2021

Synergistic Supply Chains

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Table of Contents

1. Executive Summary 2
2. Introduction 3
3. Rethinking the Supply Chain 5
4. Corporate Finance 9
   4.1 The Value Creation Framework 9
   4.2 Capital Efficiency 11
5. Hurdles and Barriers 13
6. Conclusion 16
7. Contact Information 17

1. Executive Summary

While the pandemic has accelerated the evolution of Unified Commerce, it has also surfaced the troubling issues with non-resilient supply chains- material and product shortages, supply chain disruptions and rising cost-of-goods sold (COGS). This Paper describes the emerging view of "Synergistic Supply Chains (SSC)" which recognizes that supply chains are really the sum of the actions of trading partners to source, produce and deliver customer satisfaction.
The fully enabled SSC has the power to:

- handle high degrees of complexity
- eliminate latency with real time information
- resolve many problems with AI and machine learning
- optimize the entire chain, not just specific links
- harvest the benefits of internal synergies and externals even while facing VUCA.

Enabling the SSC entails working with the full end-to-end Network; adopting common goals for all partners; convincing all partners that harmony results in what is best for all; and providing for orchestration across the entire network.

Understanding what to do for SSC is Step 1, taking the appropriate action is Step 2. All too often the business case for significant change or transformation is either understated or miscommunicated. Supply Chain leaders to-date have largely sought approvals to improve their own operational metrics, such as functional costs or customer service, and shied away from the corporate financial gains that are possible with the end-to-end SSC. Yet the actions to achieve SSC become compelling when defined in corporate financial measures that matter, which include:

- those delineated in the value creation framework
- total delivered costs (COGS)
- total supply chain time
- after tax free cash flows
- capital efficiency -- fixed and variable
- economic profit.

The Paper also addresses the common hurdles and barriers that are often raised to push back actions to achieve an SSC. It provides proven responses to these. The SSC is the next and final step in viewing supply chains as profit centers

and important contributors to true value creation. Survival and prosperity in the digital age will demand it.

2. Introduction

The Pandemic of 2020 was horrific and helpful. Horrific from a health, death, suffering, economic and supply chain perspective, but helpful from a learning and reinvention perspective. It is widely recognized that the Pandemic of 2020 did not change history, it accelerated history. For many businesses and professions, the year of 2020 saw a decade of change. Two topics often seen as undergoing the greatest accelerations are e-Commerce and Supply Chains. As we reflect upon our careers with e-Commerce and Supply Chains, three non-e-Commerce and non-Supply Chain books written over a span of 22 years come to mind:

1. Discovering The Future: The Business of Paradigms: 1985 by Joel Arthur Barker. Barker explores how good ideas are often rejected because they assume the future will be an extension of the past. The fact is that people resist change when they operate within old paradigms that block creative solutions and the ability to see that the future will be different from the past. Barker makes these observations about Paradigms: they are common, useful, often a warning of resistance to change and people who facilitate the shift in paradigms are often courageous outsiders who see the world differently than those who hold onto the original paradigm.

2. The Tipping Point: How Little Things Can Make a Big Difference: 2000 by Malcom Gladwell. Gladwell explores how some social trends soar, while others wane. The book explores the three phases of a concept or product: introductory period, period of popularity and then onto the building of momentum until a critical mass exceeds a threshold to beget a boiling point, and major significance/popularity is achieved. Gladwell explores the process of arriving and passing the tipping point and the challenges and hurdles to overcome to make this happen.

3. The Black Swan: The Impact of the Highly Improbable: 2007 by Nassim Nicholas Taleb. Taleb explains that a black swan event is a highly improbable event with three principal characteristics: it is unpredictable, it carries massive impact and after the fact, we concoct an explanation that makes it appear less random and more predictable, than it was. In fact, the

lessons presented by Taleb are advances in thinking of what was presented by Barker and Gladwell in that the black swan begets a paradigm shift and often became the tipping point resulting in major changes.

Applying the work of Barker, Gladwell and Taleb to the impacts of the Pandemic of 2020 allows us to understand:

- How the world shifted in 2020 and the ongoing impacts on how we live, work, shop and play.
- How shifts in how we live, work, shop and play resulted in:
    - Major paradigm shifts in all aspects of life.
    - Major levels of uncertainty due to the lack of planning for the many paradigm shifts.
    - Tipping points occurring in e-Commerce and Supply Chain have become black swans.

The largest disruption of 2020 was clearly COVID-19, but other disruptions such as record numbers of hurricanes and wildfires, unprecedented social upheaval, record numbers of bankruptcies, huge geopolitical and financial crises, massive swarming locus across 12 countries and yes, even an exploding port. These disruptions wreaked havoc throughout the world. Then with COVID-19 begetting lockdowns and social distancing all the black swans worked in unison to create chaos. People did not go out to shop, kids did not go to school, parents did not go to work, families did not go to church, sports and entertainment events were canceled, travel was curtailed and except for immediate family we stopped shaking hands and giving hugs. To put food on the table and toilet paper in the bathroom we turned to e-Commerce. For some this was already their norm, but for many this was a paradigm shift. The paradigm shift was so sudden e-Commerce could not handle the volume and so "essential" stores and services remained open with many operational changes. The level of black swans across all aspects of life were so significant that our supply chains ceased to operate, begetting further black swans. In fact, gaggles of black swans swam in unison to create tipping points across the supply chain that went into 2021 (and going to last into 2022 and beyond) have resulted in capacity constraints in everything from ketchup at McDonald's, to ports, pallets, containers and truck drivers.

The black swans of 2020 resulted in so many paradigm shifts, that tipping points exploded like fireworks on the 4th of July. These black swans continue to wreak

havoc within all aspects of life and even now as we start to come out from under the vail of COVID-19, we still need to grasp the impacts of 2020 and realize that the following paradigms need to be addressed:

- History will not retreat, and we will not go back to the old normal. In fact, we will not go on to a new normal, but a series of continuous new normals.
- Life with travel, vacations, entertainment will return but working from home and the growth of e-Commerce will continue. Stores will not disappear but will become much more experiential and shopping in stores will become more of a pleasure and less of a chore.
- The supply chains of 2020 and before are inadequate to deal with the new reality of VUCA (Volatility, Uncertainty, Complexity, Ambiguity). The new reality of VUCA demands that organizations not just look at their supply chain as a tool to improve their performance, but rather as a tool to improve the performance of every company in the chain. As Aristotle said: "The whole is greater than the sum of its parts".

This "Whole is Greater" is the basis of the Synergistic Supply Chain and is the greatest supply chain learning to come from the Pandemic of 2020. This paper presents the Synergistic Supply Chain requirements, benefits and hurdles. Fasten your seat belt, it is time to challenge several paradigms about supply chains.

3. Rethinking the Supply Chain

"The Whole Is Greater Than the Sum of Its Parts." *Aristotle*

Aristotle was not talking about the supply chain, but what he said has everything to do with how we rethink the supply chain. A few observations about Aristotle's famous quote:

- Michael Jordan learned a great basketball team is made of great players who play together. Teamwork is the key to championships.
- It is often taught the way to really grasp what an author wants to communicate in a book is to first read the cover, the back, the authors bio, the flaps, the contents, the dedication, the prologue, etc. Only then can you grasp the context of the book and really understand the whole. A book is much more than the sum of the chapters.
- The Beatles had much more influence on music than John, Paul, George and Ringo. The band of 4, had 100 times the influence that a single member of the band.

- What Aristotle said was not true: the whole literally is not greater than the sum of the parts, but rather the output from the whole exceeds the output of the parts. Aristotle's point was: **The results of the whole are greater than the sum of the results of the parts.**

In 2003 in the book by Jim Tompkins, No Boundaries, the message of the book was to make your supply chain a competitive strength, you needed to remove the boundaries between the links of the chain to unleash the power of the chain. And in a similar way in the same year, Greg Brady (CEO, One Network Enterprises) said to make your supply chain a competitive strength you need to think of the chain as an integrated network. Tompkins and Brady were both saying the best supply chain results will not be from optimizing any link, but when all boundaries are removed and the whole supply chain functions like an integrated network. Or more simply, "The whole is greater than the sum of the parts".

The harmony of a well-coached basketball team or a Beatles song results from the whole being greater than the sum of the parts. The bonus achieved when components working harmoniously, is Synergy. Synergy is when the combined value of multiple elements (or companies) is greater than the sum of the separate elements (or companies). So, if Aristotle wanted to simplify, "whole is greater than the sum of the parts" all he needed to say was "Synergy". Interestingly, corporate synergy (or vertical integration) most often refers to the benefit a company expects to realize when it merges with another corporation. Corporate synergy occurs when companies interact harmoniously or congruently. But a key question is do we need to merge, or could we just work with no boundaries? We think a merger is unnecessary, we think that if all the companies in a supply chain work together as one in a harmonious and congruent manner, synergy will result. This is in fact what we call the Synergistic Supply Chain. So, like Aristotle just needed to say was "Synergy" all Tompkins and Brady had to say was "The Synergistic Supply Chain".

The evolution of The Synergistic Supply Chain has been ongoing for 30 years and can be summarized by EERR where the letters stand for:

- E = Efficiency
- E = Effectiveness
- R = Respect
- R = Resilience

The age of the Efficient Supply Chain was from 1991 to 2005. During this period, the focus of supply chain was 100% on cost reduction and the efficiency of the supply chain. Starting in 2006 it began to be recognized that the focus of the supply chain should not only be on the cost of the supply chain, but also the customer experience resulting from the supply chain. This customer-centric supply chain of customer satisfaction and quality of service beget an efficient and effective supply chain. This efficient and effective supply chain remained the focus of supply chain until 2020 when the supply chains around the world collapsed under the weight of COVID-19. First the supply from the "factory of the world" was cut off for two months as China delt with lockdowns closing their economy. Just as the Chinese factories began to ship again in March of 2020, the virus was spread around the world and the demand for products skyrocketed. From the second half of March until the middle of May 2020, every day/night the news, news on TV and the Internet was the same: "The Global Supply Chain Results in Major Shortages". Hundreds of millions of people for the first time realized that something called the "Supply Chain" was how they were able to receive their goods from around the world. Consumers, businesses and in particular executives, by the summer of 2020 had a new a newfound respect for supply chain. The executives realized their supply chains lacked visibility and given the ongoing disruptions, they were unable to perform the goal of supply chains, the synchronization of supply and demand. They spent the remainder of 2020, with this newfound respect of supply chains, focused on achieving better visibility of their End-to-End (E2E) supply chain. As the world entered 2021, with the ongoing VUCA of events around the world, it became to be realized that an Efficient/Effective/Respected Supply Chains with good visibility was inadequate. In fact, real time E2E visibility does not beget a resilient supply chain as visibility without actionability still does not allow the synchronization of supply and demand. Therefore, the realization of 2021 was that for supply chains to perform in this VUCA world they must be Efficient, Effective, Respected, and Resilient (EERR). They must focus on cost reduction, customer satisfaction, visibility and actionability to maximize the success of their supply chain. This evolution of 14 years focused on Efficiency, followed by 14 years of Efficiency and Effectiveness, followed by 14 months of Efficiency, Effectiveness, and Respect has gotten to the current state of Efficiency, Effectiveness, Respect, and Resiliency (EERR) going forward. The Synergistic Supply Chain embodies EERR.

The four keys to a Synergistic Supply Chain are Network, Synergy, Harmony, and Orchestration. Consider:

1. Network: A chain is a one-to-one connection of links. The chain's performance is defined by the weakest link. A network is many connections of links. The performance of the network is measured not by any one link, but the synergy across the network elements. The more the links work together and have synergy, the better the network will perform.

2. Synergy: As we said synergy is "The whole is greater than the sum of its parts". The strongest synergy from across the links results when the links work not only for their own best interest, but also for the best interest of the network. This bigger picture of working for the whole, working for the interest of the network comes from the harmony of the links.

3. Harmony: Harmony requires links that understand what is best for them, is best for the network. Harmony only occurs when we all work together as one. To achieve harmony, we must all be marching to the same beat.

4. Orchestration: To march to the same beat there must be orchestration across the network. Without orchestration there is no harmony and thus no synergy. Often in today's supply chains a lack of orchestration occurs because the links do not have the information to harmonize. It is like an orchestra with no conductor and no sheet music. The orchestra without a conductor or sheet music does not make beautiful music, but rather noise. Orchestration is not easy, as today's supply chains often consist of 100's of suppliers and logistics providers, disruptions are frequent and often the tools of orchestration are not used.

It is only by embracing these four keys of network, orchestration, harmony and synergy that we can achieve Synergistic Supply Chains. Synergistic supply chains have:

- The power to handle high levels of complexity.
- A real-time network that eliminates latency.
- Autonomous resolution tools (Artificial Intelligence and Machine Learning) that enable Orchestration.
- The vision of leadership to:

- Realize a supply chain of optimized links does not beget a synergistic supply chain.
- Harvesting the benefits of internal synergy (transportation, inventory and other costs) and external synergy (Cost of Goods Sold and Customer Satisfaction) even while facing VUCA.

Thus, we can see that achieving Synergistic Supply Chains is the new goal for business executives and supply chain leaders. We need next to define their business value to any organization.

4. Corporate Finance

What is Value? This is the right question for operations and other executives to ask and understand. There are commonly accepted measures of value – such as stock price and earnings per share (EPS); and there are related measures that are important such as Free Cash Flow. Further, there are value factors that contribute to these common measures of value. Among these are operations drivers such as Cost of Goods Sold (COGS); and supply chain drivers such as the cash-to-cash cycle, total supply chain times (order to delivery), gross operating margins, and quality (resilience, risks, services, etc.)

4.1 The Value Creation Framework

As we have discussed above, the Synergistic Supply Chain is today's overriding goal for value creation. Through Efficiency, Effectiveness, Respect and Resilience, the optimized supply chain network of trading partners delivers distributed financial benefits to each partner company. The cost of goods sold, and the Total Delivered Cost (TDC), are minimized, thus gross operating product margins are shared by all.

Let us first consider the traditional Value Creation Framework for Supply Chains. In Figure 4-1 we can see that the supply chain value drivers stimulate business actions, which then impact business objectives that contribute substantially to the goal. This framework has been in place ever since supply chains were accurately defined and managed.

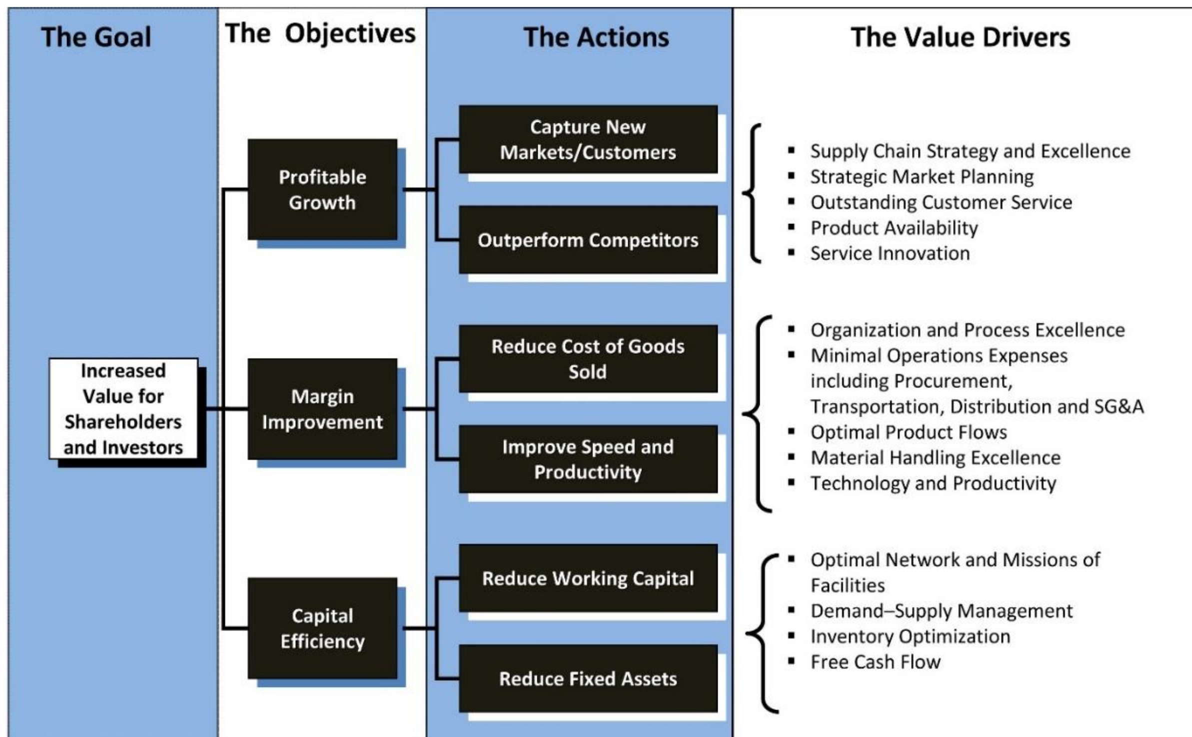

Figure 4-1 The Supply Chain Value Creation Framework

What is new is the realization that the network of partner companies that are the "real supply chains" can be optimized to make this framework powerful. Its value drivers, which involve the total end-to-end (E2E) network, are increased substantially, which reduces the cost, minimizes the lead times and enhances the quality of service. Certain new E2E technologies are now providing real-time data for all the network partners, to eliminate the disruption risks and excessive lead times. This minimizes the need for as much safety stock, speeds up slow and sequential order processing and reduces other costs involved in waiting, communicating, validating and pre-auditing all transactions.

Supply chain leaders have been exposed to financial measures and corporate value goals; however, they have often lost focus on these due to the many operational issues to resolve. The new digitalization of the supply chain, and digital commerce transformations, now present us with the capability to link supply chain performance targets tighter with corporate finance than ever before.

Figure 4-2 The TDC Model

Figure 4-2 illustrates the Total Delivered Cost (TDC) model, which defines all the costs that make up producing/sourcing the product and moving it to the point of distribution. The Cost of Goods Sold (COGS) is included in this TDC. When the costs of final distribution are added, then the total COGS can be measured and known.

This computation of the TDC enables supply chain executives to further realize the cost value drivers and enhance their management. The amount of working capital expended for stock in transit, or in the E2E cycle for example, adds up to the millions. If a normal supply chain cycle is 65 days from order to delivery, and this can be reduced to 20 days, then imagine the working capital savings alone.

4.2 Capital Efficiency

The efficient use of working capital is a strategic objective on the Value Framework (Figure 4-1).

The supply chain cash operating cycle is a key value driver and Cash-to-cash Cycle Management is a highly important business action. Supply chains originate when a production or purchase order is issued, and cash is expended to support the production or purchase. This cash is tied up until the product produced is sold and cash is received – which is measured by the total supply chain time, or “the cash operating cycle”. Inventory metrics such as:

- DH = days in inventory
- DSO = days sales outstanding
- DPO =days purchases outstanding

account for inventories; however, as the TDC model indicates, many other expenses are included in the COGS.

The cash-to-cash cycle is calculated by understanding the number of days that cash is tied up in inventory and receivables, as follows:

1. Add: Inventory C2C (days cash is tied up in inventories)
   Average Inv/COGS x 365 days
2. Add: Receivables C2C (days cash is tied up in uncollected AR)
   Average AR/Net sales x 365 days
3. Less: Payables C2C (days use of cash before paying for inventory)
   Average AP/COGS x 365 days

This calculation derives the situation regarding cash availability – if a negative number, then cash is being effectively leveraged to produce a “net availability” of cash from operations, which of course is quite desirable.

One other key metric for capital efficiency is Free Cash Flow (FCF). One of management’s critical success factors is to not only grow revenues but convert as much as possible to FCF. The efficient conversion of a revenue stream leads to value creation. The model is illustrated by the following:

____

SOURCES OF CASH -- Revenue Growth Rate
Operating Income Revenues
Less: COGS
R&D
SG&A

MINUS:

CONSUMERS OF CASH -- Tax Rate
Working Capital (AR + Inventory – AP)
Fixed Capital (PP&E; DC; Assets)

EQUALS:

AFTER TAX FREE CASH FLOWS -- The source of value creation and stock value

Another way to view the financial perspective with its relation to operations, customers and business processes is through the “Balanced Scorecard”. Several companies have adopted this method to interrelate financial goals (increase shareholder value) with improved supply-demand and operations management; with improved customer relationships; and with increased digitalization (speed, cost, and quality). The measures (or KPI’s) provide key indicators of each process and the companies learn more about what really matters (e.g., cause and effect). Designing and managing operations to maximize value is management’s role and responsibility. Reconfiguring operations to benefit the overall performance of the company is the primary means to achieve stakeholder value. And achieving E2E supply chain synergies is the solution to progress from strategy to execution. One more value measure worth mentioning, “economic profit”. This is the difference between value earned on developing one product or investing in a new technology vs. another type of investment. The revenues earned from investment “A” minus the opportunity costs, or that earned from an alternative investment “B”, is thus the “delta” accounting profit. This measure is an important metric for evaluating alternative uses of operating capital. Thus, when E2E supply chain investment is contemplated, it is essential that the economic profit be
considered to commit the “economic costs”.

The Synergistic Supply Chain, with its E2E visibility and decision automation and support, provides the opportunity to limit the total product lead time and thus reduce the total product costs. There are direct correlations between the efficiency and effectiveness of E2E supply chains, and these depend on the collaboration and shared objectives of the trading partners in the supply chain.

5. Hurdles and Barriers

By understanding synergistic supply chains and how they drive corporate value, the obvious question can be raised as to why all companies are not tightening the integrations to achieve value goals. One answer lies in the traditional gaps between operations and finance – gaps that persist in language, terminology, methodologies and setting collaborative and common objectives. Another factor are the different priorities of the two missions – finance and accounting are often driven by income and expenses, while supply chain leaders are driven by customer service, disruptions and operating costs.

There are five primary pushbacks we hear from executives on the questions of collaborative common objectives and the challenges of integrating E2E supply chains. Let us consider these and some meaningful responses:

1. Complexities. There is no question that global supply chains have introduced new and challenging complexities. But the digital revolution has the capability to reduce the complexity by providing actionable data and information, faster, and better.

The synergistic supply chains, with their focus on network ROI via a collaborative foundation, will maintain the primary focus on producing value for all parties in the network. This reduces and even eliminates the numerous sub-optimizations that are the focus through the network, which provides much of the complexity. Initiatives that drive ROI and gross margins throughout the network for all trading partners have the benefit of simplifying the work.

2. Processes. Some pushbacks have to do with the commonly accepted need to reengineer business processes before E2E Synergistic supply chains can be designed and leveraged. What the digital age has taught us is that sequence does not work. Processes can and should be reengineered at levels 3 and 4 after the new technologies are selected. What should precede the technology implementation is only a high-level process rethink that integrates the network partners, for the supply chain MEGA processes (PLAN, BUY, MAKE, MOVE, DISTRIBUTE and SELL). This newer approach gets change management ready for the technology, so that its solutions on real-time data visibility and decision support can be leveraged immediately, with "details to follow".

3. Technologies. This pushback occurs in two forms: (1) that the company has invested heavily in its technology architecture and landscape, including both its ERP and its point solutions, and it is not ready to dispose or dilute their ROI; or (2) that the company is too involved in its current implementation of another point solution, and resources are not available for at least another year to even consider an E2E system.

These pushbacks are understandable but not defensible. When corporate finance measures are so impacted by an E2E system, the enterprise executives, and its Board of Directors, should both intercede to change the technology priorities. When the most important ROI of an E2E reinvention is to improve the company's

"measures that matter" -- stock price, EPS, FCF and EBIDTA -- it is therefore too mission critical to delay, be overconcerned about past investments or be hesitant about changing directions.

4. Investments. This pushback is similar to that just discussed on technologies. The issue is about cost of capital, hurdle rate, verified ROI and other decisions about capital investments. The fact is that generating "gross margin cash" is exactly what is needed to provide the capital to invest in serving customers and build for the future.

New business and operating models are necessary to meet the increasing and changing customer demands and remain competitive as the business world changes. Digital Commerce requires revised strategies, alignments and operations practices, all of which require well-planned initiatives and roadmaps. Investments are essential to make these transitions fast, efficient and effective. Executive teams must rethink their capital plans, and resource allocations, to "start now".

5. Resistance to Change. This pushback is often believed, but not often verbalized. The fact is that the digital age will leave behind those who are unable or too slow to adapt. Speed matters in this new digital age. First, executives must change their mind-sets – from thinking inside-out, to thinking outside-in. They need to start with in-depth customer knowledge and insights and work backwards to their company and to their trading partners – in effect, redesign and leverage the Synergistic Supply Chain to act on customer needs and not on company-designed services and service level agreements (SLA's).

They also need to be less concerned with EPS – even though capital markets evaluate on that metric and get more concerned with gross margin cash and FCF, in order to provide the internal capital to invest in innovation. What is different today? Scale, speed, and technology!

6. Conclusion

It is more and more apparent that the digital age will leave behind those companies that are unable to adapt, quickly and effectively. Nowhere is the adaptation of new leading practices more important than with the company's supply chain – in its E2E entirety.

The evolution of supply chains has occurred over the 30 years. This table illustrates their overall evolution:

Supply Chain View	Definition
Cost Center	functions viewed as costs; all tactical; transportation and warehousing are the focus.
Functions	production and distribution added; networks optimized for costs.
Integrated	inventories gained importance; services added; "flows" began to matter; global issues more prevalent.
Synchronized	global chain visibility matters: ability to orchestrate matters.
Synergistic	E2E trading partners connected as a network; sharing real-time data; total time and cost finally managed.
Profit Center	Finally, supply chains recognized as high value contributors. Customers are the new primary focus; digital commerce is enabled.

It is increasingly recognized that those companies that view their supply chains as "profit centers', which include synergistic E2E collaborations, best deliver value to customers and are the market leaders. Digital and e-Commerce strategies separate the leaders from their competitors, whether they are retailers, brands, industrial products, distributors or other, enabled by supply chain profit centers.

7. Contact Information

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