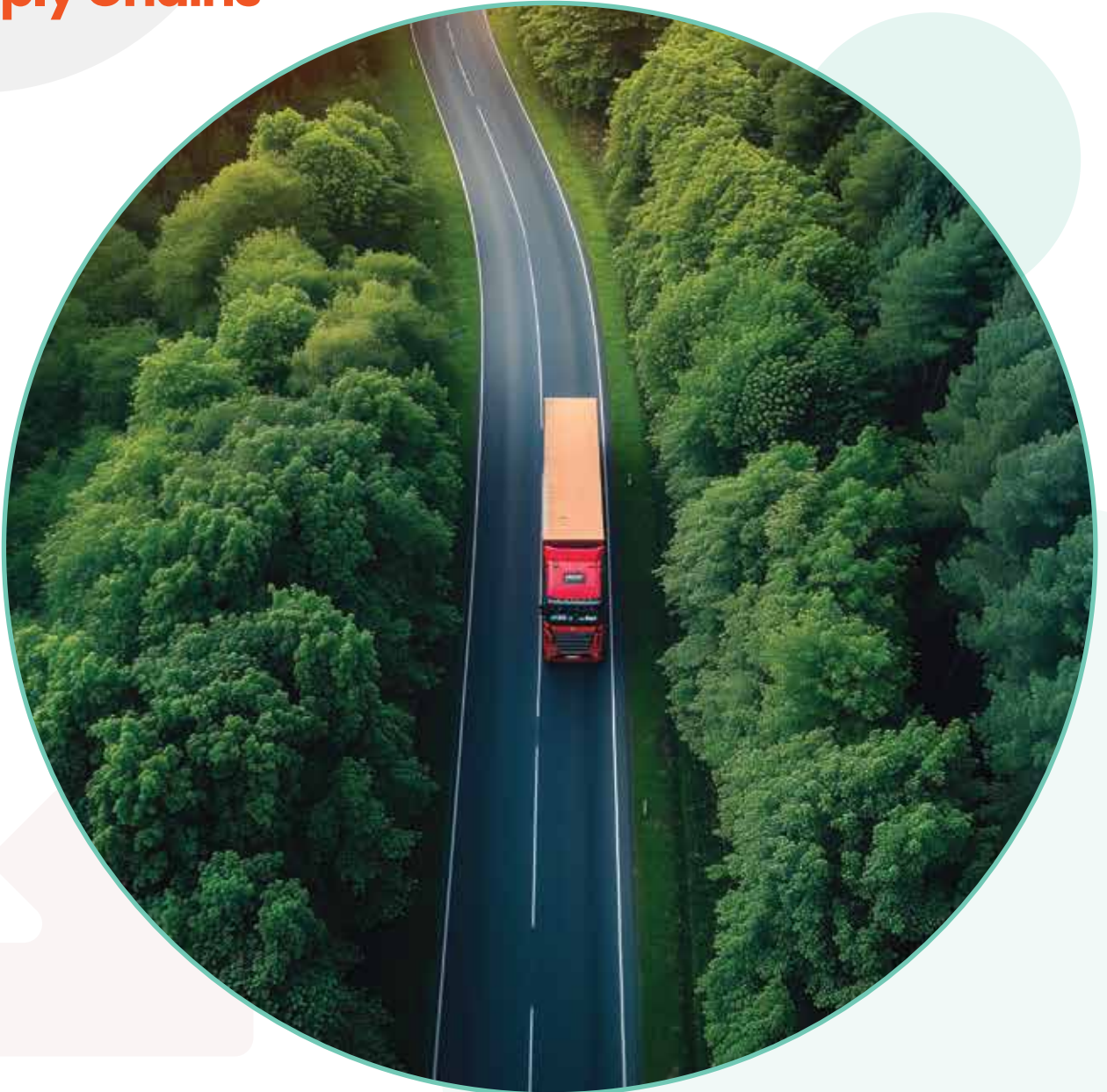
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In typical business functions like marketing or finance, most companies understand the landscape drawn from historical knowledge and the organization's collective experience. The picture is different for sustainability. As ESG reporting has become more commonplace and increasingly mandated by regulation, organizations create dedicated teams for sustainability. In a world of climate change and environmental degradation, businesses are under growing pressure to incorporate sustainability across all their activities, from manufacturing to employee travel, with little or no prior experience to pave a clear path forward. This leaves companies and their sustainability teams to monitor a wide spectrum of ESG parameters in compliance with rapidly evolving regulations and stakeholder expectations, all while acting in a way that will drive impactful change.

The expectations are higher for big companies operating across borders. These organizations have a larger footprint and considerably greater influence over their business partners. Key stakeholders, such as investors and customers, now expect these big conglomerates to use this influence to hardwire sustainability practices within their operations and supply chain.

The supply chain, which spans the entire business from raw material extraction to the hands of the final consumer, quite understandably falls under scrutiny as a part of this growing focus on sustainability, especially given the complex, sprawling nature of global supply chains today.

Large companies are driven by a combination of stakeholder pressure and internally motivated zeal, on a mission to propagate environmentally and socially responsible practices throughout their supply chain.

Schneider Electric

Gartner #1 Supply Chain 2023

In the third year of its STRIVE (Sustainable, Trusted, Resilient, Intelligent, Velocity, and Efficiency) program, Schneider Electric recognizes that walled organizational transformation is over. They demonstrate collaborative progress with "The Zero Carbon Project," which has trained, resourced, guided, and supported their suppliers. Participants reduced carbon emissions by 10% by 2022, which helped reduce Schneider Electric's supply chain carbon footprint.

(#2 in 2022)

PEPSICO

Gartner #5 Supply Chain 2023

PepsiCo has several collaborations to use regenerative agriculture principles to drive a more secure and sustainable food supply.

(#5 in 2022)

CISCO SYSTEMS

Gartner #1 Supply Chain 2022

High-tech leader Cisco Systems held the No. 1 spot for the third consecutive year. Sustainability remains top of mind, with progress made in Scope 1, 2, and 3 GHG reductions, a drop in virgin plastic, improved sustainable packaging, and a 99.9% reuse or recycle of products returned.

(#2 in 2023)

Sources: | www.gartner.com/en/articles/these-are-the-best-supply-chains-of-2023 | www.scmr.com/article/the_gartner_supply_chain_top_25_insight_on_leaders

The key to succeeding with any sustainable supply chain journey boils down to data and visibility. Businesses need the ability to record important data across their supply chain network and provide real-time visibility into this data for insights to relevant stakeholders and to accelerate progress toward sustainability. In a nutshell, these are the central concepts of transparency and traceability that will underpin the sustainable supply chains of the future.

> **A company might broadly state that** "X percent of our materials are sourced sustainably." **However, it's important to dig deeper and understand the specific types of materials involved and the certifications they hold. This holds for any metric or data point measuring supply chain activity.**

Traceability is the ability to collect comprehensive data about any supply chain activity for disclosure purposes and to drive positive change.

Transparency is where data and insights about a supply chain activity are visible to relevant stakeholders across the network. Senior managers can view the entire supply chain, while teams and partners concerned with a certain activity might have visibility only into the information surrounding it.

With transparency and traceability, companies can continuously collaborate with supply chain partners to improve sustainability. For instance, Mondelez's Harmony Wheat program offers guidance to farmers who are its supplier partners on sustainable practices such as minimizing water and waste in farming and increasing biodiversity.

The Harmony program has developed a strong and unique data reporting system on farming practices, ensuring full traceability from wheat storage to plant. External Harmony audits are conducted among Harmony partners every year by independent and certified organizations, such as SGS and Bureau Veritas, to guarantee compliance.

80%

of the wheat for Mondelez's European biscuits comes from the Harmony program and the goal is 100% by 2030.

BUILDING A DATA ECOSYSTEM
FOR SUPPLY CHAIN TRANSPARENCY
AND TRACEABILITY

Pulling data from across a complex supply chain network for transparency and traceability is difficult. The first challenge is ensuring the smooth flow of data across disparate systems in multiple organizations spanning the supply chain network and paying attention to data privacy norms and conflicts of interest, such as a supply chain partner working with more than one company. The second set of challenges centers on the requirement for data to be safe and accurate and to capture the information required to track and meet reporting and sustainability objectives.

Let us unpack a step-by-step approach to how these challenges can be overcome with a focus on the sourcing side of the supply chain.

Data consolidation

The process starts with gathering certifications and ingredient data for a material. GTIN (Global Trade Identification Number) data establishes which product in one database corresponds to a product in another database. Especially across organizational boundaries, GTIN data helps standardize product traceability across the globe with the origin of the material carefully traced. All the data collected about the material from diverse sources is harmonized, ensuring consistency and clarity. The consolidation process must have checks and balances in place that ensure that local and cross-border laws and confidentiality are not violated. Finally, the data is cross-functionally and cross-entity integrated, resulting in a unified source of truth for complete supply chain traceability. When a customer starts this process for a certain material, they build a robust data foundation for transparency and traceability for the entire supply chain.

Traceability Modeling

Once data consolidation brings clean, accurate data to a single place, the next step is organizing the data to track and analyze the journey of a product or material through its entire supply chain, from raw materials to the finished product in the hands of the consumer.

For instance, farmers might provide information about the organic status of their corn or the certifications associated with their agricultural methods. This information needs to be translated into a standardized format that can be used to calculate KPIs like the percentage of sustainably sourced agrarian materials. At first glance, this looks straightforward, but large companies procure hundreds of materials worldwide that must comply with internal norms and numerous regional and global certifications. This makes traceability modeling a complex yet critical step that must be executed efficiently, accurately, and comprehensively to establish data-driven supply chain sustainability.

% Sustainable sourcing	GHG emissions of supply chain partners (Scope 3)	% Diversion from landfill
This can be specific to a raw material, e.g., recycled plastic or certified palm oil. This broad metric reflects a commitment to sustainability and can be used to set targets and for external reporting.	Tracks partners' carbon footprint to identify improvement areas.	Measures how effectively a business prevents harmful disposal.

Supply Chain Reporting

With data in one place and available in a format that can support the measurability of important KPIs, one can begin to generate reports that track the performance of suppliers from the first tier to the nth tier. These reports can unlock transparency for internal teams, external partners, and auditors. Automated disclosures of a regular frequency can flag risks such as deviations of the KPIs from acceptable norms preemptively so they can be mitigated quickly.

IDENTIFYING A CENTRAL HUB FOR SUSTAINABLE SUPPLY CHAIN MANAGEMENT

To traverse this three-step journey toward a data ecosystem for supply chain transparency and traceability, companies need a solution with an advanced ability to unify diverse data, model it for traceability, and prepare it for reporting in numerous real-world scenarios. With multiple successful instances of helping global businesses build data environments for competitive advantage, ATOM.AI, Tredence's end-to-end accelerator ecosystem for data engineering, meets these criteria. It can serve as a central hub for large companies to monitor and improve the sustainability practices of their supply chain networks.

The solution has proven its ability in various sectors and use cases to aggregate and harmonize data across internal and external sources and ensure the completeness of inputs for models, dashboards, and reports. ATOM.AI also has advanced capabilities to automate the crucial data-sharing processes that span the ecosystem, so speed and accuracy are not a concern. Additionally, Tredence experts have the know-how to standardize these processes from a regulatory compliance standpoint. Finally, the solution can help build user-friendly dashboards and provide state-of-the-art analytics.


A 'Traceability Cockpit' provides supply chain teams with an analytics-rich, multidimensional view of their supply chain network at their fingertips 24/7 to accelerate the journey toward sustainability.

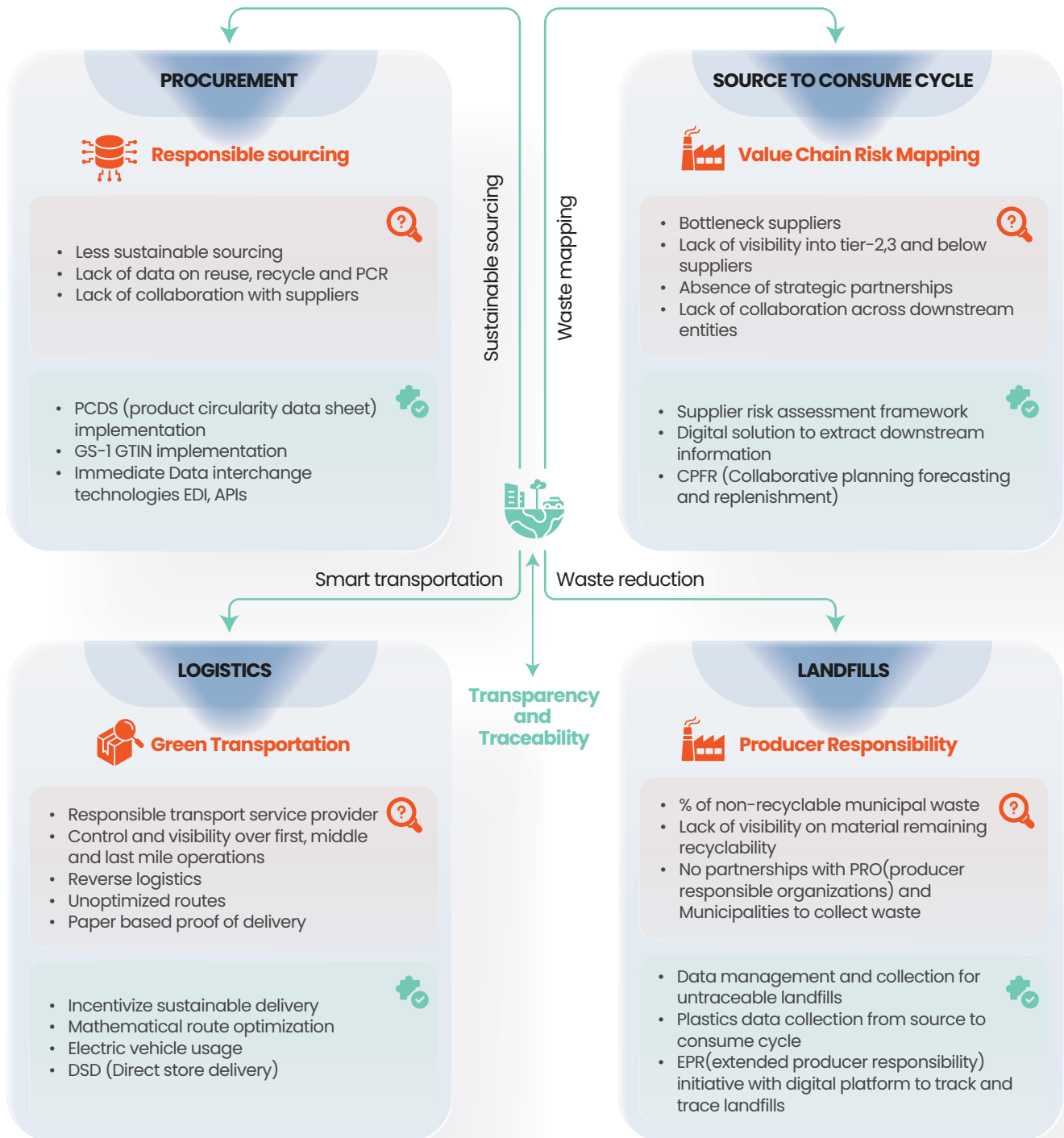# THE TECHNOLOGY ADOPTION CURVE FOR SUPPLY CHAIN TRANSPARENCY AND TRACEABILITY

A company often begins using ATOM.AI to improve visibility within its operations. The solution can resolve the complexity of managing data across multiple plants and production processes and provide teams with data streams that can be used for AI/ML models and single-pane-of-glass views of inventory and manufacturing processes.

At this point, the company may find a lack of transparency in the sustainability aspect of a certain part of their supply chain. For example, information may be urgently needed on the sustainability practices of palm oil suppliers in a certain geography. Here, ATOM. AI can be deployed to collect the required data from palm oil suppliers. This data and related insights will be available on the company's systems and dashboards within a short period. Internal teams can use the information to learn if the suppliers' practices meet the relevant sustainability criteria. When a supplier is not compliant, internal experts or external consultants can pinpoint the areas for improvement and help the partner move in the right direction.
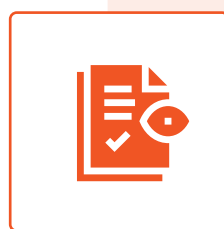
With the first step taken, the traceability data for palm oil, including the relevant metrics and insights, will be updated regularly and shared across teams and external suppliers. From thereon, the data ecosystem can steadily cover the entire supply chain network, entrenching transparency and traceability.

Best-in-Class: Supply Chain Transparency & Traceability

PROCUREMENT

Responsible sourcing

- Less sustainable sourcing
- Lack of data on reuse, recycle and PCR
- Lack of collaboration with suppliers

- PCDS (product circularity data sheet) implementation
- GS-1 GTIN implementation
- Immediate Data interchange technologies EDI, APIs

SOURCE TO CONSUME CYCLE

Value Chain Risk Mapping

- Bottleneck suppliers
- Lack of visibility into tier-2,3 and below suppliers
- Absence of strategic partnerships
- Lack of collaboration across downstream entities

- Supplier risk assessment framework
- Digital solution to extract downstream information
- CPFR (Collaborative planning forecasting and replenishment)

Sustainable sourcing

Waste mapping

LOGISTICS

Green Transportation

- Responsible transport service provider
- Control and visibility over first, middle and last mile operations
- Reverse logistics
- Unoptimized routes
- Paper based proof of delivery

- Incentivize sustainable delivery
- Mathematical route optimization
- Electric vehicle usage
- DSD (Direct store delivery)

LANDFILLS

Producer Responsibility

- % of non-recyclable municipal waste
- Lack of visibility on material remaining recyclability
- No partnerships with PRO(producer responsible organizations) and Municipalities to collect waste

- Data management and collection for untraceable landfills
- Plastics data collection from source to consume cycle
- EPR(extended producer responsibility) initiative with digital platform to track and trace landfills

Smart transportation

Waste reduction

Transparency and Traceability

How Centralized platform solves major issues in managing material transparency & traceability:

- End-to-end planning by **interconnecting procurement and aggregate planning** functions

- **Sensing upcoming shocks earlier** and deeper across the sustainability drives by applying digital technologies

- **Improving decision-making** by applying advanced in time of disruptions

- **Connecting all dots** from planning, sourcing, inventory & manufacturing

TACKLING NON-TECHNOLOGY CHALLENGES

The challenges of establishing supply chain transparency and traceability are as much of a process and policy nature as they are technical. Sufficient processes and policies consider regional and country-specific laws, organizational culture, partnership dynamics, and operational issues outside technological control. For example, business partners may hesitate to reveal certain proprietary information, or farmers in a particular region may lack stable internet access.

At Tredence, we not only have the technology and sustainability expertise but also the rich experience gained from implementing data ecosystem projects in various sectors. Our team can help establish and maintain data-sharing relationships in various on-the-ground situations and initiate the process changes and change management efforts that have to accompany technology adoption in a fast-evolving field like sustainability.

A VALUE-ADDED SOLUTION

ATOM.AI's solutions can be tailored to address different aspects of supply chain transparency and traceability, depending on the company's focus. It can be used for procurement to ensure sustainable sourcing, logistics optimization, or even tracking products down the value chain to prevent pollution. These can all be combined to deliver an end-to-end supply chain visibility and actionability platform.

Tredence is uniquely positioned in the sustainability solutions landscape, blending technical expertise with deep sustainability knowledge. We're a one-stop shop that bridges all the gaps.

Technology Expertise

We have experienced data engineers and architects who are well-versed in designing and building data pipelines, robust digital architectures, and multidimensional dashboards. Organizational boundaries are not a barrier to our data ecosystems, which can cover an entire supply chain network.

Domain Expertise

Whether it is sustainability, supply chain, or business sector, we have the relevant experts who understand nuances, regulations, and reporting requirements.

Analytics Leadership

Our core offering of last-mile AI has delivered tangible business results for Fortune 500 companies. Our data modelers are well-versed in coaxing insights from complex data in all verticals. This makes us an ideal partner to leverage traceability and embed sustainable practices across supply chain networks.

Our approach to improving Supply Chain T & T reporting

Independent multi-stakeholder across
Supply Chain T & T

Responsible for overall traceability of products

Set standards/ certification requirements

Monitors KPIs throughout the supply chain

Ensure flow of the data between stakeholders from data sources

Data Consolidation

- Gather material certification & ingredient data
- Procure certified material as per global sustainable scheme
- Collect GTIN data to map material origin
- Harmonize data collected from multiple sources
- Integrate cross-functional & cross-entity data
- Single source of truth for all the data related to supply chain traceability

Traceability Modelling

- Model selection based on certified and non-certified materials
- Map source to consumption entities and data
- Classify commodities and finished goods based on product segregation or mass of balance concept
- Responsible sourcing KPIs % compliance, % quality complaints, % terminations

Supply Chain Reporting

- Track tier-1/2/3 and beyond suppliers' performance on defined responsible KPIs
- Automated monthly carbon disclosure framework with notifications on critical cases on target breaching
- Persona based reporting for auditors and internal stakeholders
- Entire value chain's emission mapping
- Timely risk reporting and mitigation

Enterprise Data Platform

Sources

- Identification of data sources
- Internal and 3rd part Data source mapping
- Upstream/downstream suppliers mapping

Ingestion

- Internal & 3rd party data source to target mapping
- Build carbon footprint data models
- Unification of all supply chain data

Aggregate layer

- Build gold layer for traceability data on EDP
- Add business rules & DQ measures of 3rd party data
- Data preparation for reporting tool and analytical use-cases

Visualization

- Scope-3 & transparency metrices reporting
- Actionable insights & alerts to plan procurement strategy
- Pre-emptive alerts for expert intervention

Distinctive solution offerings

Comprehensive responsible sourcing KPIS

Carbon footprint data model

Commodity segregation

Self-serve visualization

We partner with our clients in building a comprehensive and future-proof solution for supply chain sustainability that can deliver lasting impact. The solutions deliver more than simple supply chain transparency and traceability. We build the digital infrastructure to capture and aggregate that data across entire networks to provide optimized metrics and reports.

However, information by itself is not very useful.

A solution built with ATOM.AI provides a multidimensional 'Traceability Cockpit' that mines this data to equip clients with advanced analytics and insights to drive actionability internally and with external partners toward supply chain sustainability goals. The solution's flexibility enables extended transparency and traceability anywhere within or outside an organization. In addition to the preparedness of data for state-of-the-art analytics and global reporting standards, this will set your supply chain network firmly on course for lasting sustainability.

ABOUT TREDENCE INC.

Tredence is a global data science solutions provider focused on solving the last mile problem in AI. The 'last mile' is the gap between insight creation and value realization. Tredence is a Great Place to Work-Certified and as a 'Leader' in the Forrester Wave: Customer Analytics Services. Tredence is 2000+ employees strong with offices in San Jose, FosterCity, Chicago, London, Toronto, and Bangalore, with the largest companies in retail, CPG, hi-tech, telecom, healthcare, travel, and industrials as clients

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