



The Rise of Supply Chain Viability – Digital Solutions as a Boosting Role

White Paper

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*“Science-based,
practice-driven”*

Better is the enemy of good – A flood of triggers questions today's supply chains

For years, global supply chains have been lulled into a sense of complacency, prioritizing cost containment and efficiency, leading to a continuously increasing degree of complexity, rigidity and loss of control by outsourcing and globalization.¹ Supply chains were striving for pure efficiency with its objectives to squeeze out costs, keep inventories at a low level and to transport goods with exceptional efficiency to distant markets. That was suitable for a long time, but in a globalized and outsourced world as of today, an organization's success is no longer dependent on its efforts only. The success of an organization depends largely on how effectively it can orchestrate a vast, global network of supply chain partners to deliver goods and services that meet the needs of individual consumers.

Today's supply chains are experiencing high levels of change in terms of both, internal and external pressures described by PESTELE factors.² Supply chain disruptions are not new, but shocks are increasing in frequency and severity. Companies have been reluctant to invest in resilience, believing that the benefit was not worth the cost. Recently, the COVID-19 crisis has revealed structural flaws in supply chains that lead to increasing uncertainties and vulnerabilities - leading to fundamentally scrutinize the dominant supply chain narrative of cost reduction and responsiveness.³ Thus, the crisis has changed the momentum and supply chains realized they have to step up and contribute.

«The increasing emergence of disruptions, the shift of ecological, social and ethical imperatives, and customer advocacy force traditional supply chains to change»

Even harder, today's supply chains are more and more confronted by ecological and social imperatives, driven by customer advocacy, with an unprecedented speed.⁴ For instance, with the European Green Deal politics and supply chain law initiatives actively intervene in the change by directly impelling supply chains to act.⁵ The current situation provides every reason to believe, that the pace of change will accelerate and that future supply chains will be in a constant state of flux.

Political

- Politicization of society
- Carbon tax

Economic

- Shift in value creation
- Individualization

Social

- Change of lifestyle
- Health orientation

Technological

- Digitalization
- Connectivity

Environmental

- Climate change
- Circular economy

Legal

- Supply chain law
- Change of legal systems

Ethical

- Responsibility initiatives
- Sense of responsibility

The fundamental shift of relevance and the recognition of vulnerability and rigidity by supply chains leads us to the assumption, that decision-makers must change and evolve their companies and supply chains now, to be able to survive on the market in the long-term. Particularly, since the principle “survival of the fittest supply chains” is more dominant than ever before.⁵ Here, the Schumpeterian law of creative destruction gains a new meaning – companies must abandon the old principles of how they designed and orchestrated their supply chains. Only with the new and the better, the flood of challenges affecting companies’ supply chains can be countered.

The new arena of challenges – Future supply chains need to evolve to master the VUCA world

The impact of altering triggers over time constantly forces supply chains to keep up with the changes and evolve.⁶ As supply chains look for ways to compete in such a VUCA world (with high levels of volatility, uncertainty, complexity and ambiguity), leaders will need to master supply chain evolution and make it a distinctive competitive advantage. In the past, supply chains were continuously striving to become more efficient by squeezing out costs in the best way possible in the short-term. But this does not necessarily guarantee effectiveness by meeting the demands of the various shareholders in the long-term. In recent history, companies have been increasingly extradited to external shocks such as natural disasters. The COVID-19 crisis has then triggered companies to fundamentally reassess their structural flaws. To handle past, current and future emerging crises and disruptions supply chains are in need to become resilient by gaining a clear view of supply chain risk and implement measures from an array of remedies, like scenario planning, back up inventory, safety stock, flex production or components re-routing, when necessary.⁶

To be able to exist in the long-term, only being resilient will not lead to a survivable supply chain. Figure 1 illustrates how supply chains will need to evolve and which factors play a key role on the respective level. Thus, the evolution of sustainability and digitalization have a significant bearing by driving next-generation supply chains.⁷ The progress of sustainability is mostly shaped by the shifting relevance and interpretation of the triple bottom line dimensions of sustainability, from being economic focused to become ecological and social-oriented and finally ecological and ethical dominated in the future. Current supply chains are still far away from a comprehensive sustainability implementation. To survive in the long run, it is crucial to manage generating corporate and social added value across the entire supply chain and, at the same time, to understand that sustainability will become the norm across everything they do.⁴

«Future supply chains need to become sustainable, resilient, and digitalized to achieve viability and beyond»

88%

of swiss supply chain managers confirm the ecological and social orientation as of highest importance for sustainability implementation

While digitalization and sustainability have evolved separately so far, they will once gradually converge by collaterally shaping the future vision of supply chains. Because digital solutions conquer the market, ready to be adapted to supply chains, the evolution will continue to bio-intelligent* and autonomous solutions to take account of the rising dominance of neo-ecological imperatives with social responsibility.⁷

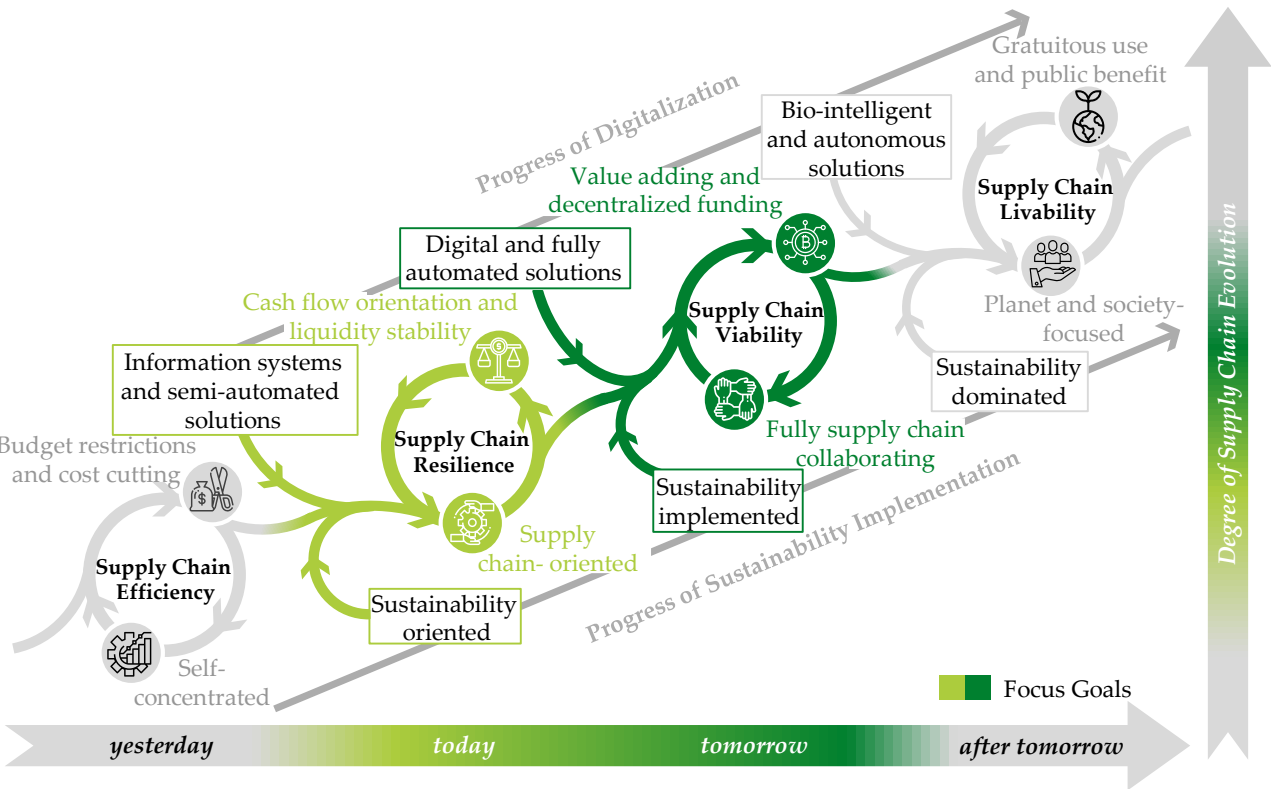


Figure 1: Levels of supply chain evolution and its key factors

However, the concept of resilience, sustainability, and digitalization as being individually resolved, will not lead to viable supply chains. Rather an integrated dynamic framework is required by combining digitalization and sustainability implementation with an extension to master risks and disruptions affecting all perspectives.⁸ To achieve viability, supply chains need to manage this change to survive as one of the fittest.

The increasing dominance of ecological and social focus of objectives will even force future supply chains to increasingly merge sustainability and digitalization development beyond viability. This leads to a construct we call supply chain livability, focusing on direct affection for the people in a society, in terms of aspects such as economic development, affordability, public health, social equity, and pollution exposure.

The evolution of supply chains and the shift of relevance and imperatives is accompanied by an evolution of financial focus and objectives, too.⁶ While cost cutting and budget restrictions were prominent in the past, cash flow orientation, liquidity stability, value-adding and decentralized funding will allow supply chains to be viable and will need to adapt to the rising social and ethical focus by gratuitous use and public benefits in the far future.

The supply chain evolution also comes along with a shift of business focus, impact, and objectives. Supply chains need to move from self-concentrated company focus to open boundaries, to establish collaboration along and across supply chains to become viable.⁹

To become livable and justify a future business existence, supply chains of the future will need to focus on adding value and creating a direct positive impact on society. Moreover, the preservation of the planet with its biodiversity will have to become a major condition for supply chains as well.⁴ Sooner or later, the current VUCA world with a pure economic narrative will be replaced by a VUCA world dominated by social and ecological factors. Decision-makers should be aware of this new prospective arena of challenges.

The principal goal – On the road to supply chain viability

The evolution of supply chains seeks to achieve livability as its ultimate objective in the far future, but the principal goal today is seen in the supply chain viability as the next necessary step in the evolution. Supply chain viability focuses on the implementation of sustainability, following social and ecological imperatives, to survive in a constantly changing market and environment on a long-term basis and at the same time to have the ability of a dynamically adaptable network to maintain itself and be able to react agilely to changes through increasing resilience.¹¹ Supply chain viability is characterized by a fully collaborating perspective of the value creation with business partners. The boundaries of the company have been overcome.¹² Together with customers and suppliers, companies are looking for solutions to upcoming problems. This includes the joint use of resources and capacities. The supply chain actors are open and willing to do this collaborative form of cooperation – also because precautions are taken to ensure that their data and trust are not abused.¹²

To get closer to supply chain viability, companies must provide the necessary agility by ensuring end-to-end flexibility and proactivity along and across supply chains to react, survive and recover during and after disruptions and changing conditions.¹³

**Bio-intelligent solutions are defined as a systematic application of the knowledge of nature and/or natural processes aiming at optimizing a manufacturing system regarding its societal and business challenges by seeking a convergence of bio- and technosphere.¹⁰*

«Ecological and social-driven demand for sustainability and the ability to dynamically adapt to maintain itself, and to agilely react to changes to ensure resilience drive future supply chains»

75%

of swiss supply chain managers set future management focus on long-term sustainability and adaptability for reaction, to disruptions

The increasing economic-driven demand for resilience and ecological and social-driven demand for sustainability forces supply chains to apply transparency.¹⁴ By ensuring end-to-end visibility and traceability within and across supply chain networks, risks and changing conditions can be predicted and detected and at the same time the increasing ecological, social, and ethical imperatives for sustainability and reliability of supply chains can be satisfied.¹⁵ Viable supply chains are characterized by decentralized decisions that take into account local conditions adequately.

E.g. Volvo uses Oracle cloud solutions and blockchain technology to establish global traceability of cobalt used in its batteries. This enables Volvo to achieve end-to-end transparency for ensuring adherence to ecological, social and ethical imperatives of raw material sourcing and at the same time ensuring agility to react to unforeseeable events.¹⁶

However, the implementation of supply chain viability to meet these goals requires a holistic change, driven by a various set of triggers and enablers, which should be tackled with an integrated approach.

Move the chessmen into position – Various enablers foster supply chain viability

The set of triggers forcing supply chains to evolve is almost endless and attack supply chains from every angle. Following the changing internal and external conditions, the characteristics and components of enablers change and adapt in line and need to be constantly reviewed, reassessed and re-evaluated.¹⁴

Therefore, the isolated implementation of concepts, characteristics and technologies is not target-oriented and effective to achieve wide-ranging supply chain viability. Figure 2 illustrates the comprehensive dynamic approach of change along supply chains that is indispensable to achieve sustainability and resilience within and across supply chains to transform the vision of viability and beyond.⁷

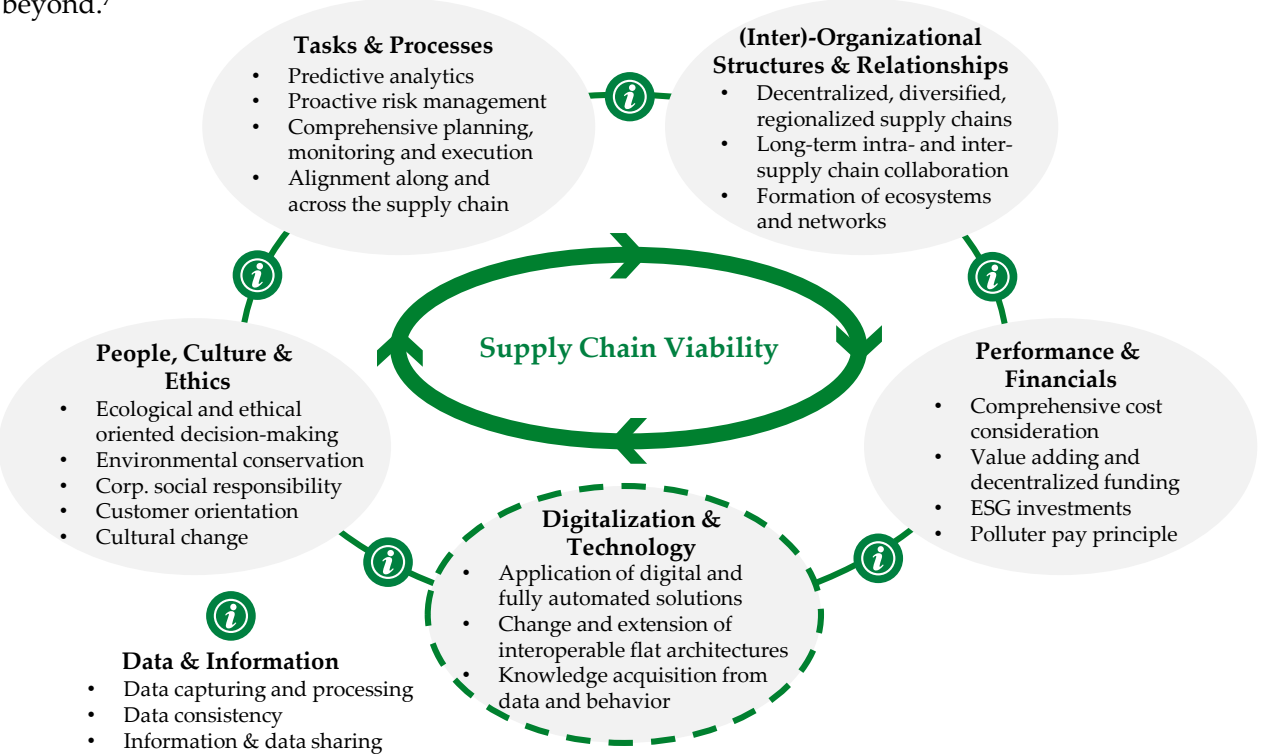


Figure 2: Enabler categories to achieve supply chain viability

Current supply chains have rigid and convoluted (*inter*)-organizational structures and relationships that need to be rethought to respond quickly to and overcome volatility and disruptions with a long-term sustainability orientation.¹⁷

The increasing complexity and connectivity of supply chains and networks require the highest amount of alignment and collaboration on a long-term basis. To establish comprehensive visibility and traceability and to ensure the ability to react to changing environments, *tasks and processes* must transform significantly and adapt to predominant, rapidly changing conditions.⁸

The rise of business ecosystems, connectivity and collaboration extends the amount and variety of *data and information* created and stored at a rapid pace. The ability to capture and analyze data is better than ever before and supply chains need to seize the opportunity to become real-time.¹⁵ The central tower idea must be overcome. The “big brother is watching you” principle is replaced by a decentralized variant, in which the data belongs to the entering and causing actors, following a democratic idea.

As crises arise on the agenda, constrained supply chains, slow sales, and reduced margins will combine to add even more pressure on *performance and financials*.⁶ Supply chains will need a strong dose of realism, so that they can free up cash and secure sustainable liquidity in terms of disruptions and investing in the change for a sustainable future.¹⁸ Green funds and ESG investments will play a crucial role.

Ecological, social, and ethical triggers are on the move, likely to become dominant in the future and become the new normal, forcing supply chains to a fundamental change in *people, culture, and ethics*.⁸ True to the motto “people matter most”, also the employees must be involved in the transformation towards supply chain viability. New knowledge and skills must be considered as well as the creation of completely new functions and roles (e.g., the viability manager, who is responsible to integrate ecological and ethical dimensions into corporate decision-making and to implement dynamic adaptability against disruptions).

The key enabler in accelerating the realization of those components is seen in the *digitalization and technology* on the road to supply chain viability and beyond.⁷ Like in a game of chess - decision-makers must concentrate not only on one piece. Every figure has its right to exist – no matter how modest its properties. However, some sacrifices may be necessary to get closer to the vision of supply chain viability.

«To achieve supply chain viability, a various set of enablers must be considered using a comprehensive approach»

93%

of swiss supply chain managers see technological innovation as a key enabler to improve sustainability

Pull the king maker – Digitalization and technology is key for supply chain viability

Supply chain complexity has grown exponentially and the drive for supply chain transparency is likewise greater than ever. With technologies allowing companies to create better forecasts, streamline operations, and break down departmental silos, organizations can no longer consider digital transformation as optional.¹⁹ Not cash, but data is king. The digitalization and use of technologies is arguably the most important business trend of our time.

Figure 3 illustrates, that the variety of digital and fully automated solutions is enormous and steadily enhancing.⁶ Cloud solutions, blockchain, and automation reached market readiness and innovations such as quantum computing and bio-intelligence are already in the pipeline under development. Now it is about the implementation and fit of technology in the right position to unfold its full potential.⁶

Almost every supply chain of today heavily relates to on-premise supply chain management systems to handle the daily operative activities efficiently. Thus, in a data-driven world, cloud solutions enable the migration of information in this supply chain systems.²⁰ It allows supply chains with the ability to monitor, connect, and collaborate across the entire supply chain with an end-to-end connection of products, processes, services and assets with employees, partners and customers.²¹

«Digital transformation enables supply chains to become viable, with cloud solutions being the most promising technology to achieve supply chain viability.»

Tetra Pak for example just launched an Oracle cloud solution-based project to implement real-time visibility and traceability, to provide transparency, and reliability for their customers.²²

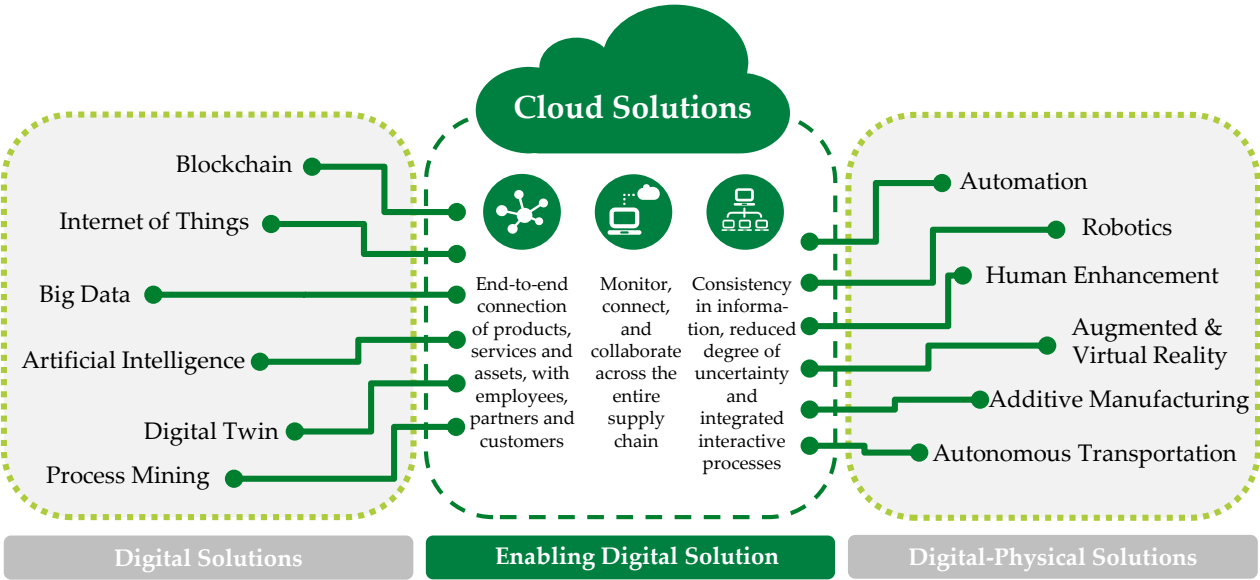


Figure 3: Digitalization and technology as a key enabler to achieve supply chain viability

To fully automate and digitize viable supply chains, cloud solutions build the basis to integrate interoperable flat architectures, to transfer real-world assets and ensure consistency between disparate systems, which are addable, removable and interchangeable, following a plug- and play principle.²³

84% of swiss supply chain managers grant cloud solutions a significant increase of relevance and positive impact for supply chains

Despite the ample opportunities for digital solutions as cloud solutions provide, figure 4 illustrates various barriers that hinder supply chains to adapt and integrate technologies. Most supply chains tend to stick to existing legacies, which are currently appropriate, but will not fulfil its purpose in the long-term future.²¹ Supply chains need to overcome the fear of change, be aware of the necessity and opportunities digital solutions and automation provide, and break up legacies to unfold its full potential.²⁰ Even though it takes time to gain value in the short-term, on a long-term basis it is indispensable to apply technologies like cloud solutions to enable supply chain viability.

	 Requirements	 Barriers
 Functional	• Data collection • Security mechanisms • Data consistency • Avoid data redundancies • Data sharing • Meaningful information extraction • Task-technology fit • Break up legacy systems and architectures • Interoperability • Accessibility • Useability • Scalability • Extensibility • Flexibility	• Data privacy • Information theft • Data transfer from legacy systems • Integration of complex, customized tasks • Time for planning and implementation • Data extraction of legacy systems • Access to sensible and confidential data and information • System integration and interfaces
 Non-Functional	• Break up legacy structures and processes • Investments • Top-management commitment • Digital capabilities and expertise • Openness for sharing • Clear responsibilities and governance • Alignment with supply chain direction • Supply chain network integration • Authorizations • Backup solutions	• Fear of change • Time-to-value achievement • Sticking to existing legacies • Costs of implementation • Dependencies (e.g., product owner) • Maintenance and development • Awareness of necessity • Acceptance • Change of currently working processes

Figure 4: Overview of requirements and barriers for digital and technological solutions

A successful implementation for supply chain viability should be well aligned with long-term objectives.⁷ The consideration of various functional and non-functional requirements is indispensable. Only if the barriers are conquered and the requirements are considered, technology will enable supply chains to achieve viability and accelerate its implementation driven by the increasing sustainability dominance in economies and society.

The early bird catches the worm – Getting started in time with supply chain viability

The time for change is more prominent than ever before. Supply chains need to master the comprehensive evolution to achieve viability and beyond along and across the entire supply chains with the usage of digitalization and sustainability implementation.²⁴ It is time to start the journey into the new realms of supply chain viability. Technology enables and accelerates the evolution to supply chain viability. But to truly optimize the supply chains, companies must get the correct technology in place first. How to approach the comprehensive evolution to digital transformation, sustainability implementation and supply chain viability achievement of an entire supply chain is the most prominent question. The following four levels of action serve as a very first guideline to begin the transformation to next-gen supply chains.

Starting: The awareness of the PESTELE triggers and the analysis of its influences on the supply chain and networks must be prioritized. The progress of sustainability implementation requires a realistic and comprehensive assessment to derive and prioritize decisions, which are aligned with both, short-term actions and long-term objectives. The assessment and decision prioritization should also comprise digitalization and technology as an enabler to implement sustainability and having the ability to agilely act against disruptions.

Doing: The derivation and prioritization of decisions and actions need to be transformed into concrete sustainability and resilience measures, based on the long-term objectives. New digital opportunities should be undergone a profound task-technology-fit to realize its full potential in the supply chain.

Reviewing: As environments and society are constantly changing and technologies rise with a rapid pace, observation, and analysis of changing conditions, influences and impact on the supply chain, as well as digital advancements are indispensable. Constant reassessment and re-evaluation of decisions and actions are inevitable to have the ability to adapt and to reprioritize supply chain viability initiatives.

Improving: Only with a constant reviewing, supply chains will be able to adapt and to reprioritize decisions and actions for long-term objective achievement of supply chain viability. The environmental and social change, as well as rising and changing enabler should be continuously considered, evaluated and implemented to ensure the continuous improvement towards the long-term objectives of supply chains.

But since supply chain viability is more a philosophy, there will be no finish line. Environments will continue to change, customer advocacy will rise, leading to a focus on tailored, agile, trustworthy and innovative characteristics.²⁵ Further, sustainable and social aspects will reach dominance and new possibilities like the developing field of bio-intelligence and autonomous solutions will encourage supply chains to further evolve beyond viability, seeking to become livable.

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