

Digital Supply Chain Transformation Guide:

ESSENTIAL METRICS



The Frontside Flip:
Focusing on Customers
and Revenue



“The biggest weapon a company has to outperform its competitors over the next 3 years is the Digital Supply Chain. The Digital Supply Chain will dramatically improve revenue and reduce costs while delighting customers. A true winning play.”

Sam Palmisano, former Chairman and CEO,
IBM and Founder, Center for Global Enterprise (CGE)

GLOBAL DIGITAL SUPPLY CHAIN COMMUNITY



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You Get What You Measure: Making the DSC Real

The supply chain is the most significant business process for most companies today. This is a given for companies that manufacture and distribute products, but it rings true for companies that deliver software or financial services as well as other services. Such companies may not use the term “supply chain,” but they have one and it must be managed with greater precision than ever. In fact, Our research shows that companies who successfully implement a Digital Supply Chain will reduce costs by 20% on average while increasing revenue by 10%.

In 2015, the Center for Global Enterprise (CGE) assembled a group of chief executives in Sanya, China to discuss managing global businesses. These CEOs agreed that the topic

of the Digital Supply Chain (DSC) was their highest research priority.

We don't want to measure how good we are; we want to measure how good our customers think we are.

ANDERS KARLBORG, ASSISTANT CEO, ZTE

Subsequently, the Center for Global Enterprise recruited leading supply chain executives from 26 companies around the world. This exceptional team of CEOs and supply chain executives joined forces to define the game-changing business strategies, technologies and market patterns that make a DSC a must-have in today's business world.

Companies need to focus on four areas to make the transition to a DSC: Demand, People, Technology, and Risk. The management of these areas were defined and a comprehensive review of the findings can be found in the October 2016 white paper [Digital Supply Chains: A Frontside Flip](#). The key take-away of this research is that Digital Supply Chains must focus on the customer to drive business growth. Supply chains are no longer a necessary evil where low cost and on time delivery wins. They are a tool for market success and business growth.

The CGE established the Digital Supply Chain Institute (DSCI) to continue its focus on supply chain transformation and to cooperate with the Global Experts Group of 26 leading supply chain companies representing a cross section of industries from around the world.

The Global Experts Group determined that three areas in particular require more attention to hasten the implementation of the Frontside Flip. These research areas were:

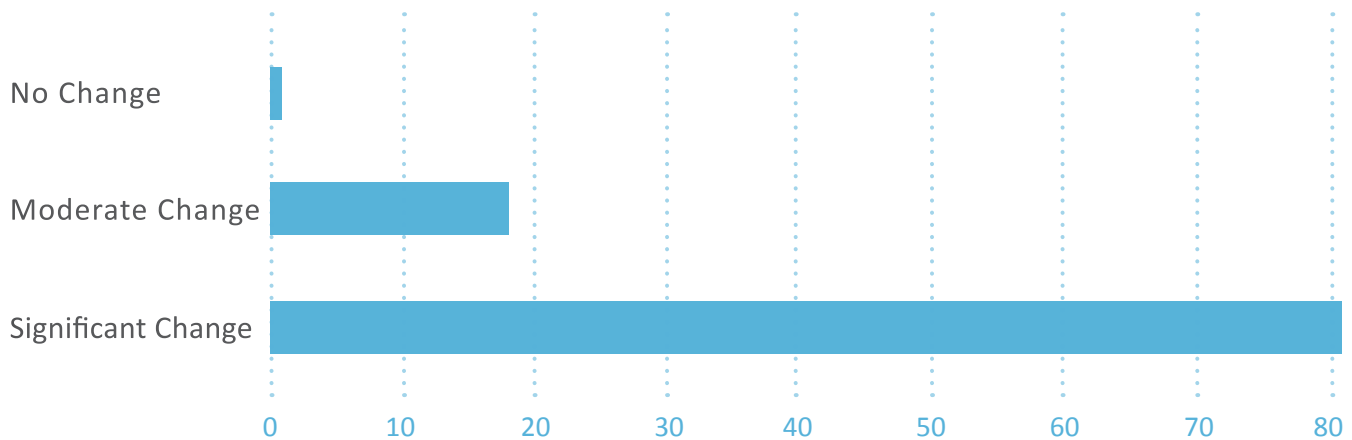
1. DSC Performance Metrics
2. Blockchain Technology
3. Driving Demand with the Digital Supply Chain: Using Real-Time Big Data and AI/ Machine Learning

The DSCI agreed to execute focused research projects in these three areas to expand upon the findings outlined in *A Frontside Flip*. Performance Metrics was selected as a top priority and is the focus of this paper: creating the right set of measurements to ensure that a DSC is built, that growth is accelerated, market share increased and costs dramatically slashed.

The DSCI surveyed leading companies – around 125 supply chain leaders – on how performance metrics will change in the next three years. 81% of the respondents said that performance metrics will change significantly while only 1% expect no change in their performance metrics between now and 2020ⁱ.

When asked how Digital Supply Chain performance metrics will look in relation to existing supply chain metrics, 79% of the respondents said that performance metrics will be a combination of new DSC metrics and traditional supply chain metrics. 10% of the respondents said that DSC metrics will feature completely new metrics and only 6% of the respondents believe that the metrics will resemble existing metrics, albeit better and fasterⁱ.

Change in Performance Metrics Over Three Years



Guide for Action

This guide is the result of extensive research and numerous consultations with our DSCI members, Global Experts Group, industry leaders, practitioners, and academics. The report has four major sections, the first of which covers a review of currently used supply chain metrics which are referred to as “traditional” supply chain (TSC) metrics. These TSC metrics are important as they comprise 80% of the DSC scorecard. The second section outlines a new set of essential metrics for a Digital Supply Chain which will show how these metrics account for change in the areas of Demand, People, Technology, and Risk. The third section includes an extensive maturity assessment which is designed to help supply chain executives determine how much progress has been made in their supply chain transformation while providing guidance to companies as to where they should focus efforts to improve. The fourth and final section also provides guidance on how a company should implement the significant changes required for an effective Digital Supply Chain to grow revenue and reduce costs.

We believe the implementation of these new measures, combined with certain existing traditional metrics, will help companies accelerate their transition to a Digital Supply Chain.

The work is intended for senior supply chain executives, but can also serve as an insightful guide for anyone working on or studying supply chain management and best practices. Part of the transition to a Digital Supply Chain involves re-defining our understanding of supply chains to include industries that have not traditionally considered themselves supply chain businesses.

We have a culture that respects and works towards performance metrics. We take them seriously and so do our people.

MIKE CORBO, CHIEF SUPPLY CHAIN OFFICER, COLGATE-PALMOLIVEE

For this reason, we believe our work is equally applicable to executives working in manufacturing and commodities trading, as well as those working in finance, banking, software, and other service industries.

Implementing a DSC requires supply chain leaders to take conscious steps towards creating a more demand-driven and customer-focused supply chain. In keeping with this principle, this handbook adheres to a customer-driven approach. We hope you find our examination of traditional metrics, our maturity assessment, and our outline for new digital metrics a theoretical and practical way to understand “how” your company can make the transition and become a more profitable, cost efficient Digital Supply Chain.

Such a transition requires education and training. The DSCI has developed Leading the Digital Supply Chain, a 5-week online course combined with a one-day, in-person workshop to help companies take advantage of new management practices, the expanding universe of data, and emerging technologies to collaborate with their customers and suppliers to drive innovative products and services.



Photo credit: ZTE

Chapter one

What is a Digital Supply Chain?

“In Digital Supply Chains: A Frontside Flip”, a Digital Supply Chain (DSC) is defined as a customer-centric platform model that captures and maximizes the utilization of real-time data coming from a variety of sources. It enables demand stimulation, matching, sensing and management to optimize performance and minimize risk.

There are several key considerations in transforming a supply chain to a Digital Supply Chain. First and foremost is understanding your customer and the end consumer in a more sophisticated way by utilizing data analytics and advanced technologies.

As defined by the customer, our business is all about precision, accuracy, and quality, and our metrics also have to be precise, accurate and of high quality.

JOHN WAITE, VP GLOBAL SUPPLY CHAIN, MICRON

Production will be driven by customer demand and not by manufacturing efficiencies. This will lead to improved inventory management while better meeting customer needs.

Instead of being a function that focuses on the less visible aspects of business (everything from procurement through delivery), the supply chain will evolve into an integrated role alongside sales, marketing and product development. Digital Supply Chain leadership will work across all elements of the demand stack including demand stimulation, demand management, demand sensing, and demand matching. This requires an increase in internal collaboration and with key supply chain partners – suppliers and customers. Data analytics and advanced technologies enable companies to have greater visibility into supply chain risks and prevent or mitigate negative impacts in an improved fashion.

It is important that a company start by developing a DSC strategy. We will suggest how to develop this strategy later in this document. One point must be made clear, if you do not change your

measurements you cannot adapt to a new strategy. Conversely, when changes are made to your metrics, great things will happen.

Metrics Make It Happen

When communicating what really matters most to employees, investors, suppliers and customers, there is no better quantifiable tool than a business metric. Remember, you can't improve what you don't measure. When implementing a change, it is important to evaluate the effectiveness and efficiency of the changes being made. Metrics assess business undertakings, no matter if these measures involve production goals, sales, customer satisfaction, or risk avoidance, as they play a role in assigning accountability to different departments in areas where the company operates and performs.

Change Digital Supply Chain metrics and you will change behavior.

Transforming your supply chain to a Digital Supply Chain means adding new metrics to determine the success of your efforts to drive change. The three sections on traditional supply chain metrics, Essential Digital Supply Chain metrics, and the Transformation Maturity Assessment provide a step-by-step guide on how to use current and new performance measures to assist your company in building a successful Digital Supply Chain.



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Chapter two: Traditional Supply Chain Metrics

Introduction

To move forward, it is important to look at the metrics currently in use in a supply chain. Transformation does not happen overnight, and businesses cannot come to a grinding halt when changing policies and long-standing practices. Existing measures used to assess supply chain performance are, therefore, of paramount importance. For the sake of clarity, we have chosen to describe metrics currently in use today as “traditional” supply chain (TSC) metrics. These measures represent the role of supply chains centered on facilitating the movement of goods and services, but not necessarily the customer-focused or demand-driven ones that are characteristic of Digital Supply Chains. While we recognize the valuable role, these traditional measures continue to play in today’s supply chain, we firmly believe changes must be made for a company to undertake a successful transition to a Digital Supply Chain.

To gain a better understanding of the type of metrics currently being used across industries,

our team carried out extensive academic empirical research, conducted interviews with many of our Global Expert Group companies, and benchmarked our findings with data from the American Productivity & Quality Center (APQC)ⁱⁱ.

The guiding research questions used to shape this investigation were: “What are the supply chain metrics that supply chain leaders care about the most?”; and “What are the supply chain performance metrics that are ‘universal’ in practice across industries and organizations?” In *The Hierarchy of Supply Chain Metrics*, Debra Hofman wrote that “the key is to focus on the few critical metrics that really matter – the ones that provide the most balanced view of end-to-end supply chain performance, allowing companies to see clearly how they’re doing and why, and where they’re making tradeoffs” (Hofman D., 2004)ⁱⁱⁱ. The Global Experts Group predicts that the scorecard of the future Digital Supply Chain will still include roughly 80% of these Traditional

Supply Chain metrics and these metrics will be deeply impacted by the Digital Supply Chain. It is important to consider how a firm's digital

actions and initiatives will ultimately improve its performance as measured by these key traditional metrics.

Traditional Supply Chain Metrics

Our research concludes that key traditional metrics for supply chain leaders will continue to be used as strategic tools for managing supply chain performance. Metrics such as Perfect Order and Demand Forecast Accuracy will not become irrelevant, or less important, as we transition to the Digital Supply Chain. Instead, these metrics will become the best and most reliable indicators of the efficacy and magnitude of the benefits of emerging digital strategies, actions, and outcomes. Of course, there are many arguments why supply chain metrics are not “one size fits all.” Some supply chain strategies are highly focused on customer service as a firm differentiator and, as a result, a leader may be comfortable with higher levels of inventory. Alternatively, a perfectly legitimate strategy may trade off some degree of customer satisfaction associated with higher inventory levels for the sake of efficiency, cost reduction, and risk management. Our proposal for a key set of traditional metrics recognizes this strategic segmentation, and attempts to highlight a standard set of measurements that will help you assess your current performance, and importantly, the impacts of any new digital activities.

The following chart illustrates the key Traditional Supply Chain metrics our research team has found to be most useful in terms of

isolating and determining the potential and actual impacts of the Digital Supply Chain.

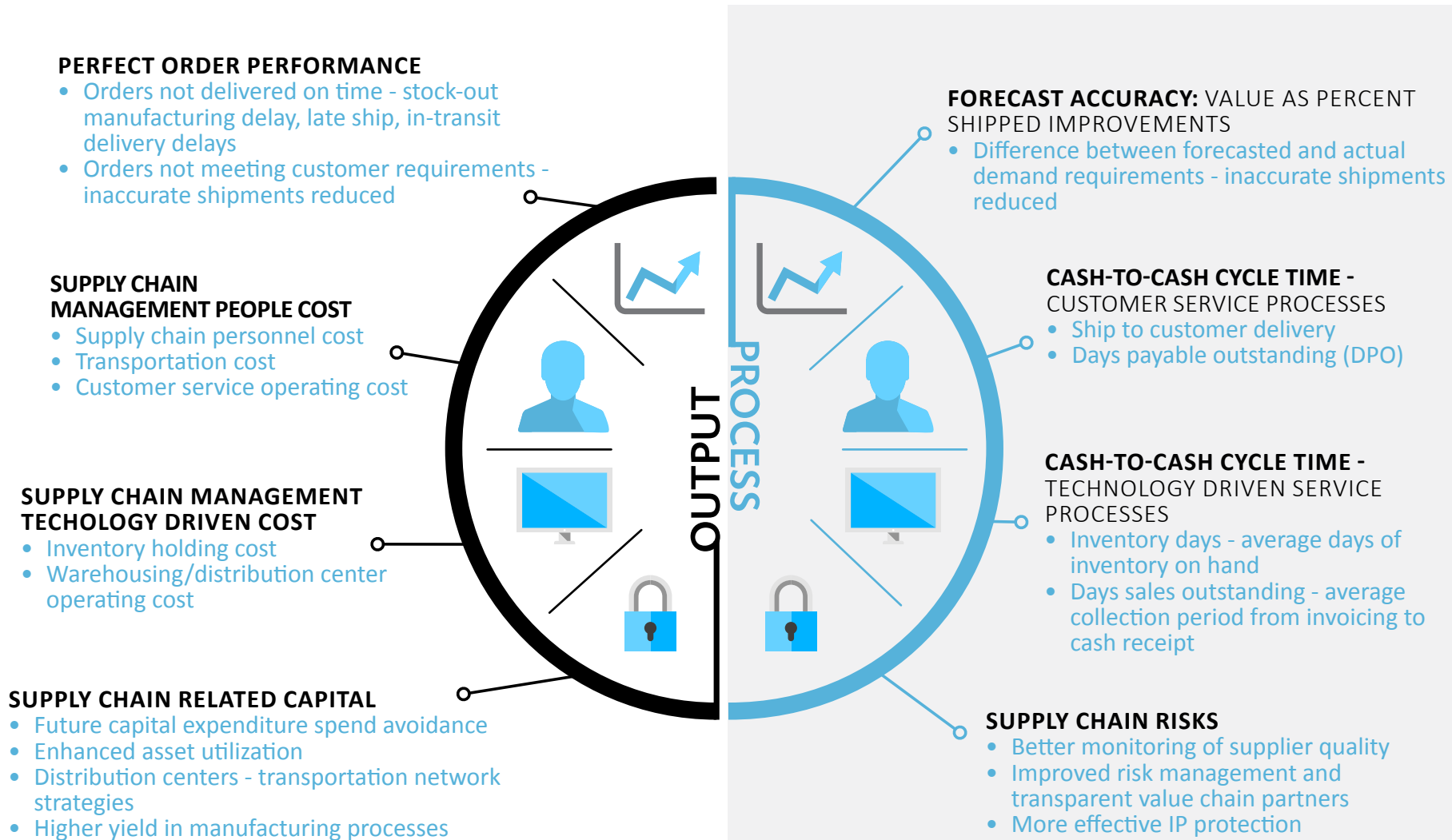
The metrics shown in the chart should look familiar to supply chain leaders. Our research team has organized the metrics into Output Metrics and Process Metrics. We have further divided them so they are aligned with the Digital Supply Chain focus areas of Demand,



Photo credit: Li & Fung

People, Technology, and Risk. We believe that these categories provide needed structure to assess and manage Digital Supply Chain initiatives and performance.

Traditional Supply Chain Metrics



APQC Benchmarks

The DSCI research team recognized the need to acquire and organize relevant benchmarks for the traditional measures put forth in this guide. How else can we ascertain the relative benefits of investments and actions in the Digital Supply Chain without reference points for expected performance? The challenge we face is the lack of collective data about Digital Supply Chains at this early stage of companies' transformation. To overcome this limitation, our team identified relevant open standards benchmarks from our research partner organization, APQC.

These examples across industry metrics and their accompanying top, median, and bottom performance values and percentages, give us baseline data that could be utilized when developing traditional supply chain performance

targets. While there are limitations to the precise use of these benchmarks, including the challenge of normalizing data to account for different measurement approaches utilized by APQC member firms submitting information, there is a conceptually sound argument for comparing your firm's current state against the open standard as a way to highlight strengths and weaknesses in performance. Key performance indicators calculated to show potential weaknesses against the APQC benchmarks may be stronger candidates for prioritizing remedial Digital Supply Chain strategies and actions.

The following chart was provided by APQC as a starting point for the key traditional measures we discuss in this guide.

APQC's Traditional Supply Chain Management Tune-Up Diagnostic Cross Industry Data

PROCESS GROUP	MEASUREMENT CATERGORY	KEY PERFORMANCE INDICATOR	TOP PERFORMERS	MEDIAN	BOTTOM PERFORMERS
Deliver Products and Services	Process Efficiency	Value of forecast accuracy as a percentage of value shipped	95%	90%	80%
Deliver Products and Services	Cost Effectivness	Supply chain management costs per \$1,000 revenue	\$26.31	\$58	\$107.09
Deliver Products and Services	Cycle Time	Cash-to-cash cycle time, in days	30	45	80
Deliver Products and Services	Process Efficiency	Perfect Order Performance	95%	90%	81%

TSC Metrics

How will Digitalization Drive Improvements?

The world is in the midst of a substantial number of major changes that will force companies to change the way they lead, manage and operate their supply chains. Taking advantage of these

changes will lead to great success. Improvements should occur across most TSC metrics as companies respond to change. The game-changer list includes:

Demand Forecast Accuracy (DFA)

DFA is one of the traditional metrics most central to helping us assess the impacts of digitalization. DFA improvement strategies, such as investments in new processes, technologies, and people focused on achieving faster and more immediately actionable demand forecasts,

are ripe candidates for digitalization. Key digital actions that are likely to impact DFA include: collection, analysis and proper use of demand sensing data such as analytics and real-time algorithms to augment historical demand data from transactional systems.

Perfect Order

A perfect order is one that is delivered completely, accurately and on time. This measure is often regarded as a proxy for overall supply chain performance and as a leading indicator of customer satisfaction. Digital Supply Chain strategies and actions that can influence this

metric include: more accurate and timely information regarding inventory levels and raw materials, predictive warnings of transportation network disruptions, and real-time sensing of the quality of materials in manufacturing processes.

Cycle Times

The classic tradeoff most supply chain leaders face is how to balance inventory holding costs against the ever-rising expectations of outstanding customer service. To achieve a perfect On-Time-In-Full delivery record, it is commonly accepted that inventory levels, and working capital costs, must be accordingly high. The added value of the Digital Supply Chain lies in its ability to help supply chain leaders manage these trade-offs more

effectively, with reduced information latency, more accurate customer sensing data-driven forecasts, and greater transparency related to costs. Digitalization strategies effectively target the narrowing of margins of error posed by these trade-offs with a combination of low-latency demand information and people equipped with newly informed analytical and sensing technology.

Supply Chain Impact on Value Creation

This guide is focused on the Digital Supply Chain and how supply chain leaders deal with the operational performance of their functional areas. The transformation to a Digital Supply Chain places the supply chain function in the

center of value creation for the organization. Consequently, a more robust and wider view of the impacts of Digital Supply Chain investments and actions is needed.

Our team has found it useful to ask, “How will this digital strategy or action help improve supply chain performance?” When focusing on the value of digital investment, it is important to remain open-minded as you consider processes or technologies that are over-exposed in the popular literature. Will the deployments of technologies like 3-D printing, driverless vehicles and AI automatically lead to greater supply chain performance? Our research approach for developing this metrics guide was to promote a more data-driven assessment of digital strategies and actions before implementing them, and to remain optimistic as you carefully select ideas that have the potential to bring great added value quickly and efficiently. In addition, you must incorporate a simple, effective value model for how metrics are likely to influence a firm’s overall performance. Performance improvements from Digital Supply Chain actions will not be limited to the supply chain function alone, they will influence shareholder value. Consider the following value

model developed by the DSCI based on supply chain literature, such as Enrico Camerinelli’s book on linking financial performance and supply chain decisions (Camerinelli E., 2009)^{iv}, and Hofman’s work on traditional supply chain metric hierarchy (Hofman D., 2004)ⁱⁱⁱ.

In this model, we illustrate the relationships between key supply chain performance metrics influenced by digital actions, and key firm financial value drivers, such as operating margins and capital efficiency. While these relationships can be understood in normal operating terms, we recommend noting how proposed and actual digital actions impact both internal supply chain performance, and, ultimately, improve return on invested capital and total return to shareholders. Supply chain leaders seeking to justify their selected investments in digital technologies, processes, and people, are advised to project how they might also improve the overall financial performance of the firm.

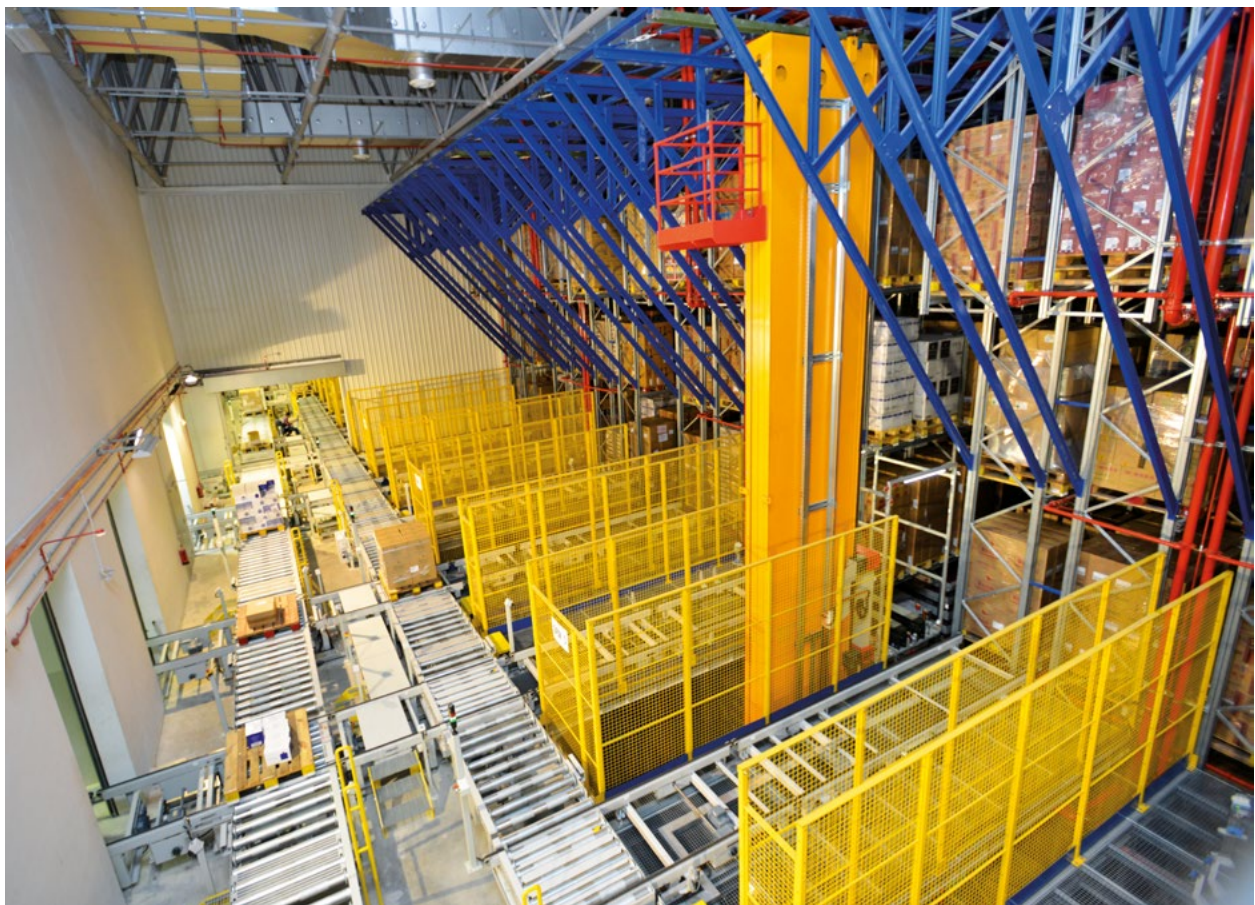
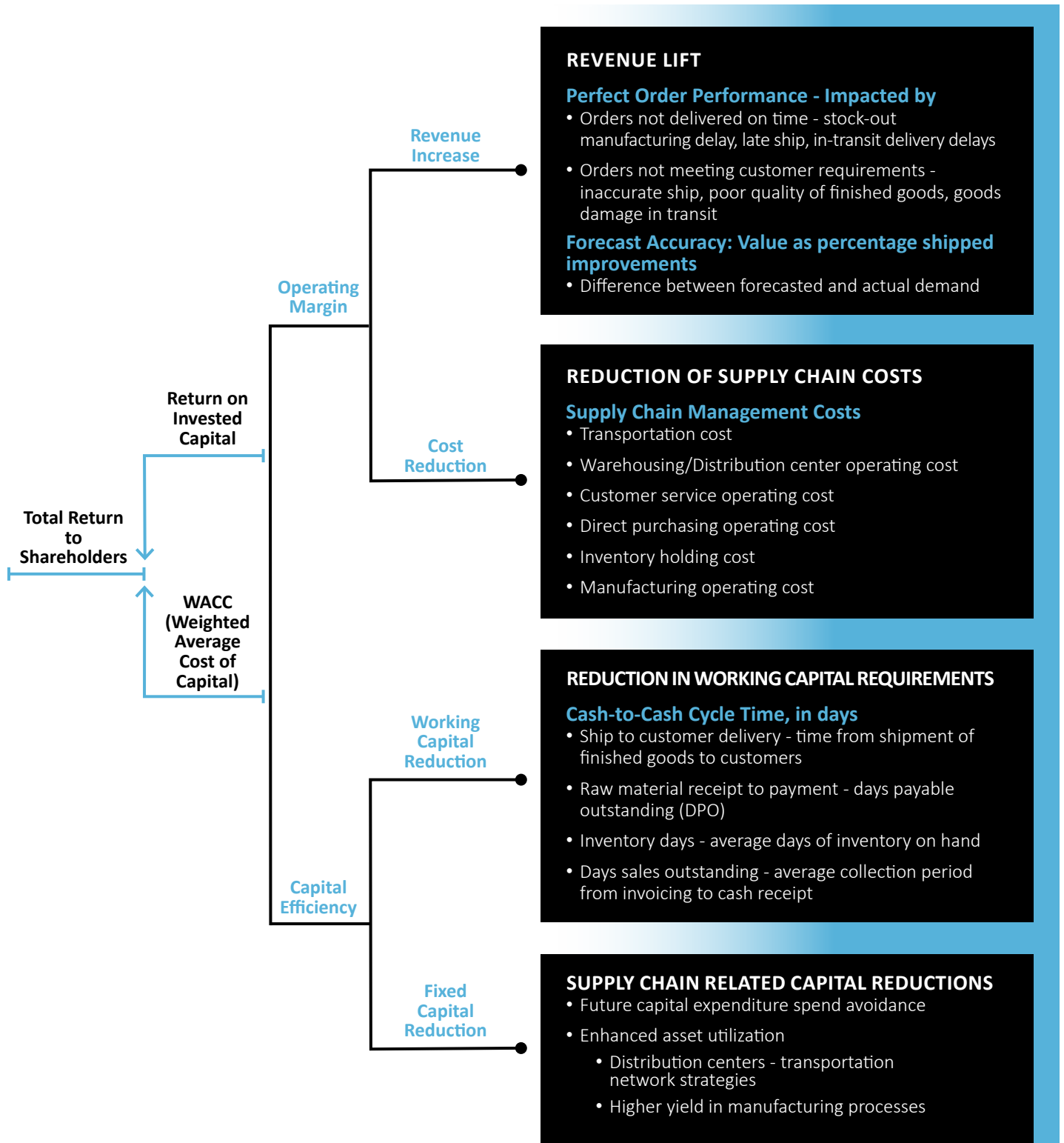


Photo credit: Li & Fung

Supply Chain Impact Framework

KEY METRICS



Sources: Stapleton, Hanna, Yagla, Johnson, & Markussen, 2002
 CSCMP, Haozhe Chen, C. Clifford Defee, Brian J. Gibson, Joe B. Hanna, 2014



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Chapter three: Essential Digital Supply Chain Metrics

What are the Essential DSC Metrics?

The idea is to automate everything that can be automated in terms of manufacturing, equipment, and supply chain operations.

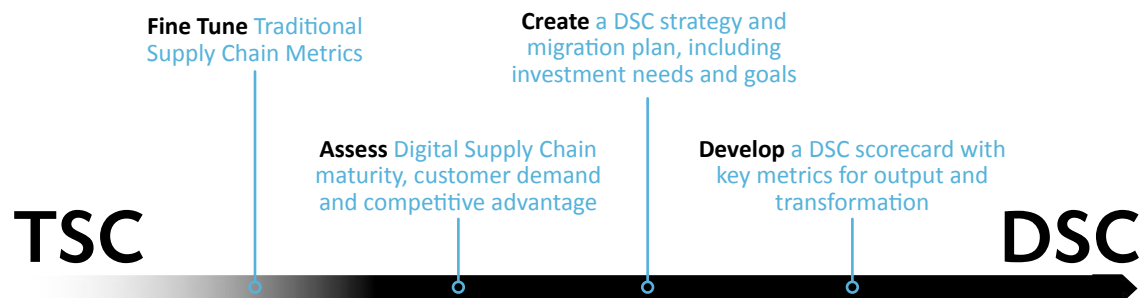
ANDRES BEJARANO, DIRECTOR, FACTORY PERFORMANCE AND RELIABILITY, GLOBAL SUPPLY CHAIN, COLGATE-PALMOLIVE

New business models and philosophies require new methods of evaluation. We believe transitioning to a Digital Supply Chain is the best way forward for any company, including companies that have not traditionally considered themselves as having a supply chain focus to their business. New metrics are needed to drive these changes in order to focus people on performing different sets of activities and to assess the

effectiveness of your overall transformation. The Transformation Maturity Assessment included in this guide provides a powerful indicator of your current state of change.

In this section, we aim to help you perform steps to undertake the “Frontside Flip” successfully. Here we offer a list of Demand, People, Technology and Risk metrics which are essential for measuring a successful DSC transformation. The new DSC scorecard will include essential TSC metrics and a list of dynamic DSC metrics. We believe the adoption of these measures will help companies dedicated to undertaking this transformation become more demand driven and customer focused.

Guidance for Using These Metrics: Getting it Done



The first step each company should take is to complete the Transformation Maturity Assessment and also distribute the “Outside In” assessment to at least five customers and five suppliers, included later in the guide. In many cases, it is ideal to distribute the assessment to a cross section of supply chain, sales/marketing, finance and operations people. It is crucial to have the results confirmed through benchmarking, or an evaluation by outside experts familiar with the Digital Supply Chain since self-assessment, without third party verification, is frequently misleading.

The second step is to analyze assessment results and determine where opportunities for improvement lie. Strive to strategically prioritize actions and quantify the impact of improvement in each area. For example, how much expense would be reduced if we opted for driverless vehicles? How much would sales rise if we did a better job of demand forecasting? It is important to estimate the size of the potential benefit so that the right level of investment can be made.

The third step involves developing a Digital Supply Chain strategy. This strategy should clarify expected benefits, the people accountable,

and the investment needed. Demand, people, technology, and risk should each be addressed. The strategy should produce at least a 10% revenue increase and a 20% decrease in costs. You may not realize these outcomes until 2020, though some companies will reach the target sooner.

The fourth step is to select the DSC performance measures that best measure the benefits and drive the transformation. Each company must select at least one essential output metric and one process metric for each of the four areas of change: Demand, People, Technology, Risk. Output metrics directly affect revenue or expense, such as total revenue gained from DSC actions. Process metrics drive needed actions that change some element of the business process. Hiring a targeted number of data scientists, deploying 3D manufacturing or increasing the number of compliant suppliers are examples of such process metrics.

Finally, the metrics must be assigned to specific people in your company. In some cases, such as Demand Stimulation, the metric might be shared between the Sales and Supply Chain. If so, the metrics should be built into the performance review process and compensation.

Inevitably, the strategy and metrics chosen, have to be embraced by company leadership. We recommend two half-day meetings be conducted in order to develop a DSC strategy. Appendix C shows how the meetings should be organized. These meetings should be conducted to align people around the new direction and acceleration. The offsite might be called:

Achieving the Digital Supply Chain - Benefits, Measures and Accountabilities. Selected sales, marketing and finance people should participate with the CEO and CFO agreeing to the plan.

If you do not measure and carry out what is required by the process metrics, you will not achieve the output results that the DSC can deliver.

Demand Stack

The single most important change for supply chain organizations is to shift the emphasis from cost reduction and on-time delivery to managing elements of the demand stack actively.

demand matching. Each company must incorporate precise metrics for improvements made, or planned to be made, in demand. Including the responsibility for demand stimulation will be a new feature for most companies.

The demand stack consists of demand stimulation, demand sensing, demand management, and

Digital Supply Chain



Guidance for Service Companies

Service companies deliver resources to their customers which means they have to hire, train, and contract for their services' resources. They also have to deliver these resources to the customer when needed. Such companies are remarkably similar to a manufacturing company but the line item parts that meet required specs are people. Most services companies have to collect data on employee skills and the skill

set required of future employees. In computer services, these skills pertain to specific code languages and all service companies must manage resources with the rigor that a product company uses. Digital Supply Chain metrics can direct and record progress. The service companies in the GEG agree that the Digital Supply Chain will increase customer revenue as well as reduce costs.

Guidance for Product Companies

Product companies typically have a supply chain leader with some scope of authority. However, in many companies, the scope of authority has shortcomings that need to be overcome. Who determines when factories will be closed or opened? Who contracts out specific parts of the supply chain? As a general rule, a Digital Supply Chain leader should be appointed in such

companies. This person should have powerful decision-making authority over procurement, manufacturing, delivery and demand, and should report to the CEO. The focused accountability of a senior leader, with broad responsibility for process and results, will augment the implementation of a Digital Supply Chain and get results.

Guidance for Financial Companies

Very few financial companies have a Chief Supply Chain officer even though some financial institutions use the term "supply chain." None-the-less, it is extremely important to invoke Digital Supply Chain thinking into Financial Services. For example, one major investment manager in India tracks the "total number of financial

transactions without human intervention." We expect that progressive financial institutions will soon appoint a Digital Supply Chain executive to transform their own supply chains to give companies a focal point for needed changes, some of which cut across business unit lines.



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The Essential DSC Metrics

Crucial Choice, Politically Tough, Incredibly Effective

Selecting appropriate metrics is crucially important as they drive the behavior that you get. Failure to identify incorrect metrics could send your organization and people into a tailspin. Here we present a recommended process for identifying a short list of Essential DSC Metrics. A section of this white paper described the four-step process in creating a new scorecard which contained metrics from the TSC and the DSC in each of the four critical areas of Demand, People, Technology and Risk.

We strongly recommend every company select at least one metric from each of these four critical areas to drive a successful DSC. Demand is so crucial and so novel to most supply chain organizations that we recommend at least two metrics. Developing a People Plan, or, as some experts refer to it, a Talent Resources Strategy, is also essential as it is clear that people require a variety of skills to attain Digital Supply Chain results. You must find people capable of capturing and analyzing data to drive better decisions. You will need more people with backgrounds in Sales and Marketing and Customer Service to drive more customer-focused growth solutions. Relying on people with procurement engineering backgrounds to be responsible for revenue growth is a recipe for disaster. Therefore, people requirement measures in this area are a must as technology is central to going digital and associated risks are constantly increasing in this field. Your metrics will shape management decisions across these areas.

Choosing new metrics, holding people accountable and paying them for results is difficult. In particular, DSC people may sense that they cannot drive revenue. The sales team or engineers may believe that DSC people are purely operational and underestimate their efforts. If this occurs, it is a sign that you are

on the right track! Navigating through this challenging process of setting new metrics and determining how to collect and use data is an integral part of the DSC as will be shown later in this document.

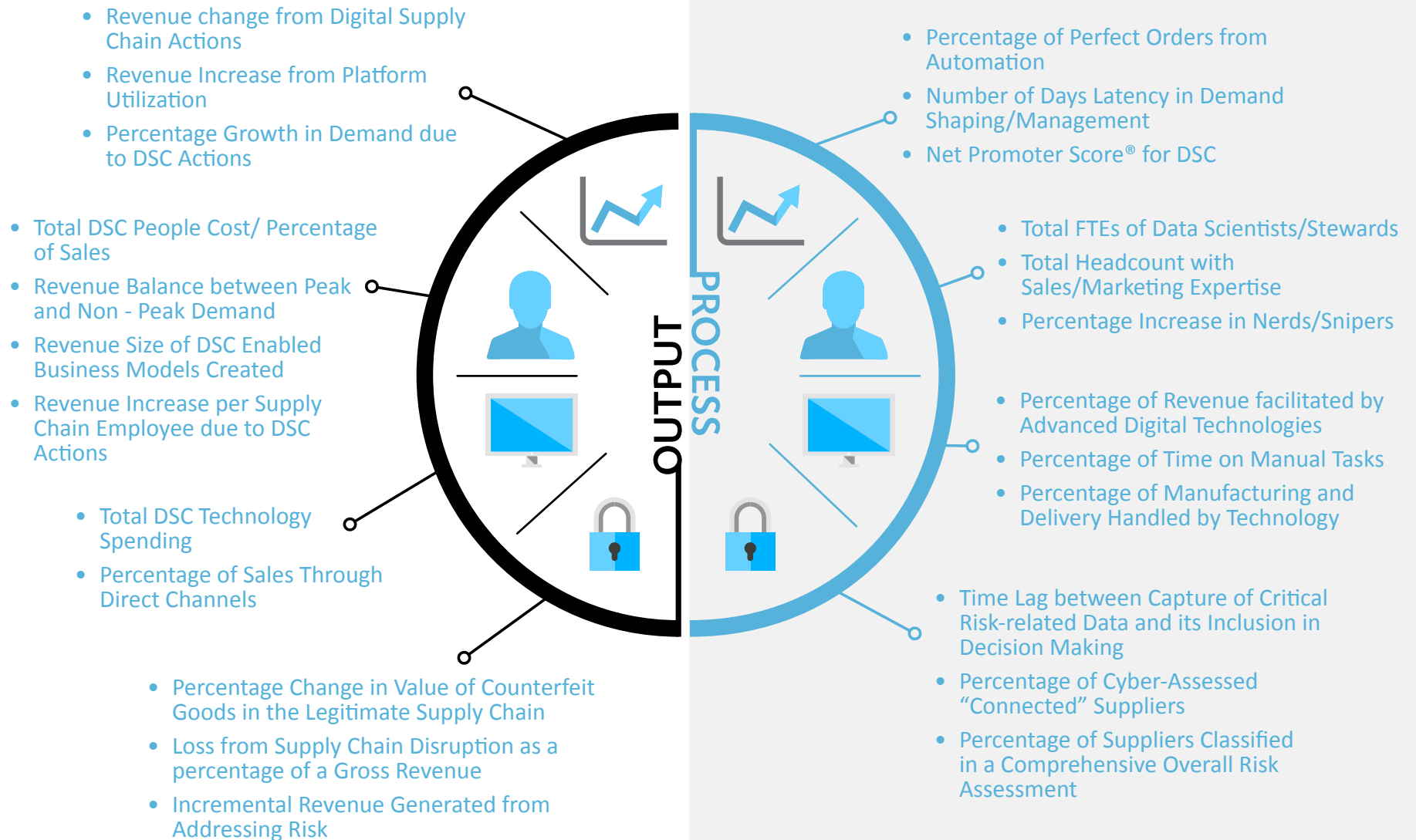
As with the Transformation Maturity Assessment, our DSC metrics have been divided into four areas which are critical when transforming a traditional supply chain into a digital one. Measuring for Demand, People, Technology, and Risk ensures that all sections of the company are fulfilling the required changes to become more demand driven, customer focused, technology savvy, and risk compliant.



Photo credit: Li & Fung

You can access our interactive tool to assist you in selecting the correct Essential DSC Metrics for your business in **Appendix A: Essential Digital Supply Chain Metrics: Pick List**. By clicking on each metric, you can find an explanation of what the metric does, why it is important, and how the metric should be implemented.

Essential Digital Supply Chain Metrics



People are Coin Operated

When compensation and rewards reinforce the need for success, people will do what is needed to accomplish the metrics for which they are accountable.

The best measurements do not drive transformation unless they become part of the management culture and the company way for getting things done. Accountability for each of the metrics must be assigned and it is crucial to balance the need for shared, integrated metrics with line of site accountability for specific results.

THE PRINCIPLES FOR COMPENSATION ARE STRAIGHTFORWARD:

1. More pay is at risk and the upside is larger, so supply chain people should be paid like sales people.
2. The bonus pool should be funded based on company and supply chain results. The target split could be 50/50 for funding.
3. Bonus payouts should be based on supply chain results and individual results. The target split could also be 50/50 for payouts.
4. Special incentives must be associated with managing the Demand Stack. In Year One, at least 20% of the payout should be for Demand Stack improvements.



Photo credit: Li & Fung



Photo credit: Li & Fung

Chapter four: DSCI Transformation Maturity Assessment

Why a Transformation Maturity Assessment?

Transforming your supply chain to a Digital Supply Chain (DSC) is a radical departure for many companies and rare is the company that can stop and start from scratch. Consequently, the supply chain must be kept running while you transform it. Knowing how far along you are in your transformation to a DSC is necessary; you cannot improve what you do not measure.

Ideally, you should start with an evaluation of where your organization stands and decide which improvements to prioritize. The DSC

Transformation Maturity Assessment (TMA) is designed to help you measure how you are performing in each of the four foundational pillars of the DSC: Demand, People, Technology, Risk. The DSC Transformation Maturity Assessment is applicable to companies in any manufacturing or service industry. It will also assist you in defining a clear path and determining which steps will accelerate your transformation to a DSC by helping you allocate resources, make investments and prioritize improvements.

How TMA fits into the overall DSCI Performance Guide

Transformation Maturity Assessment

The Relationship between Transformation Maturity and Essential DSC Metrics

The Transformation Maturity Assessment measures the underlying foundation that enables your supply chain performance results to be repeated and continually improved to meet the changing business landscape. It studies the maturity of the processes you have in place to transform to a DSC and to continue the journey. Together, the Transformation Maturity Assessment and the Essential Performance metrics provide you with a comprehensive way to measure progress made toward a DSC and the impact it is having on your business.

Supply chains have always had numerous performance metrics and, in some cases, the number can be overwhelming. The justification for using performance metrics has been to provide accurate information on performance levels and to measure actual results against desired results. This chart looks at the Traditional Supply Chain metrics, the transformation and the Essential Digital Supply Chain metrics.

The DSC requires you to augment the TSC metrics and ensure that Demand, People, Technology and Risk are being tracked as essential components of the DSC. The Transformation Maturity Assessment follows these four essential areas.

As your DSC transformation matures, certain performance metrics will change and others may no longer be relevant. TSC metrics are likely to evolve in two areas in particular. First, the target measurement associated with KPIs may be increased. For example, the target KPI for “perfect orders” could rise from 90% to 95%. Second, the KPI itself may evolve to become more specific to a DSC. For example, a KPI for measuring “perfect orders” could be altered to measuring “perfect orders without human involvement.”

Regardless of the metrics you are using today, it is essential for you to use selected DSC metrics. In the following Transformation Maturity Assessment, a series of questions are asked about your progress and, specifically, whether you are using the new “essential” DSC metrics. When used together, the Transformation Maturity Assessment and the essential DSC performance metrics provide you with a foundation capable of driving continual improvement of your DSC.

Digital Supply Chain Performance Metrics/ Scorecard Research Framework

DIGITAL SUPPLY CHAIN TRANSFORMATION PATHWAYS PROCESS MATURITY*

Level 1 Level 2 Level 3

DEMAND

We have not integrated demand management or stimulation into our supply chain. We are at the early stages of using real-time data to forecast demand.

We are implementing programs to use real-time data in demand forecasting in some areas. Our SC team is increasingly involved in demand stimulation, demand shaping and management.

Our SC program is aligned with the "Frontside Flip." Our demand sensing and stimulation program enables us to generate additional revenue through improved demand visibility and the ability to satisfy demand.

PEOPLE

Our staffing, job performance metrics and leadership developments plans do not specifically take DSC transformation into account.

DSC and collaboration is integrated in our staffing, job performance metrics and leadership development plans. We have started to focus more on data-driven decision making.

Senior leadership shows clear commitment to the principles of DSC and appropriate performance metrics are fully integrated into how we hire, develop and compensate people.

TECHNOLOGY

Our technology implementation plans are not yet specifically linked to our DSC strategy. The technology in current use is focused on traditional SC fulfillment functions.

DSC is becoming more central to our corporate technology strategy and we have started to implement it with a focus on increased automation.

We strategically utilize digital technology to improve supply chain performance, with a focus on demand stimulation and risk management, leading to revenue growth.

RISK

The management of our supply chain business performance and compliance risks has not begun to take advantage of DSC capabilities.

We have begun to use real-time data and relevant advanced digital technologies to measure and monitor supply chain risk as well as new DSC risks, such as cybersecurity.

We use real-time data to reduce business performance and compliance risk through predictive analytics. Our risk program is increasingly automated in collaboration with our suppliers and customers.

ESSENTIAL METRICS EXAMPLES

DEMAND

- Revenue Increase from Digital Supply Chain actions
- Revenue from Platform Utilizations
- Percentage Growth in Demand due to DSC action
- Net Promotor Score® for DSC

PEOPLE

- Total DSC people cost/ Percentage of Sales
- Revenue Increase per Supply Chain Employee from DSC Actions
- Total FTEs of data scientists/stewards
- Total headcount with Sales/Marketing expertise

TECHNOLOGY

- Total DSC Technology Spending
- Percentage of Sales Through Direct Channel
- Percentage of revenue facilitated by Advanced Digital Technologies
- Percentage of time on Manual Transaction

RISK

- Percentage Change in Value of Counterfeit Goods in Our Legitimate Supply Chain
- Loss from Supply Chain Disruption as a % of Gross Revenue
- Percentage of Cyber-Assessed "Connected" Suppliers
- Percentage of Suppliers Classified in a Comprehensive Overall Risk Assessment

REVENUE INCREASE

- Perfect Order Performance
- Forecast Accuracy

REDUCTION OF SUPPLY CHAIN COSTS

- Supply Chain Management Costs
 - Transportation Cost
 - Warehousing/Distribution Center Operating Cost
 - Customer Service Operating Cost
 - Direct Purchasing Operating Cost
 - Inventory Holding Cost
 - Manufacturing Operating Cost

WORKING CAPITAL REDUCTION

- Cash-to-Cash Cycle Time, in days
 - Ship to Customer Delivery
 - Days Payables Outstanding (DPO)
 - Inventory Days
 - Days Sales Outstanding

FIXED CAPITAL REDUCTION

- Future CapEx Spend Avoidance
 - Enhanced Asset Utilization
 - Distribution Centers – Transportation Network Strategies
 - Higher Yield in Manufacturing Processes

RISK

- Supplier Quality
- Risk Managed and Transparent Value Chain Partners
- IP Protection

* excerpts of full details beginning on page 27

Outside In

One of the most fundamental shifts needed to transform to a Digital Supply Chain is re-orienting from an internal focus to a customer focus. To do this effectively means engaging your customers and your suppliers in assessing your supply chain performance. It also means broad internal engagement. We recommend distributing the

Transformation Maturity Assessment to all your supply chain staff, as well as selected customer-facing sales and marketing, IT and finance staff. In addition, we suggest asking at least five customers and five suppliers the questions below. Ideally, responses would be confidentially collected by a third party.

1. How well does our company's supply chain anticipate and match demand?

- a) One of the very best
- b) Better than most
- c) About average
- d) Worse than most

2. How well does our supply chain staff collaborate with your company for our mutual benefit?

- a) One of the very best
- b) Better than most
- c) About average
- d) Worse than most

3. How would you assess the state of our technology and its capabilities?

- a) One of the very best
- b) Better than most
- c) About average
- d) Worse than most

4. How well do you think we manage business performance and compliance risks?

- a) One of the very best
- b) Better than most
- c) About average
- d) Worse than most

Considerations on the Scope of the Assessment

As you or others in your organization complete the Transformation Maturity Assessment, it is important to keep scope in mind. Some organizations may choose to do one enterprise-wide assessment, while others choose to complete the assessment based on a more limited scope, such as a certain business unit, product line or geographic location. As previously mentioned, you may also want to have all

supply chain staff complete the assessment, as well as staff from sales and marketing, product development, IT, HR and finance. Getting a broad perspective on your transformation is invaluable in prioritizing actions. We recommend that you define the scope prior to beginning and note if you answer a specific question considering a different scope.

Transformation Maturity Assessment

As mentioned above, we have divided our survey into four sections with questions focused on assessing your current state of transformation. The questions have been designed to evaluate you on four critical areas of the DSC: Demand, People, Technology, and Risk. Answer each of the questions based on what you do today, not what you are considering doing in the future.

Each answer has a value of 1, 2 or 3, or, the value is based on the number of items checked in a “check all that apply” question.

Point values for each question within the category are averaged to generate category maturity in Demand, People, Technology, and Risk.

Review your maturity score in Demand, People, Technology, Risk against the Transformation

Maturity Summary Scale. A copy of a short version of the Transformation Maturity Assessment can be found in **Appendix B: Transformation Maturity Assessment**. DSCI will also release the Transformation Maturity Assessment as an Online tool for companies as well as their suppliers and customers. The comprehensive TMA Assessment is only available to DSCI members. Please contact us if you like to take the comprehensive assessment. The secure, online tool automatically generates your score based on your answers to the assessment questions. You can benchmark your scores against the blinded, aggregated scores of others that have completed the assessment. All information collected in the online assessment will be kept confidential and used by DSCI for research purposes only.

Transformation Maturity Assessment Scale

After completing the assessment, the maturity of your transformation is measured on a 1 to 3 scale in four categories: Demand, People, Technology, and Risk. A summary description of each maturity level is provided below. You can use the summary description for general guidance on your progress, while the

responses to specific questions can be useful in developing action plans. Overall, the results of the self-assessment give you a better understanding of your progress transforming for each of the four areas and provide insight into prioritizing areas for improvement that will accelerate the transformation.

	Level 1	Level 2	Level 3
DEMAND	We have not integrated demand management or stimulation into our supply chain. We are at the early stages of using real-time data to forecast demand.	We are implementing programs to use real-time data in demand forecasting in some areas. Our SC team is increasingly involved in demand stimulation, demand shaping and demand management, and performance metrics reflect this shift.	Our SC program is aligned with the “Frontside Flip.” Our demand sensing and stimulation program enables us to generate additional revenue through improved demand visibility and the ability to satisfy demand. We are integrating real-time data from a wide range of sources into our demand stimulation and forecasting. Our supply chain team proactively collaborates with marketing/sales and product development, as well as with suppliers and customers. We have a program to review and improve our performance against DSC metrics and benchmarks.

	Level 1	Level 2	Level 3
PEOPLE	Our staffing, job performance metrics and leadership development plans do not specifically take DSC transformation into account. Our SC department is primarily reactive to our sales department or overall corporate strategy.	DSC and collaboration is integrated in our staffing, job performance metrics and leadership development plans. We have started to focus more on data-driven decision making. The culture of the SC function has started to shift from being a fulfillment center to being part of a cross-functional team that helps to stimulate and match demand better.	Senior leadership shows clear commitment to the principles of DSC and appropriate performance metrics are fully integrated into how we hire, develop and compensate people. The culture of the SC function has shifted to focus on growth with an entrepreneurial spirit. The effectiveness of cross-functional collaboration and collaboration with suppliers and customers partners are measured. Supply chain leadership is heavily involved in corporate strategy and has appropriate decision-making authority.
TECHNOLOGY	Our technology implementation plans are not yet specifically linked to our DSC strategy. The technology used in our SC department is focused on traditional SC fulfillment functions. There is limited automation or use of real-time data. Managing and analyzing available data is time-consuming.	DSC is becoming more central to our corporate technology strategy and we have started to implement it with a focus on increased automation. Our technology is enabling us to share data with internal departments, suppliers and customers to stimulate better and match demand. We are piloting or using some relevant advanced digital technologies.	We strategically utilize digital technology to improve supply chain performance, with a focus on demand stimulation and risk management, leading to revenue growth. We continually evaluate the application of new technologies and data sources, and integrate as appropriate. We utilize data and analytics to effectively understand past performance and predict future demand and risks. The review and utilization of relevant advanced digital technologies is part of a continual improvement process.
RISK	The management of our supply chain business performance and compliance risks has not begun to take advantage of DSC capabilities. We have begun to analyze risk mitigation opportunities and new risks of the DSC, such as cybersecurity.	We have begun to use real-time data and relevant advanced digital technologies to measure and monitor supply chain risk. Our risk assessment includes an evaluation of new DSC risks, such as cybersecurity. We have started implementing collaborative programs to reduce risk with companies in our supply chain.	We use real-time data to reduce business performance and compliance risk through predictive analytics. Our risk program is increasingly automated in collaboration with our suppliers and customers. We have integrated cybersecurity and the protection of confidential information into our supply chain assessment and monitoring program. We have strategically targeted a risk area related to our business and are now known as a leader in managing this risk. This has provided us with a competitive advantage in the market and will lead to revenue growth.



Photo credit: ZTE

Chapter five: Priority Actions for Senior Management

How can we decide the all-important issues of which metrics to manage when there is no agreement on vision and scope, or the timing of the Digital Supply Chain change? Answer: You cannot. Or, at least, you cannot move ahead quickly unless DSC, Finance, Sales, HR, and overall leadership agree.

HERE IS HOW WE SUGGEST YOU GAIN CONSENSUS ACROSS THE C-SUITE ON DSC VISION, OBJECTIVES, SCOPE AND APPROACH:

FIRST, BECOME FAMILIAR WITH AVAILABLE TECHNOLOGIES, MARKET NEEDS AND OPPORTUNITIES. ASK QUESTIONS SUCH AS:

- Are customers buying more online?
- Can we get and use more data on our customer's customer?
- What expectations are associated with customer service and speed?
- Are there any "digital native" new entrants challenging your company?
- What new technologies exist for capturing customer data, delivering with speed and producing what you deliver?

Next, administer the Transformation Maturity Assessment and uncover your current status and opportunities for improvement with respect to the Digital Supply Chain. Make sure you get a third-party review to help you gauge your progress and include customer and supplier assessments. Discover how some companies are faster and better at approaching their Digital Supply Chain. It is analogous to taxi companies assessing their supply chains and discovering that the old process of hailing a cab was dissatisfying and antiquated. Rather than being "Ubered" and never recovering, outside advisors can alert you to opportunities that insiders do not see.

Hosting a Digital Supply Chain Transformation Strategy session is the next logical step. This session must include top people from Sales (the DSC will grow revenue), HR (a new digital talent strategy will be needed), Finance (investments will need to be made and costs and return managed) and, of course, people from the Supply Chain. Appendix C is an outline of how the workshop should be structured and what the DSC Vision, Scope, Timing and Approach should look like.

Governance

Governance is a key element for accelerating progress towards the Digital Supply Chain that will increase your revenues and decrease

your costs. You must decide who will be in charge and what authority they will have. Our recommendations are:

1. Place someone in charge of the Digital Supply Chain and assign them the authority to make decisions, investments and drive change. This person may have to operate across business units and the reporting structure of your company may have to change to find the right focus on the DSC.
2. Appoint a person to run the DSC transformation effort. This person should have several of the skills that the new DSC will require. They must be data driven and good at analytics. They must understand customer needs and
3. Create a Steering Committee that includes senior leaders who worked to develop the DSC strategy. The DSC Steering Committee should be chaired by the DSC leader and managed by the person in charge of the DSC effort.
4. Lock in the accountability and reporting system so that DSC progress can be tracked and managed by the CEO. Process and Output metrics are to be used; the same metrics that were selected in the DSC workshop.

Leadership and Call to Action

The time to start is yesterday and you are already one day behind. This is the right attitude for DSC transformation. Everyone including suppliers, employees, customers and shareholders are counting on you to make the DSC happen. Do not fall back on incremental change and managing a day-to-day supply chain business. Develop the DSC strategy, place people in charge, manage to a clear set of metrics, make investments in new technologies and reach your goals. We hope that this Transformation Guide provides tools to help you lead the change. The Transformation Maturity Assessment is a powerful tool for getting people's attention and forcing them to focus on what a company needs most. The DSC Transformation Workshop will bring clarity to your direction, investments and results. The Essential DSC Metrics will keep you on course. Demand, People, Technology and Risk

are the four areas of focus. Most companies can achieve 10% revenue growth and a 20% drop in costs. Executing the DSC will protect you from the Digital Natives and create a supply chain to satisfy customers for many years to come.



Photo credit: ZTE

Appendix A

Essential Digital Supply Chain Metrics: Pick List

Output and Process Metrics

Demand – Output Metrics

Revenue Change from Digital Supply Chain Actions

What Calculate the total dollar value of Digital Supply Chain actions that have increased revenue. These actions can include: using big data to match customer demand better, stimulate sales through a “sticky” supply chain that creates advantage, better informed product design based on DSC knowledge and local 3D manufacturing etc. This metric will be shared (double counted) with Sales and Marketing.

Why The DSC must do a frontside flip and face the customer in a way that grows revenue. Measuring DSC-generated revenue growth is essential to focus on and will support this effort. The DSC strategy was jointly developed with Sales and Marketing.

How Each year DSC leadership must meet with Sales and Marketing to establish the categories of actions that the DSC can take to grow revenue. Each action must be built into the budget and measured.

Revenue Increase from Platform Utilization

What Every supply chain should grow revenue from platform partners. This revenue should be planned and measured in revenue dollars. These platform partners may be current or new suppliers, or even customers.

Why A Digital Supply Chain platform that connects to customers is an asset. Other companies will welcome the opportunities to access the Digital Supply Chain, its manufacturing, shipping, logistics, quality and customer intimacy. Technology enabled collaboration makes all of this possible.

How Select a specific supply chain process that offers benefits to other vendors. Develop a revenue sharing model that enables your company to keep a percentage of the value. Value could come from cost savings or from increased sales.

Percentage Growth in Demand due to DSC Actions

What Calculate a target percentage increase in demand that comes from specific Digital Supply Chain actions. These actions could include increasing delivery speed, improving availability, offering goods and services through on-line channels, anticipating customer requirements etc.

Why This metric is similar to the Revenue Increase metric but is expressed as a percentage which enables more comfortable comparisons with other companies and previous years.

How Percentage growth should total at least 10% of current company revenue by year three.

[→ Go back to Essential DSC Metrics Framework](#)

Demand – Process Metrics

Percentage of Perfect Orders from Automation

What Measure the total number of perfect orders achieved through automation. Compare to total orders and to total perfect orders.

Why Automation, done correctly, will create more perfect orders. Perfect orders create customer satisfaction. This creates more orders and revenue.

How Count total orders, total perfect orders, and total perfect orders through automation. Integrate customer knowledge into automated systems.

Number of Days Latency in Demand Shaping/Management

What Measure the lag time between a demand requirement and the date of fulfillment.

Why Speed is often the biggest factor driving customer choice. Win business because of speed. This metric is increasingly important in many industries. DSC strategy will determine if this is important for your company.

How Develop a measure of latency, track quarterly and move towards real-time tracking.

Net Promoter Score® for DSC

What Measure the number of customers willing to recommend you as their supplier. A high score (9 or 10) is good, a low score needs to be improved.

Why Digital Supply Chains should create customer loyalty. Customer loyalty means more revenue from existing and new customers. Net Promoter Score has been tracked by many companies but will be applied by the DSC because the DSC is focused on customer retention and growth.

How Administer the Net Promoter Score survey to all customers and suppliers. Set the target for a score of 9 or 10. You may use the Net Promoter Score method or create your own version.

People – Output Metrics

Total DSC People Cost/ Percentage of Sales

What Total salary and benefits costs of current and planned DSC. Calculate average pay now and compare to planned average pay.

Why A DSC will require substantially lower people costs but average pay should increase.

How Decide how outsourced people costs will be tracked. Include this in the calculation. Align goals for this metric with DSC Talent Strategy. DSC people costs (the total cost of people working the supply chain) divided into total sales.

[→ Go back to Essential DSC Metrics Framework](#)

Revenue Balance between Peak and Non-Peak Demand

What Most companies have periods of high and low demand. The DSC will shift demand from peak periods to low periods. Acquire new people with skills in sales and big data analytics (e.g., data scientists) who can anticipate and shape demand through changes in availability, pricing, customization etc.

Why Shifting demand enables factories to operate efficiently and potentially eliminates the need for specific factories and excess inventory. Inventory can be reduced.

How Create joint DSC/Marketing peak team to create a view of customer behavior and factory performance. Integrate big data for demand analytics.

Revenue Size of DSC Enabled Business Models Created

What Calculate the annual revenue of a new business model created by the DSC. The single most important factor when developing new business models is to bring digital natives, marketing experts, and data scientists on board.

- A new business model could:
 - a) Sell DSC services to other companies that need distribution or warehousing
 - b) Be a “go direct” business that exists because the DSC includes sensors in products that trigger orders
 - c) Give products away and sell content or services
 - d) other

Why Collecting new data from sensors, IoT, social media and other sources will create new business opportunities for those who do it well. High-performing DSCs could become the most valuable asset of certain companies.

How Bring people on board who can envision new ways of doing business. Invest in them and measure the results.

Revenue Increase per Supply Chain Employee due to DSC Actions

What Measure the revenue increase per supply chain employee from DSC actions such as implementing new digital platforms, training of current employees, etc.

Why To measure the actual impact and progress of these DSC actions into the transformation to the Digital Supply Chain. To measure the productivity per employee due to DSC transformation.

How Make a list of all ongoing DSC actions which went through DSC transformation. Calculate the revenue increase due to the implementation of these DSC actions. Divide revenue increase by Number of employees.

People – Process Metrics

Total FTEs of Data Scientists/Stewards

What Calculate the total number of data scientists and data stewards in the DSC.

Why Data scientists and data steward skills are in great demand as they are necessary for an effective DSC. The DSC Talent Strategy will spell out the number and skill set needed. Average data and systems literacy should also increase.

How Calculate the number of data scientists and data stewards. Set a target for the number needed as well as for the overall skill base.

Total Headcount with Sales/Marketing Expertise

What Count the people in the supply chain with at least 3 years of experience in sales, marketing or customer service.

Why Front end, sales drive skills and mind set are needed to achieve the DSC. These new people will drive a mindset/culture change.

How Quarterly survey with targets. Comparison with DSC Talent Strategy with performance targets.

Percentage Increase in Nerds/Snipers

What Classify people as Snipers or Nerds. Snipers are good at doing something. Nerds are good at collecting and analyzing data. They are never the same person. Measure the percent relationship between the two types. Most organizations will have many more snipers than nerds. Set a target for managing this differently given the explosion of new data available.

Why Nerds can make snipers much more effective. They have to be valued to attract and retain them. Nerds will make the Snipers more effective.

How Periodic headcount survey. Create a culture that recognizes the value of being a Nerd or a Sniper.

Technology - Output Metrics

Total DSC Technology Spending

What Add up the annual capital and expense for IT (Enterprise Software, Blockchain) and special technologies (e.g., 3D or driverless vehicles or sensors). Some judgement will be required to determine what spend is DSC spend. Building that spend baseline is important.

Why Technology spending will go up because of the increasing amount of data, new methods of manufacturing and production, IoT, sensors, etc. Measuring and managing this spending is important. We must spend more but we must get more for what we spend.

How Capture all the spend on technology. Include phantom servers run by the engineering department, include cloud spend that is sometimes called by the name of the internal customer. Make sure that return expectations are clear and audited.

[→ Go back to Essential DSC Metrics Framework](#)

Percentage of Sales Through Direct Channels

- What** Measure the percentage of business that goes directly to the customer. Not through a channel partner or re-seller. This applies to B2B as well as B2C. Decide if revenue or bookings will be measured.
- Why** Direct channels will deliver higher margins and more customer intimacy. This will lead to market share growth, more revenue and higher earnings.
- How** Set up a web presence that lets your customers purchase directly from you. Maintain current channels but build your own.
-

Technology – Process Metrics

Percentage of Revenue Facilitated by Advanced Digital Technologies

- What** Measure the exact percentage of business revenue that is, or has at least some part, produced with advanced digital technologies like AI, 3D, Blockchain, IoT, etc. Measure the percentage of business revenue that is delivered by driverless cars/drones. Measure other sources of revenue that have been enabled by DSC technology.
- Why** We know that 3D, driverless, and other technologies can transform the DSC. Importance of measuring, managing and incentivizing development.
- How** Collect data from factories, delivery systems, and sales or bookings. Consolidate incremental revenue and calculate percentage of total revenue.
-

Percentage of Time on Manual Tasks

- What** Calculate the total amount of time within a certain segment of the supply chain (e.g., order to cash). Calculate the percentage of that time that requires people work as opposed to machine work.
- Why** Automation is the key to reducing costs, speeding delivery of value, and improving quality. DSC automation is important.
- How** Form a work team to map out existing and to-be processes. This team can also do the calculations. Be sure to employ baseline and improvement metrics so that the percentage reduction in manual work can be calculated.
-

Percentage of Manufacturing and Delivery Handled by Technology

- What** Measure the percentage of your factory and delivery work that is automated and is not touched by human hands.
- Why** The DSC will harness the power of software and machines to drive higher levels of customer satisfaction and efficiency.
- How** Calculate the total number of delivery transactions made per week. Determine the percentage of those that are delivered by driverless vehicles. Determine the percent of manufacturing steps that are performed by software/machines.
-

→ [Go back to Essential DSC Metrics Framework](#)

Risk – Output Metrics

Percentage Change in Value of Counterfeit Goods in the Legitimate Supply Chain

What Measure the number of counterfeits in your legitimate supply chain (legitimate defined as authorized suppliers, distributors and retailers).

Why Counterfeit goods are commonly found in authorized supply chains. It could be from over-production by an authorized factory, or an authorized distributor that purchases counterfeits knowingly or unknowingly.

How Monitor the total production emerging from an authorized factory by studying raw material/component purchases, working hours and shipments of finished goods. Establish a mechanism for auditing distributors and retailers to establish if they have controls in place to verify that all incoming product is authentic. Sample, test, measure and control.

Loss from Supply Chain Disruption as a percentage of Gross Revenue

What Calculate the dollar amount of negative supply chain events as a percentage of gross revenue and track reduction against this baseline. Negative events will be defined in the DSC strategy.

Why Business performance and compliance risks impact revenue and expenses through supply chain disruptions and losses. Measuring the reduction of risk will focus managers on reducing these problems.

How Baseline revenue lost or expenses incurred due to negative events in the supply chain whether caused by business performance or compliance issues. Measure tangible losses such as lost sales due to supply chain disruptions.

Incremental Revenue Generated from Addressing Risk

What Companies that excel at reducing a specific risk area can turn it into a competitive advantage to generate value for the company through increased sales, higher margins, higher valuations, increased ability to raise capital, longer-term contracts, etc.

Why Reducing risk and converting this into more sales creates financial value. Measuring this value is essential.

How Identify a risk area that is central to the customer. Establish a value baseline financial measurement. Track changes to this baseline.

Risk – Process Metrics

Time Lag between Capture of Critical Risk-related Data and its Inclusion in Decision Making

What Count days between risk discovery and inclusion. Some judgement is required to determine when things are discovered and when things are decided. At the end of the performance period you should be able to calculate the average time between discovery and decision.

Why Speed is all-important. Taking action on data that is as close to real time as possible is essential. This risk metric will help focus people on speed of execution.

How Identify current supply chain data sources and determine the time span between when the data first existed and when it is integrated into your risk assessment. Allocate resources to reduce the time span as needed. Measure the change reduction in days from discovery and inclusion.

Percentage of Cyber-Assessed “Connected” Suppliers

What Calculate the total number of suppliers as a denominator. Calculate the total number that have undergone a thorough assessment of cybersecurity controls and confidential information protection programs. Divide the denominator by the number of assessments. It is important to decide what an acceptable cybersecurity assessment is and what an acceptable level of risk is.

Why Cybersecurity and the protection of confidential information, including trade secrets, is a growing risk in the Digital Supply Chain. Your supplier assessment program and ongoing monitoring must cover these escalating issues. Measuring the percentage of suppliers that have been assessed is important.

How Start by mapping all of your suppliers that are connected to any of your networks or those that receive confidential information or trade secrets from your company. Conduct assessments. As a program matures, consider weighing the percentage based on the dollar value of the supplier.

Percentage of Suppliers Classified in a Comprehensive Overall Risk Assessment

What This examines the existence and utilization of a comprehensive risk assessment program that includes a tiered – low, medium and high - risk rating system. Beyond that, it studies the percentage of suppliers at each risk level. Companies have traditionally done this. The DSC approach is to incorporate new sources of data, prescriptive analytics, unstructured and structured data.

Why There is a trend in many industries towards supplier consolidation with a focus on having a smaller base of “strategic suppliers.” One factor driving consolidation is that it provides more leverage and control over the supplier, thus reducing risk. Coupled with this, is the trend towards companies doing a more comprehensive and “holistic” supplier assessment of the broad range of business performance and compliance issues they face. Continuing increases in regulations will accelerate the need for comprehensive risk assessments to be conducted, with results being analyzed and implemented.

How Establish your risk tolerance in the relevant business performance and compliance risk areas. Develop a tiered risk rating assessment and classification system of at least three levels in each of the risk areas. You may wish to aggregate this into an overall risk score. Many companies will have existing programs that can be utilized and modified as necessary to cover the enhanced risks of the Digital Supply Chain. Initiate the comprehensive assessment program with strategic suppliers or with those in known high-risk areas.

→ [Go back to Essential DSC Metrics Framework](#)

Appendix B

Transformation Maturity Assessment

Here we provide you with the print version of a short version of Transformation Maturity Assessment and a means for you to manually calculate score. DSCI is also making this available

as an online tool that automatically calculates your score and enables you to compare and aggregate multiple assessments. Use this link to get access to online assessment tool: dsc.institute/DemoTMA

Demand

This section will help you assess:

- The quality and degree of latency in the data your firm utilizes to make demand decisions
- How deeply your supply chain function is involved in stimulating customer demand
- Your Supply Chain function's ability to create and act upon forecast information
- How well your function reacts to rapidly changing market demands

The assessment questions will help you develop a better understanding of how your supply chain currently interacts with and reacts to customer demand information. These are key capabilities enabling a real-time Digital Supply Chain – and the successful execution of the “Frontside Flip.” A supply chain that demonstrates a high level of performance in these categories will facilitate improved revenue generation and improved customer satisfaction while managing operating costs and working capital investments.

1. The following best describes the role our supply chain function has in stimulating and shaping demand. (Select one)
 - a. Supply chain responds to demand forecasts and orders. (1 Point)
 - b. Supply chain is involved in consensus demand forecasting for some areas of the business, but not integrated into demand stimulation activities. (2 Points)
 - c. Supply chain is fully integrated into a cross-functional demand stimulation program, with product development and marketing/sales. (3 Points)
2. The following describes supply chain's involvement in the evaluation and adjustment of our business model based on understanding our customer. (Select one)
 - a. Supply chain is reactive to any changes in business models. (1 Point)
 - b. Supply chain is consulted in the development of new business models. (2 Points)
 - c. Supply chain leaders are actively involved in creating new business models to better meet customer needs. (3 Points)

People

This section will help you assess:

- The degree your talent development efforts address new digital skills
- Alignment of your job performance and compensation metrics with your DSC strategy
- The degree of cross-functional collaboration between the SC and other departments
- How well your supply chain culture demonstrates integration behaviors
- The extent to which your supply chain associates are data oriented in their decision making

The assessment questions help you develop a better understanding of how your supply chain function motivates, engages, and guides the performance and commitment of your talent. The people component of the Digital Supply Chain transformation is a key enabler to realizing investments in technologies and processes.

A supply chain that demonstrates a high level of performance in these People categories drive improved revenue generation and customer satisfaction while more effectively managing operating costs and working capital investments.

1. **Our current personnel recruiting and development program supports our transformation to a Digital Supply Chain in the following way. (Select one)**
 - a. We are not currently recruiting positions specific to the needs of the Digital Supply Chain, nor are we developing employees for those needs. (1 Point)
 - b. We have identified the personnel capabilities needed to execute our Digital Supply Chain plan and have started a program to recruit and develop the needed talent. (2 Points)
 - c. We have a fully operational program for recruiting and developing the capabilities needed for a Digital Supply Chain, and our program is reviewed and revised to meet evolving needs. (3 Points)
2. **The following best describes today's status of cross-functional collaboration between supply chain and other departments in our company (such as marketing, sales, product development, human resources, finance, etc.). (Select one)**
 - a. Cross-functional collaboration, if it occurs, is sporadic, and typically facilitated in response to a specific issue. (1 Point)
 - b. We have cross-functional working groups that meet on a routine basis, however they tend to be project specific and not linked to a broader strategic agenda. (2 Points)
 - c. Supply chain is fully integrated into a cross-functional working group whose purpose is to drive corporate strategy and Digital Supply Chain performance. (3 Points)

Technology

This section will help you assess:

- Your supply chain's current use of technology speed and data latency
- The degree to which your supply chain is utilizing emerging relevant technologies
- How well your measurement of technology investments is aligned to digital transformation
- Your supply chain's relative sophistication in its cultivation of and use of data to support its digital transformation
- How well your supply chain collaborates with value partners through technology

The assessment questions help you develop a better understanding of how your supply chain function utilizes and maximizes its investments in technology to support improved demand-driven performance and risk reduction. Digital Supply Chain technology investments should be aligned to strategy, supported by high-quality, low-latency data, and measured based on their performance impact.

A supply chain that demonstrates a high level of performance in its use of critical technologies drives improved revenue generation and customer satisfaction while more effectively managing operating costs and working capital investments.

1. **The following best describes how we evaluate the acquisition and implementation of technology specifically used to support our transformation to a Digital Supply Chain. (Select one)**
 - a. We do not have a way to track technology investments related to our DSC transformation. (1 Point)
 - b. We have pilots underway to establish baseline data to identify those technology investments that will best support our transformation to a DSC. (2 Points)
 - c. We have a rigorous review process that analyzes the ROI on technology investments and scales those that effectively support our DSC transformation. (3 Points)
2. **In our supply chain program, our current strategic data utilization is best described in the following way: (Select one)**
 - a. Our challenge is to use the data we already have effectively. (1 Point)
 - b. We have projects underway to integrate data sources, turn unstructured data into structured data and improve data utilization. (2 Points)
 - c. We have established programs that evaluate the use of our existing data to improve business performance directly and are continuously seeking to find and integrate new data sources. (3 Points)

Risk

This section will help you assess:

- The degree to which your supply chain has implemented updated digital risk assessment and management processes
- The relative maturity of your supply chain's use of data analytics to better manage risk
- The degree to which your supply chain is managing risk in an integrated and predictive manner
- How well you believe your supply chain organization manages and minimizes cyber security and confidential data breaches

The assessment questions will help you develop a better understanding of how your supply chain manages, assesses, and mitigates risks due to the shift to digital. Digital Supply Chain risk management practices should be updated to manage business performance and compliance risks better. You can gauge if technology and data are being used to shift from a reactive to a preventative control of risks.

A supply chain that demonstrates a high level of performance in its management of digital risk drives improved revenue generation and customer satisfaction while more effectively managing operating costs and working capital investments.

1. The following best describes how we manage supply chain risks. (Select one)

- a. We are primarily reactive and address problems in our supply chain as they arise. (1 Point)
- b. We have established programs that address the risks that we most commonly face and we are starting to utilize data and technology to improve efficiency. (2 Points)
- c. We use data analytics to seek patterns in supply chain risks and related negative impacts and adjust our risk management program to reduce or prevent recurrence. (3 Points)

2. The following best describes how we interact with our suppliers and customers to gain better visibility into supply chain risks. (Select one)

- a. We share some risk information as part of our normal business interaction, but do not proactively focus on sharing risk information. (1 point)
- b. We share the results of our risk monitoring with customers and suppliers and collaborate on needed remediation. (2 points)
- c. We collaborate with our suppliers and customers to utilize new technologies to share risk data to predict and address potential business and compliance risks. (3 points)

DSCI Transformational Maturity Assessment Scorecard

Instruction:

1. Enter points from each of the above questions

QUESTION #	POINTS			
	DEMAND	PEOPLE	TECHNOLOGY	RISK
1				
2				
TOTAL POINTS				
Transformation Maturity Score (Total Points/ No. of Questions)				

Note:

1. Only DSCI member has access to comprehensive Transformation Maturity Assessment.
2. These scores do not represent your final scores in each category (Demand, People, Technology, and Risk) as this is the short version of the comprehensive assessment. Please contact us at gbailey@thecge.net to take the comprehensive Transformation Maturity Assessment.

Appendix C

Digital Supply Chain Strategy

Development Workshop

Digital Supply Chain Strategy Development Workshop: Taking Transformational Action

Developing a Digital Supply Chain (DSC) may be the most important organizational transformation initiative executives will face over the next five years. By performing a Frontside Flip, you are essentially flipping the traditional focus of cost control, procurement, manufacturing and logistics to focus on the customer. Using the DSC will increase revenue by 10% and costs will decrease by 20%. Of course, traditional supply chain performance is still important, but the new customer focus will drive competitive advantage.

The research conducted by the Digital Supply Chain Institute and the global collection of company supply chain leaders, our “Global Experts Group,” has concluded that the

transformation to the Digital Supply Chain is not a minor, isolated, transactional shift to new technologies. Instead, for many firms, the Digital Supply Chain is a strategic transformation, requiring high degrees of alignment across functions, insights into firm resources, and choices about business models. Our DSCI research team believes that a focused workshop, bringing together key top decision makers from a cross section of organizational functions is necessary to understand and identify digital opportunities, and to decide on initial Digital Supply Chain actions. To help accelerate this process for our member firms, the DSCI team has developed an approach for an Executive Workshop designed to quickly align your C-Suite team to the Digital Supply Chain transformation challenge.

Workshop Overview

The DSCI team has accumulated decades of experience in designing and facilitating executive level strategy workshops. This workshop guide is designed to help shape an intervention that will jump-start your firm’s own digital transformation. Utilizing the DSCI “Frontside Flip,” demand-driven research and guides as a framework, the workshop blueprint will lead your senior team

through a series of structured dialogs, with the goal of developing implementable strategies and actions. The content portion of the program introduces key concepts of the demand-driven Digital Supply Chain, highlights new strategies, and measures for the performance domains of Demand, People, Technology, and Risk.

Who Should Participate?

Strategic transformation in organizations cannot be accomplished in one swift stroke. The cross-functional interdependences, shifts in mindsets, and decisions about processes and investments require a thoughtful selection of principals, starting with a senior level executive sponsor, and cascading to senior functional leaders and their delegates. The executive sponsor of the transformation should, at the very least, be the senior supply chain leader of the organization. This sponsor may then delegate a DSC transformation leader to manage process and be accountable for strategy implementation. For the proposed transformation workshop to be effective, we recommend the recruitment of a DSC transformation steering team that includes senior-level representation from firm-level functions, such as finance, sales, marketing, product development, IT, HR and supply chain. The members of this steering team, led by the

executive sponsor, are the best participants in a transformation workshop. Having key cross-functional leaders present in the workshop allows for the creation of consensus-built actionable strategies.

The workshop team will facilitate an introductory dialog utilizing the Transformation Maturity Assessment, a strategic survey instrument designed to align participants to critical opportunities for performance gains. Once a baseline understanding of the current performance levels of your firm has been established, each key Digital Supply Chain area is rapidly mined for strategies and actions that can be pressure-tested and deployed in the near term. The workshop outcome will be a deployable Digital Supply Chain action plan tailored to your firm with alignment and support from your key organizational stakeholders.

Workshop Business Objectives

- Understand your firm's current-state Digital Supply Chain maturity
- Develop a process of evaluating performance gaps and improvement opportunities in Digital Supply Chain
- Understand and develop cross-functional actions to overcome the issues, challenges and potential barriers inherent in Digital Supply Chain transformation
- Improve your firm's speed in implementing critical Digital Supply Chain strategies and actions that will provide immediate performance returns
- Appoint a project manager to make sure it all happens!

Digital Supply Chain Transformation Executive Workshop

FIRST HALF-DAY WORKSHOP	SECOND HALF-DAY WORKSHOP
<p>Introduction: What is a Digital Supply Chain?</p>	<p>Your Digital Supply Chain Strategy</p>
<p>1. The DSC Transformation Maturity Assessment</p>	<p>4. TECHNOLOGY: Digital Supply Chain Technologies</p>
<p>2. DEMAND: Stimulating Customer Demand</p>	<p>5. RISK: Managing Digital Supply Chain Risk</p>
<p>3. PEOPLE: Digital Talent Strategies</p>	<p>Your Digital Supply Chain Action Plan</p>
<p>INTER-SESSION ONLINE MODULE; SURFACING DIGITAL SUPPLY CHAIN OPPORTUNITIES</p>	

Workshop Design Approach

We recommend two half-day on-site workshops with an optional 1-2-hour virtual intersession module.

Prior to the on-site workshop, participants will complete the DSCI Transformation Maturity Assessment instrument. The first half-day workshop will introduce the participants to the value of the Digital Supply Chain and provide them with some experience working with a well-researched Digital Supply Chain demand-focused transformation model. Participants will look at digital native organizations in their own or adjacent industries, and will review relevant performance benchmarks. The session will conclude with a module on the talent transformations needed to implement and realize performance gains from new Digital Supply Chain actions.

The workshop design should include an online inter-session where organizational opportunities in Digital Supply Chain will surface while allowing the participant group to explore and pressure-test new ideas in a collaborative setting.

The second half-day on-site workshop will focus on technologies, risks before coming to actionable conclusions going forward. Participants will have an opportunity to select relevant DSC performance metrics and establish baseline commitments for review. The wrap-up session will collaboratively socialize the Digital Supply Chain action plans amongst your executive participants, surfacing potential barriers, and building organizational commitment to them.

Topics and Design by Day

FIRST HALF-DAY ON-SITE WORKSHOP CONTENT (APPROX. 4 HRS.)

Introduction: What is a Digital Supply Chain? An introduction to the “Frontside Flip”

Module 1: *The Digital Supply Chain (DSC) Transformation Maturity Assessment* – Where does your organization stand? This module should include a review of your current SC strategy, comparative benchmark data, and expert assessments of your organization’s digital SC transformation maturity

Module 2: DEMAND: *Stimulating Customer Demand*

- Addressing the quality and degree of latency in the data your firm utilizes to make demand decisions
- Deepen your supply chain function’s involvement in stimulating customer demand
- Improve your supply chain function’s ability to create and act on forecast information
- Develop faster reactions to rapidly changing market demands

Module 3: PEOPLE: *Digital Talent Strategies*

- How to transform your talent development efforts to address new digital skills
- Build alignment of your job performance and compensation metrics with your DSC strategy
- Develop strategies to build cross-functional collaboration between the SC and other departments
- Strategies to build a SC culture of integration behaviors
- Considerations in developing your SC associates data-driven decision making capabilities

INTER-SESSION ONLINE MODULE (1-2HRS.)

Virtual Module: Surfacing Digital Supply Chain Opportunities

SECOND HALF-DAY ON-SITE WORKSHOP CONTENT (APPROX. 4 HRS.)

Module 4: TECHNOLOGY: *Digital Supply Chain Technologies*

- Assess your SC’s current use of technology speed and data latency
- Strategies for how to improve the degree to which your SC is utilizing emerging relevant technologies
- Develop a plan for how your measurement of technology investments are aligned to digital transformation
- Evaluate and plan ways to improve your SC’s relative sophistication in its cultivation of and use of data to support its digital transformation
- Develop plans for improving how your SC collaborates with value partners through technology

Module 5: RISK: *Managing Digital Supply Chain Risk*

- Evaluate the degree to which your SC has implemented updated digital risk assessment and management processes
- Understand the relative maturity of your SC’s use of data analytics to better manage risk
- Evaluate and plan ways to improve the degree to which your SC is managing risk in an integrated and predictive manner
- Understand and plan improvements to how well your SC organization manages and minimizes cyber security and confidential data breaches

ACTION PLANNING: Connect DSC back to Supply Chain Strategy, Select DSC metrics and baselines, assign accountability and timeframes for execution and results

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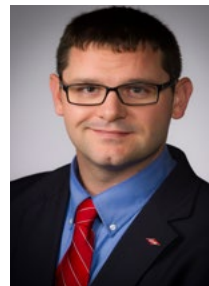
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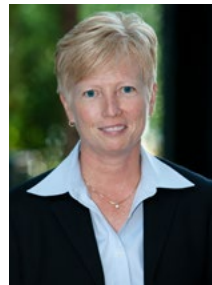
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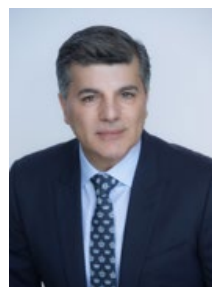
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About the Digital Supply Chain Institute (DSCI)

The CGE's Digital Supply Chain Institute (DSCI) is a leading-edge research institute focused on the evolution of enterprise supply chains in the digital economy and the creation and practical application of supply chain management best practices.

The DSCI's work is fielded by CGE and the Global Experts Group (GEG), a team comprised of top supply chain executives from companies around the world. The GEG acts as the DSCI's principle mechanism in developing the research and applied management learning.

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Digital Supply Chain Transformation Guide: Essential Metrics



The Center for Global Enterprise