SUPPLY CHAIN MANAGEMENT
Maturity Level Assessment

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The Department of Defense (DoD) and its organizational supply chain professionals recognize that DoD's Supply Chain Management (SCM) system faces numerous challenges in need of management attention, especially excess inventory levels, inadequate controls, and cost overruns. Sustaining a ready, capable force through effective, joint logistics support for America's warfighters is part of the DoD logistics mission, which includes SCM. Despite major investments in SCM systems, many organizations struggle to realize anticipated benefits, often times from the lack of valid methods to measure these benefits. Capturing key elements from historical efforts that others used to assess their SCM maturity levels, Crane Army Ammunition Activity developed the Supply Chain Management Maturity Model (SCM3) and used it to assess and improve its own maturity levels. Likewise, DoD organizations could use this model to improve operations in their supply chains and thereby improve the readiness of warfighters.

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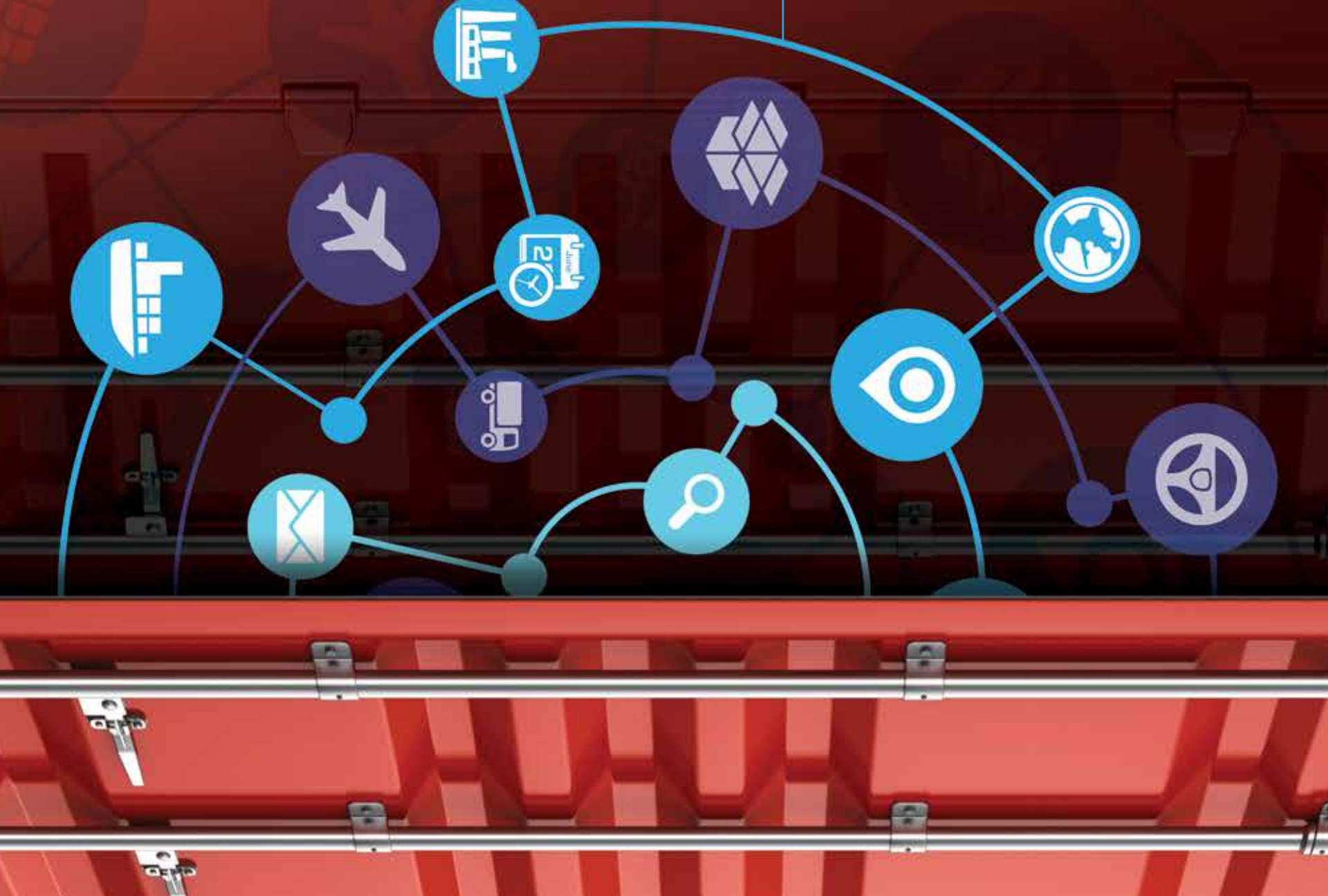


Excess inventory levels, inadequate controls, and cost overruns are initial focus areas in the Department of Defense (DoD) Supply Chain Management (SCM) system (Government Accountability Office [GAO], 2011, p. 1). Experiencing problems in these three areas for several decades, the DoD continues to lack outcome-focused performance measures for its SCM initiatives, making it difficult to assess its capabilities in forecasting, asset visibility, and materiel distribution (GAO, 2006, pp. 5–6, 9). Considering account safety stock and war reserves, the DoD possesses more than twice the amount of inventory needed to effectively sustain the warfighters (Peltz & Robbins, 2012, p. 57). While reducing this inventory would lower operational expenses, the DoD has found it difficult to accomplish.

The DoD defines its logistics mission, including SCM, as "supporting the projection and sustainment of a ready, capable force through globally responsive, operationally precise, and cost-effective joint logistics support for America's warfighters" (GAO, 2011, p. 5). The DoD has identified a goal to achieve an effective and efficient supply chain with improvement efforts aimed at each element in the logistics process. Increased government-level SCM efforts to achieve these goals increase costs and threaten profits—the primary driver behind similar improvements in the commercial sector (Peltz & Robbins, 2012, p. 27). Instead of considering profits, the DoD should identify and prioritize improving those SCM processes that can aid in supporting the readiness of warfighters within available costs.

Previous research reinforces the notion that effectively using analyzed business data improves organizational decision making. However, despite major investments in SCM systems,

many commercial and government organizations struggle to realize anticipated benefits, oftentimes from the lack of valid methods to measure them (Stadtler, 2005; Trkman, McCormack, de Oliveira, & Ladeira, 2010). What's more, commercial companies recognize the importance of enhancing SCM, but often do not know what to implement to maximize their profits. Even worse, while many organizations have adequate systems in place to capture the required operational supply chain data, and since it often resides in dispersed functional domains, they lack suitable analytical tools and metrics to assess the data to make process adjustment decisions (Song & van der Aalst, 2008). As such, they have problems in effectively achieving their supply chain-related goals.

Based upon a 2013 global supply chain survey of 209 companies, supply chain maturity is linked to operational performance (PricewaterhouseCoopers/ Massachusetts Institute of Technology, 2013). Since sustaining a mature supply chain is critical to an organization's performance, a structured diagnostic tool is needed to assess an organization's current supply chain capability, defined as its maturity level, and identify target areas for performance improvement and cost reductions.

Background

As part of DoD's goal to achieve an effective and efficient supply chain, the network of munitions storage locations throughout the military shifted emphasis from a company- or an installation-only focus to a more adaptive supply chain with integrated command and control throughout the entire Conventional Munitions Industrial Base (CMIB) of commercial and government organizations. This meant that support units now provide timely supply of the warfighter's munitions requirements in response to sensing demand, while considering delivery and production capabilities (Trip, Amouzegar, McGarvey, Bereit, George, & Cornuet, 2006, p. 11).

In 2007, and to support this shift, senior DoD logistics leaders focused their attention upon two areas impacting their supply chain: organizational configuration and performance measures (Fletcher, 2011). Their initial effort to improve the SCM included the development of a Joint Supply Chain Architecture (JSCA) based upon the Supply Chain Operations Reference (SCOR) model—a model widely used throughout the commercial sector (Siegl, 2008). To implement this architecture within the acquisition community, JSCA was added to the 2011 *Product Support Manager Guidebook* (DoD, 2011). Linking the SCOR model to JSCA required a heightened focus

on the following performance metrics: Perfect Order Fulfillment for reliability, Customer Wait Time for speed, and Total Supply Chain Management Cost for efficiency. Perhaps because this JSCA was too prescriptive and did not capture the entire supply chain system, it disappeared from the DoD with no mention of JSCA in the 2016 *Product Support Manager Guidebook*. Yet, the SCOR model remained (DoD, 2016, p. 46).

Two other commercial practices applied to the DoD included Sense and Respond Logistics (S&RL) and Performance Based Agreements (PBA) (Griffin, 2008). Fusing operations, intelligence, and logistics, the S&RL framework used highly adaptive, self-synchronizing functional processes to drive shorter decision cycles and faster responses to the warfighter. The PBA attempted to improve accountability, improve performance, and reduce costs for weapon systems with specific outcome-based performance metrics. Unlike the JSCA, these two efforts still exist.

Current DoD Direction

In 2012, President Barack Obama issued a supply chain security strategy that promoted the efficient and secure movement of goods and fostered a resilient supply chain (Obama, 2012, p. 1). To secure the flow of supplies, Obama required the alignment of federal logistics activities to the goals of this supply chain strategy (p. 5). Although this strategy focused primarily upon mitigating supply chain risks such as counterfeiting, terrorism, and cyberattacks, it lacked guidance towards the logistical and operational aspects of SCM. Yet, it was an important step towards improving SCM within the government.

Two years later, the DoD issued updates to its SCM procedures, which required use of the SCOR model for the entire DoD supply chain (DoD, 2014a, Vol. 1, pp. 5–6). In an effort to address the supply chain security issues, these DoD procedures employed risk management strategies to identify and assess potential supply chain disruptions, such as unreliable suppliers, machine break-downs, natural disasters, and labor strikes. Further, these procedures promoted collaboration with suppliers and customers. Adoption and adaptation of best commercial business practices were required to increase supply chain performance and reduce total life-cycle systems cost. These procedures required DoD organizations to continually monitor emerging business practices and align organizational decision authority in collaboration with stakeholders (pp. 7–8). Instead of requiring specific metrics, these procedures provided DoD the flexibility to tailor effective metrics, but still required metrics to be balanced throughout the supply chain system and to be compared to industrial benchmarks (pp. 6–7)

The 2016 *Product Support Manager Guidebook* requires acquisition managers to continuously reduce and streamline the logistics footprint by using existing supply chains instead of creating new ones (DoD, 2014b, Vol. 10, p. 25). During the materiel solution analysis phase, the PSM should apply the SCOR model to ensure all aspects of the supply chain are considered (p. 46). Further, acquisition managers should ensure processes exist that facilitate efficient public/private partnerships for data sharing (p. 54).

Research Framework

In this research, I assessed the SCM maturity level of the Crane Army Ammunition Activity (CAAA), a key organization within the CMIB. Located in central Indiana, this manufacturing and storage activity manufactures, stores, and provides conventional munitions to warfighters. As an Army Working Capital Fund (AWCF) organization, it operates more like a commercial manufacturer focused upon winning customers versus a government organization focused upon winning Congressional appropriations for its workload (Haraburda, 2016). In a rapidly changing environment, CAAA began a dramatic transformation in the way it does business by adopting the more robust, flexible approaches of SCM to improve its operational logistics processes. CAAA leadership recognized that using effective SCM was a viable way to achieve a competitive advantage within the CMIB and improve organizational performance (Li, Ragu-Nathan, Ragu-Nathan, & Rao, 2006).

To monitor its transformation efforts, CAAA wanted to revise existing commercial methods to assess the SCM maturity level. CAAA desired a higher level of this maturity, which led to improved operational performance, increased accuracy in forecasting, and higher effectiveness in reaching CAAA business goals (Lahti, Shamsuzzoho, & Helo, 2009).

The following three key topics were addressed in my research effort.

1. The means to measure the breadth and depth of an AWCF organization that goes beyond simple operational capacities of procurement, storage, manufacturing, and transportation.

2. The assessment of long-term, exclusive (noncompetitive) supply chain relationships with commercial vendors that would improve supplier efficiencies and flexibilities.

3. The incorporation of commercial sector methods, such as the Capability Maturity Model (CMM), to assess SCM processes.

Supply Chain Maturity Assessment Development

Since 1996, organizations have used the SCOR framework to link business processes into a unified, integrated structure that improves supply chain performance (Supply Chain Council, 2012, p. i.1). The Supply Chain Council, a global nonprofit consortium, developed this model. The model recognizes six major processes: plan, source, make, deliver, return, and enable (pp. 2.0.1–2.0.2). Overlapping these processes are 19 categories that include activities such as management of distribution, inventory, forecasting, production, training, risk, warehousing, and transportation (p. 3.0.2). Considered in this research, the following five supply chain maturity assessment models employ some concepts from the SCOR framework model. As shown in Table 1, each of these models contains five organizational maturity levels.

> ***Several key members of CAAA reviewed the initial survey instrument and provided valuable feedback regarding content and ease of use.***

TABLE 1. SUPPLY CHAIN MATURITY MODELS

			Organizational Maturity Levels				
Model	**Author(s)**	**Year**	**I**	**II**	**III**	**IV**	**V**
SCM-BPO	McCormick & Johnson	2002	Ad Hoc	Defined	Linked	Integrated	Extended
SCM2	Poirier & Quinn	2004	Enterprise Integration	Corporate Excellence	Partner Collaboration	Value Chain Collaboration	Full Network Connectivity
LME	Reay, Colaianni, Harleston, Maletic, & Marcus	2006	Initial	Managed Logistics	Tailored Logistics	Quantitatively Managed	Optimized Integration
$S(CM)^2$	Garcia	2008	Undefined	Defined	Manageable	Collaborative	Leading
SCPM3	de Oliveira, Ladeira, & McCormack	2011	Foundation	Structure	Vision	Integration	Dynamics

Note. LME = Logistics Maturity Evaluator; SCM2 = Supply Chain Maturity Model; $S(CM)^2$ = Supply Chain Capability Maturity Model; SCM-BPO = Supply Chain Management-Business Process Orientation; SCPM3 = Supply Chain Process Management Maturity Model.

1. **Supply Chain Management-Business Process Orientation—SCM-BPO.** Each of the five organizational maturity levels in this model contains characteristics associated with predictability, capability, control, effectiveness, and efficiency (McCormack & Johnson, 2002, pp. 50–52). The lowest level (Ad Hoc) has unstructured and ill-defined supply chain processes. The next level (Defined) has defined processes that are separate from one another. The third level (Linked) has processes that are connected to one another. The next level (Integrated) has all of its organizational processes connected to one another with a unified goal. Cooperation with external organizations such as suppliers and customers begins in this fourth maturity level. Finally, the highest level (Extended) is represented with a multiorganizational, integrated supply chain.

2. **Supply Chain Maturity Model—SCM2.** This model is based upon an enterprise view, with the first level (Enterprise Integration) involving functional integration (Poirier & Quinn, 2004). The second level (Corporate Excellence) has its internal organizational processes optimized to meet its goals, which is similar to the fourth level in the SCM-BPO model. External collaboration begins in the third level (Partner Collaboration), a level difficult to achieve. The next level (Value Chain Collaboration) involves supply chain optimization with frequent discussions with suppliers and customers. The highest level (Full-Network Connectivity) involves full-communications integration with external organizations. This model is based upon the concept that clearly defined, managed, measured, and controlled supply chains improve performance.

3. **Logistics Maturity Evaluator—LME.** This supply chain model applies a quantitative assessment to the CMM development model (Reay et al., 2006, p. 2-1). The first level (Initial) represents unstructured supply chain processes. The next level (Managed Logistics) has repeatable processes. The third level (Tailored Logistics) has well-defined processes throughout the organization. The next level (Quantitatively Managed) has effective metrics to manage its processes. The highest level (Optimized Integration) has integrated processes that focus upon optimal performance. In addition to an overall organizational assessment, this model assesses these five maturity levels in six functional areas: organization/workforce, logistics

processes, performance, resources, technology enablers, and vision/strategy (p. 4-1). It also incorporates a structured, high-level survey of 173 questions, separated into 26 functional components, to assess both the organizational and component maturity levels.

4. **Supply Chain Capability Maturity Model—S(CM)².** This is a maturity model that assesses the integration level of an organization's supply chain processes, from suppliers through the organization to the customers (Garcia, 2008, pp. 32, 74–75). Similar to the other models, the first level (Undefined) has unstructured and ill-defined supply chain processes. The next level (Defined) has defined processes that are separate from one another. The third level (Manageable) applies metrics to managing its processes. The next level (Collaborative) involves frequent discussions with suppliers and customers. The highest level (Leading) applies continuous improvement to its processes in pursuit of applying benchmark processes that other organizations want to emulate.

5. **Supply Chain Process Management Maturity Model—SCPM3.** This is a model based upon an assessment of nearly 800 companies throughout the world. It defines the different levels of maturities based upon related supply chain processes of companies with similar performance (de Oliveira, Ladeira, & McCormack, 2011). The first level (Foundation) represents the early stages when processes are being developed. The next level (Structure) has defined processes where performance is starting to be measured. The third level (Vision) has processes that drive future improvements. The next level (Integration) has integrated processes with suppliers and customers. The highest level (Dynamics) has processes using key performance indicators that enable responsiveness to environmental changes.

CAAA Research Model: Supply Chain Management Maturity Model (SCM3)

The maturity model applied in this research effort was the SCM3, which was heavily based upon the LME model. Tailored specifically to the supply chain processes at CAAA, the new proposed assessment model is a hybrid. Using the same organizational maturity levels from the LME model, SCM3 replaced its logistics focus with that of SCM, while blending effectiveness from the other four models. Furthermore, using CMM, the

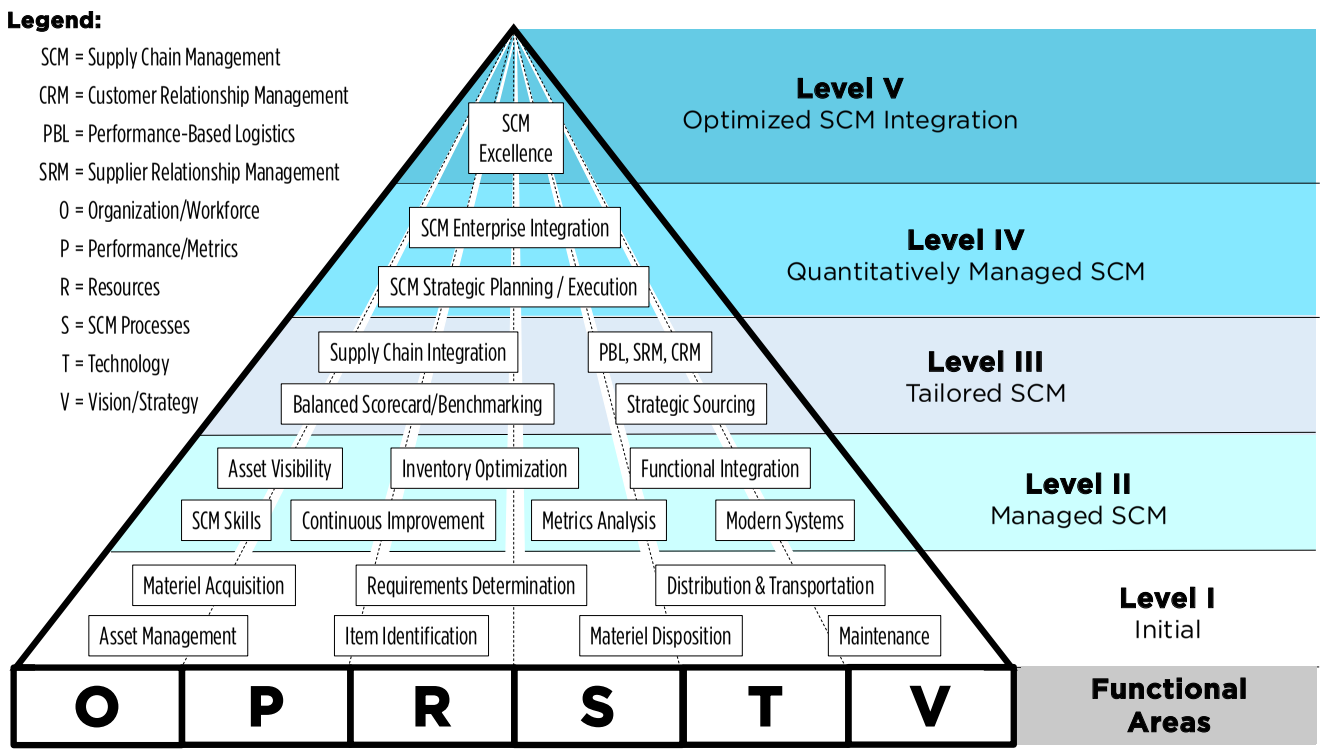
SCM3 includes maturity levels for components and functional areas. The lowest maturity level (Initial) for these additional sections is an undefined component or area (Table 2). The next level (Managed SCM) has predictable performances. The third level (Tailored SCM) has defined processes. The next level (Quantitavely Managed SCM) applies metrics and controls. The highest level (Optimized SCM Integration) is focused upon continually improving performance throughout the component or area.

TABLE 2. PROPOSED SUPPLY CHAIN MANAGEMENT MATURITY MODEL

Organizational Maturity Levels (Functional Areas and Components)					
Model	**I**	**II**	**III**	**IV**	**V**
SCM3	Initial	Managed SCM	Tailored SCM	Quantitatively Managed SCM	Optimized SCM Integration

SCM3 used many of the LME survey questions, which were each revised to more accurately assess the SCM of an AWCF organization. This new assessment model also evaluated the same six functional areas, with a focus on SCM processes. As for the functional components, this new model eliminated three and revised several others from the LME model, resulting in only 23 components in the SCM3 as depicted in the pyramid in Figure 1. Although assessed separately, these functional components were grouped into the organizational maturity levels where they were most likely to be used (Appendix).

FIGURE 1. SCM3 MODEL PYRAMID



Research Methodology

In my research to determine the supply chain maturity at CAAA, I sent the *SCM3 assessment survey* to organizational supply chain professionals and supervisors. Participants received an Excel-based spreadsheet survey instrument of 163 multiple choice questions. These questions were grouped into 23 functional components and six functional areas. In addition to assessing the overall maturity level of the organization, they were designed to assess the levels for each of these components and areas. If participants did not understand the organizational performance in any of the questions assessed, they were encouraged to select the fifth choice, 'E'. These fifth choice selections were identified as 'I do not know' (IDNK) selections. To ensure the integrity of the findings, I removed these responses during maturity-level analyses.

Each participant spent between 30–60 minutes to complete the survey. To ensure anonymity, individuals submitted responses by clicking a macro button in the file, which saved the data into a network server folder. A few organizational questions were added to indicate participant's organization and supervisory status. Finally, the spreadsheet survey was designed to prevent partial submissions containing unanswered questions and multiple submissions by the same participant.

Data Collection

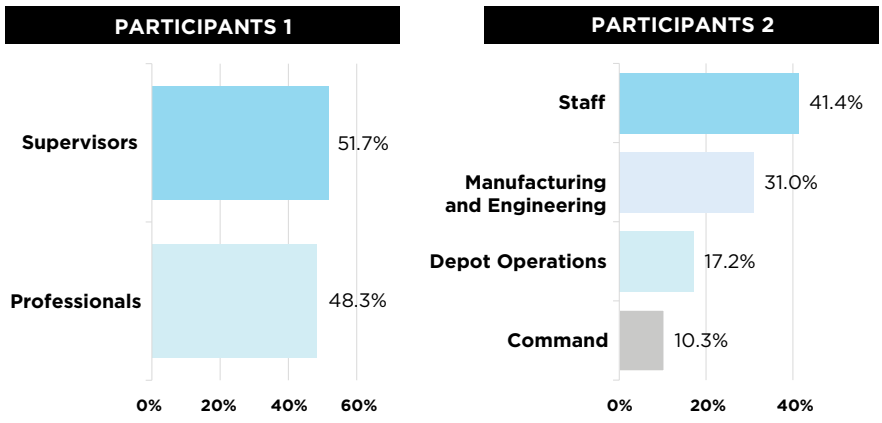
Prior to issuing the survey to participants, I conducted a small pilot study to check the mechanics of the spreadsheet and clarify text within the questions. Several key members of CAAA reviewed the initial survey instrument and provided valuable feedback regarding content and ease of use. Based upon this feedback, I clarified the questions and redesigned the spreadsheet. I issued the survey with written instructions to participants, along with a document containing generic SCM background information. They were given 4 weeks to complete and submit the survey. On a weekly basis, I provided completion status metrics to senior CAAA leaders, who used this to encourage their employees' participation.

Only 40 percent of the survey population responded. Many participants provided comments indicating the survey was too long and too complicated, suggesting that too many questions on complex topics with which the participants had no familiarity was a key reason for the high nonparticipation level.

Participants

I sent the survey instrument to participants whose functions were directly related to supply chain processes within CAAA. To minimize any risk of skewing the data with my preconceived ideas, I chose not to participate in the survey. Participants came from supply chain positions, such as manufacturing schedulers, procurement specialists, inventory specialists, and transportation controllers. Slightly more than half were supervisors (51.7 percent), with the others classified as professionals. They were also segregated into four groups: command, logistics (DO for depot operations), manufacturing (ME for manufacturing and engineering), and support staff, with percentages of each depicted in Figure 2. The command group included the commander, his deputy, and the chief of staff; the staff, however, were support professionals external to the directorates.

FIGURE 2. SURVEY PARTICIPANTS



Data Analyses

Each of the 163 questions in the survey was tied to a unique functional area and a unique functional component. Scoring of each question was based upon assigning a value to selected responses as shown in Table 3. From the assessment, I screened questions with "E" selected for the responses, indicating an answer of IDNK.

TABLE 3. SURVEY QUESTION SCORING VALUES

Answer	Value
A	5.00
B	3.67
C	2.33
D	1.00
E	screened from calculations

After the surveys were completed, I calculated the maturity level (ML) and standard deviation (σ) for each area and element using the following equations:

$$\mathrm{ML} = \frac{5.00n_A + 3.67n_B + 2.33n_C + 1.00n_D}{n_A + n_B + n_C + n_D} \quad (1)$$

n_i = number of questions with answer i

$$\sigma = \sqrt{\frac{n_A(5.00 - ML)^2 + n_B(3.67 - ML)^2 + n_C(2.33 - ML)^2 + n_D(1.00 - ML)^2}{n_A + n_B + n_C + n_D - 1}} \quad (2)$$

Results and Recommendations

Organizational Maturity Levels

The overall SCM organizational maturity level for CAAA was 3.04 (Table 4). With more knowledgeable selections, indicated with the lowest IDNK percentage (20.4 percent), the logistics group assessed the highest maturity level for CAAA (3.42); whereas manufacturing, with the highest IDNK percentage (47.4 percent), assessed the lowest maturity level (2.73). As for variances in the results, standard deviations within each of the four groups were about 1.3 within each of them. However, when combining all groups together, the variance more than tripled, indicating that each group had similar opinions, but differed significantly from other groups.

TABLE 4. SURVEY PARTICIPANT RESPONSES

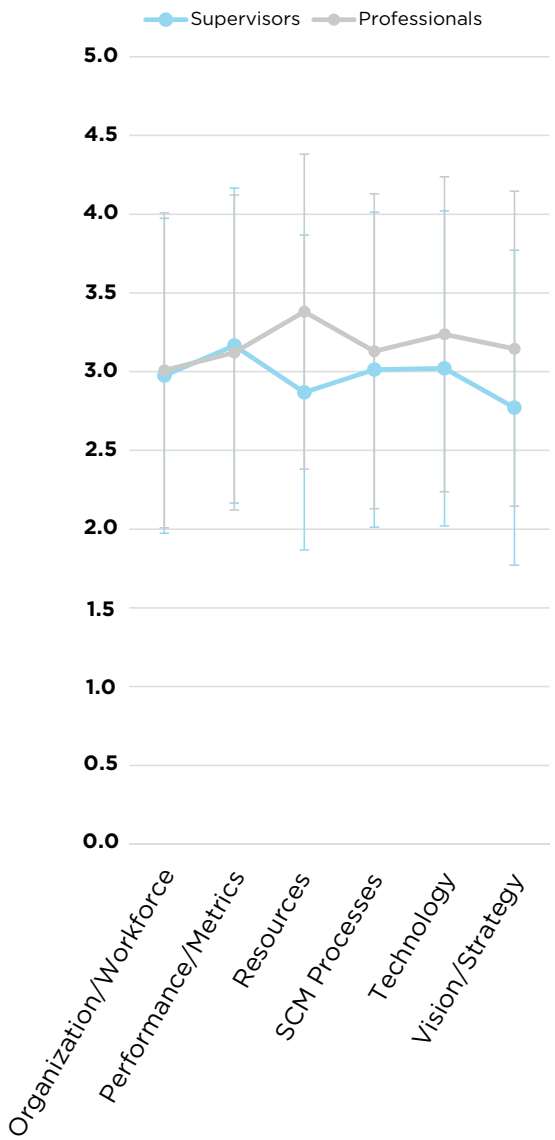
Group	ML	σ	IDNK %
Command	3.31	1.13	34.2%
Logistics	3.42	1.38	20.4%
Manufacturing	2.73	1.31	47.4%
Staff	2.95	1.35	42.8%
Overall	**3.04**	**4.71**	**39.5%**

Note. ML = Maturity Level; IDNK = I do not know.

Functional Area Maturity Levels

The SCM area with the highest maturity level was Performance/Metrics with a value of 3.15. This might be the highest because the most recent SCM improvements at CAAA involved implementation of a new performance-based dashboard with industrial benchmarks just prior to this survey (O'Neall & Haraburda, 2017). The lowest area was Vision/Strategy, with a maturity level of 2.95. As shown in Figure 3, supervisors rated the levels about 0.2 lower than professionals, perhaps because professionals spent more time performing the SCM functions than their supervisors. Another interesting observation was that the trends between these two groups were similar for five of the six areas. The Resources area was the sole exception with a 0.5 difference, perhaps because the supervisors held a more cautious perception than the professionals in believing the organization provided resources needed to complete the work.

FIGURE 3. FUNCTIONAL AREA ASSESSMENT RESULTS



Functional Component Maturity Levels

The SCM component with the highest maturity level was Materiel Disposition, with a value of 3.53 (Table 5), which was a strong core competency with the logistics group. The lowest component was strategic sourcing with a maturity level of 2.40. Again, variances in each group for each of the

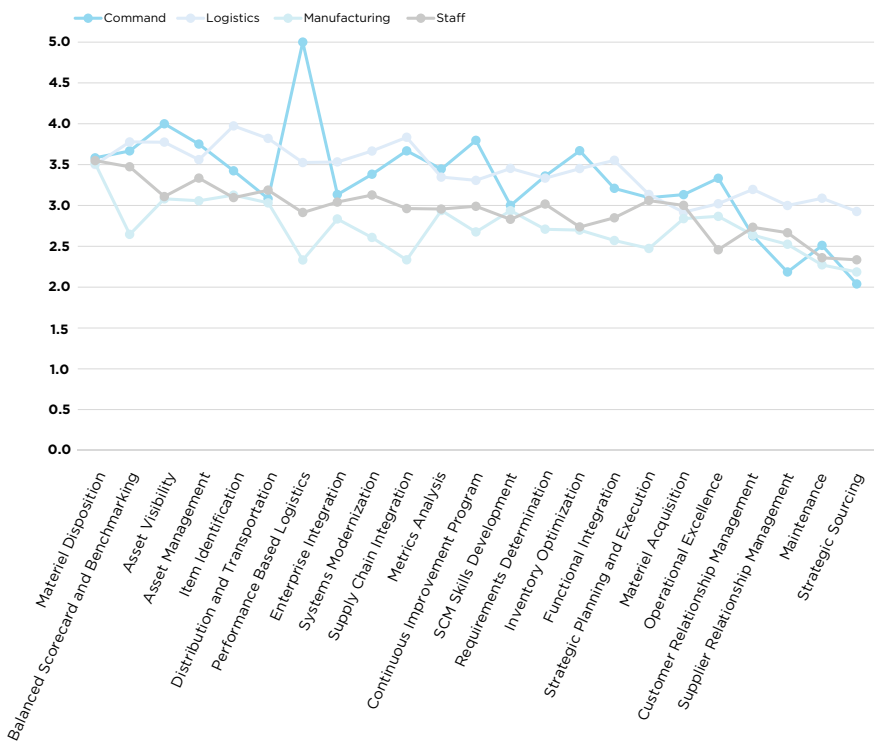
functional components were much smaller than the overall CAAA variance. Further, when both were sorted in decreasing order of overall levels, the logistics group scored higher maturity levels in each of the functional components—much higher than in the manufacturing group (Figure 4).

TABLE 5. FUNCTIONAL COMPONENT LEVELS AND STANDARD DEVIATIONS

	Command		DO		ME		Staff		OVERALL	
Component	**ML**	**σ**	**ML**	**σ**	**ML**	**σ**	**ML**	**σ**	**ML**	**σ**
Materiel Disposition	3.58	1.24	3.50	1.20	3.52	1.06	3.55	1.27	**3.53**	**4.93**
Balanced Scorecard/ Benchmark	3.67	1.33	3.78	1.37	2.65	1.39	3.47	1.40	**3.38**	**4.78**
Asset Visibility	4.00	1.24	3.77	1.35	3.08	1.12	3.11	1.51	**3.36**	**5.42**
Asset Management	3.75	1.14	3.56	1.49	3.06	1.42	3.33	1.31	**3.36**	**4.95**
Item Identification	3.42	1.31	3.97	1.09	3.13	1.38	3.10	1.56	**3.31**	**4.39**
Distribution and Transportation	3.08	1.09	3.82	1.21	3.03	1.33	3.19	1.23	**3.25**	**4.51**
Performance Based Logistics	5.00	0.00	3.53	1.40	2.33	0.89	2.91	1.13	**3.23**	**4.83**
Enterprise Integration	3.13	1.69	3.53	1.43	2.83	1.37	3.04	1.73	**3.14**	**5.27**
Systems Modernization	3.38	1.58	3.67	1.30	2.61	1.31	3.13	1.38	**3.12**	**5.95**
Supply Chain Integration	3.67	0.84	3.83	1.13	2.33	1.45	2.96	1.44	**3.12**	**3.77**
Metrics Analysis	3.45	0.96	3.35	1.40	2.94	1.25	2.96	1.44	**3.09**	**3.55**
Continuous Improvement	3.80	1.00	3.31	1.25	2.68	1.23	2.99	1.48	**3.06**	**6.94**
SCM Skills Development	3.00	1.36	3.45	1.34	2.94	1.50	2.83	1.28	**3.03**	**5.07**
Requirements Determination	3.36	1.11	3.33	1.32	2.71	1.47	3.02	1.28	**3.02**	**4.27**
Inventory Optimization	3.67	0.50	3.45	1.42	2.70	1.23	2.74	1.29	**3.00**	**3.78**
Functional Integration	3.21	1.25	3.55	1.48	2.57	1.48	2.85	1.37	**2.99**	**7.46**
Strategic Planning & Execution	3.10	1.25	3.13	1.59	2.47	1.17	3.06	1.36	**2.97**	**5.04**
Materiel Acquisition	3.13	1.29	2.92	1.46	2.84	1.35	3.00	1.28	**2.95**	**4.25**
Operational Excellence	3.33	1.01	3.02	1.41	2.87	1.33	2.46	1.23	**2.79**	**3.68**
Customer Relationship Mgmt	2.63	1.30	3.20	1.63	2.64	1.42	2.73	1.17	**2.79**	**3.88**
Supplier Relationship Mgmt	2.18	1.04	3.00	1.38	2.52	1.37	2.67	1.21	**2.65**	**3.16**
Maintenance	2.51	1.11	3.09	1.38	2.27	1.33	2.36	1.32	**2.47**	**4.44**
Strategic Sourcing	2.04	1.30	2.93	1.78	2.19	1.20	2.33	1.33	**2.40**	**3.90**

Note. Components are listed in decreasing order of overall maturity level (ML). DO = Depot Operations; ME = Manufacturing and Engineering.

FIGURE 4. FUNCTIONAL COMPONENT ASSESSMENT RESULTS



Recommendations

In the comments section of the survey, participants identified Asset Management, SCM Skills Development, Inventory Optimization, Requirements Determination, and Strategic Planning as the top five functional components that CAAA should prioritize for supply chain improvement efforts. When considering maturity level assessments with these identified components, the top five priorities for CAAA were revised to the following recommendations for improvement:

1. **Asset Management.** Hire consultants to assess gaps in the organization's practices and recommend improvements based upon ISO-55000 standards (International Organization for Standardization, 2014).

2. **SCM Skills Development.** Establish a Community of Practice for SCM as an informal venue for exchange of knowledge relative to SCM principles and practices, with a strong focus on fulfilling

the business goals of the organization (Wegner & Snyder, 2000). Next, align these skills throughout the organization and begin the journey to organizational performance excellence through the Baldrige National Quality Award program.

3. **Strategic Sourcing.** Increase knowledge in this component by encouraging SCM professionals to complete two Defense Acquisition University continuous learning modules: Strategic Sourcing Overview (CLC 108) and Spend Analysis Strategies (CLC 110). Next, develop strategic sourcing processes based upon the DoD-wide Strategic Sourcing program and its framework (DoD, 2013).

4. **Maintenance.** Complete continuous improvement projects to improve management of organizational maintenance of facilities and equipment, such as implementing predictive maintenance programs for critical systems.

5. **Supplier Relationship Management.** Complete continuous improvement projects to improve relationships with governmental and commercial suppliers.

Research Reflections

Limitations

A limitation of this study rested upon a common understanding of the SCM terms used in the survey, meaning that some of the respondents' answers may have been hunches or more appropriately identified with the IDNK selections. Based upon participant comments, many of these IDNK selections and a low submission rate were impacted by information blindness (Eppler & Mengis, 2004). Less than 40 percent participated, even after being given more time and supervisory encouragement. As such, the prioritized recommendations for improvement suggestions were based upon a minority of the CAAA supply chain population.

Implications

This survey showed it was possible to assess the SCM maturity levels within an organization. Based upon feedback that participants provided, some questions could have been answered with more than one of the responses provided, leaving it to the participant to determine which

response better represented the organization. Yet, this study provided valid recommendations to move this organization towards better understanding and application of SCM processes (DoD, 2013).

Conclusions

Performance within an organization's supply chain network can affect an organization's mission, making it critical to develop and sustain a mature supply chain. The SCM3 survey is a structured, high-level diagnostic tool that could be used to assess the organization's current supply chain capability and identify target areas for performance improvement and cost-reduction projects. Results of this survey could help improve operational decision making for organizational logistics efforts, focus supply-related management emphasis, and align organizational resources within the organizational supply chain. Additionally, these results could provide an enterprise view of how the organization's SCM processes compare to those of industry's best performers. Although this research focused upon the CMIB, similar SCM3 assessments conducted in other Defense Industrial Base organizations should yield similar results.

CAAA will implement its prioritized recommendations to improve its supply chain network with valuable information obtained from this survey. Implementing these few improvements will have noticeable results in CAAA advancing its business processes commensurate with those of other industrial leaders, and maintaining its relevance to the warfighters. Furthermore, CAAA will reduce the complexity of the original survey to just a handful of relevant questions gleaned from the prioritized five functional components. After improvements have been made, CAAA will then submit the revised survey to the same survey participants. Using the original survey results as an initial baseline, results of the winnowed questions will yield documented evidence of maturity level changes resulting from these improvements. Finally, through the continuous improvement cycle, CAAA will then identify another set of functional components in the SCM3 model for its next round of improvements.

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Appendix

Supply Chain Management Maturity Model Components

Organizational Maturity Level I—Initial

1. **Item Identification**. The system of marking, valuing, and tracking items delivered to an organization that enhances logistics, contracting, and financial business transactions.

2. **Asset Management**. The effectiveness of an organization in managing assets to support demand satisfaction. This includes the management of all assets: fixed and working capital.

3. **Distribution and Transportation**. The movement of items throughout the supply chain pipeline using services (i.e., trucking, rail, air, and marine) and facilities (i.e., warehouses and distribution centers).

4. **Materiel Disposition**. The sales, transfer, lease, loan, demilitarization, or disposal of materiel.

5. **Materiel Acquisition**. The processes to obtain materiel to satisfy an operational need, such as production, storage, disposal, and distribution tasks.

6. **Requirements Determination**. The methods to determine the requirements of the organization through a variety of techniques (i.e., interviews, observations, designs, and customer dictates) while determining the most effective, timely, and cost-efficient way to obtain those requirements.

7. **Maintenance**. The processes involved to ensure equipment and facilities work when needed in an efficient and effective manner, applying reactive, preventative, and predictive methods.

Organizational Maturity Level II—Managed SCM

8. **Functional Integration**. The collaboration, communication, and coordination between functional activities in an organization, such as finance, production, procurement, and logistics. This includes the efficient and effective deployment and allocation of the organization's resources, which includes finances, inventory, labor, equipment, facilities, and information.

9. **Inventory Optimization**. The processes for balancing the amount of working capital, such as warehouse buildings tied up in inventory with service-level goals across the organization.

10. **Systems Modernization**. The incremental cost-effective evolution of business processes that incorporates modern architectures and technologies to improve operational performance.

11. **Metrics Analysis**. The iterative process for identifying issues and problems derived out of data collected from organizational activities.

12. **SCM Skills Development**. The training and development of the organization's workforce to perform tasks needed for its SCM.

13. **Asset Visibility**. The capability to provide users with timely and accurate information on the location, movement, status, and identity of personnel, equipment, and materiel.

14. **Continuous Improvement Program**. An ongoing effort to improve products, services, or processes. This includes the process of finding and removing unwarranted expenses from the organization to increase profits without having a negative impact on the quality of its products.

Organizational Maturity Level III—Tailored SCM

15. **Supplier Relationship Management**. The comprehensive approach to managing the organization's interactions with vendors that supply the goods and services it uses.

16. **Balanced Scorecard and Benchmarking**. The strategic management system that aligns activities with an organization's vision and strategy to improve decision making and communications by monitoring performance metrics along with comparing them to Defense Industrial Base best practices.

17. **Customer Relationship Management**. The processes used to understand customer needs by building customer relationships leading towards providing better required products and services, when and where needed.

18. **Supply Chain Integration**. The collaboration, communication, and coordination between all groups involved in the supply chain from suppliers through the organization to its customers.

19. **Strategic Sourcing**. The collaborative and structured process of critically analyzing the organization's procurement expenses and using this information to make better and more cost-effective business decisions in the effective, efficient procurement of materials and services.

20. **Performance Based Logistics**. The processes used to optimize product availability while minimizing costs with the best use of public- and private-sector capabilities through partnering initiatives.

Organizational Maturity Level IV—Tailored SCM

21. **Enterprise Integration**. The timely and accurate exchange of consistent information between business functions throughout the organization to support strategic and tactical goals in a manner that appears to be seamless.

22. **Strategic Planning and Execution**. The processes for defining the long-term goals of an organization, making decisions on allocating its resources in pursuit of those goals, and continually tracking its progress towards them.

Organizational Maturity Level V—Optimized SCM Integration

23. **Operational Excellence**. The integrated approach to organizational performance that results in the delivery of ever-improving value to its customers and stakeholders while contributing to organizational sustainability.

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