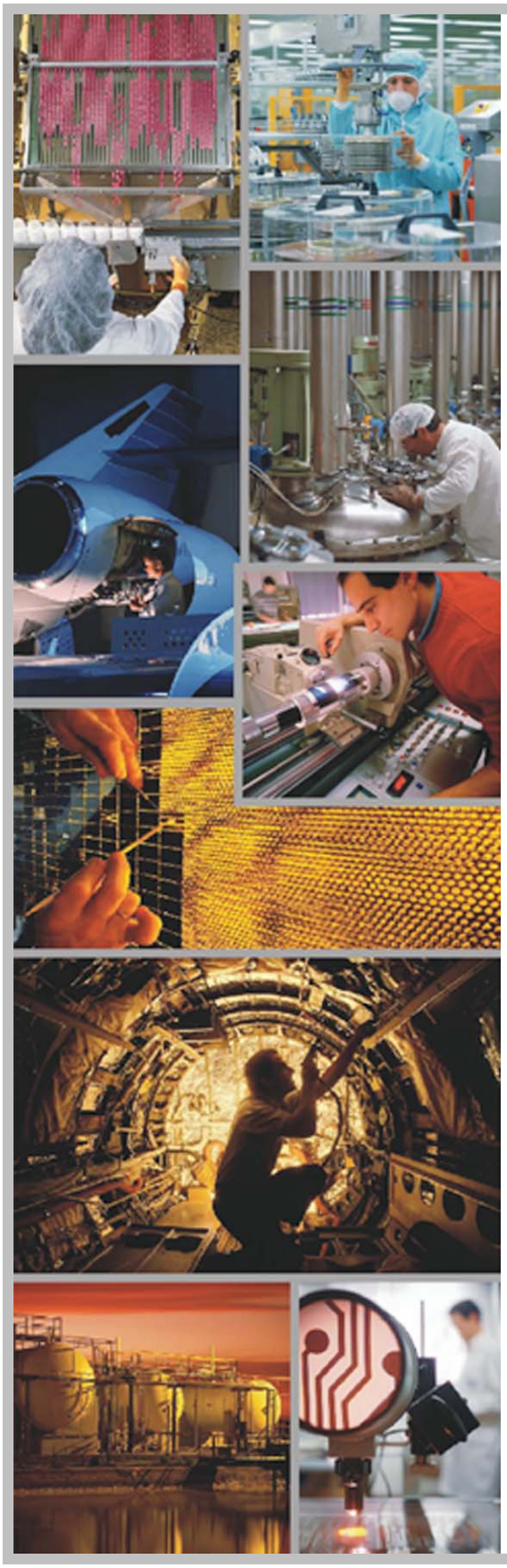

Supply Chain Integration

D R A F T

1 February 2007

Prepared For:

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6.2 Vision for Next Generation Supply Chains: Culture and Skills Viewpoint

Overall Vision for Next Generation Supply Chains: Culture and Skills

A culture of trust and innovation enables corporations to achieve breakthrough levels of business performance. This performance achievement is realized through a shared vision of success in which everyone has a defined role and clear incentives and rewards. The supply chain is a partnership with common objectives, including management of total cost and risk. The resources that support supply chain excellence are aligned for maximum results and efficiency. Industry needs, educational opportunity, and government programs and policies all support corporate success. Industries have knowledge of and access to programs and policies that provide assistance. All levels of organizations are trained to be skilled in collaborating in a network-centric environment and have a shared understanding the needed/desired skill sets. The transparency of supply chains is web-based and net-enabled. All needed information (capacity, capability, quality) is shared with all partners in the supply chain in an environment that protects the proprietary interests of all members.

Attributes of the Vision:

1. Next generation supply-chains will require a broad skill base that includes facilitation and relationship management, program management, communication skills, IT skills, and others.
2. A supply chain professional is someone who has chosen this profession as a choice instead of happenstance, has a career path into executive management, and has academic support and training to prepare them for their profession.
3. All levels of organizations are skilled in collaborating in a network-centric environment.
4. OEMs have consistent training/development processes regardless of sources of the training, and the supplier has a consistent training process regardless of the customer they are supplying.
5. The MEP is a strong advocate for supply chain integration and serves as a source for consistent, valuable information disseminated through the MEP network.
6. Shared understanding of what the needed/desired skill sets are at each level of the organization.
7. The world is web-based and net-enabled.
8. Technology tools enhance access to information, policies, and training.
9. Social science research receives appropriate emphasis along with technological research. The result will be a partnership between academia and subject matter experts resulting in tools and metrics for successful collaboration.
10. Semantic based web tools support supply chain integration.

11. Social networking is a communication and collaboration skill, supported by toolsets, that drives "intense collaboration."
12. 'Indifferent' collaborators operate (plug-and-play) in a nodal pipeline that enables the continuous flow of product.
13. Supply chains and all stakeholders share a common vision or efficient, cost effective production, business performance objectives and incentives, risk sharing and pooling of resources.
14. Alignment, visibility and robustness; everyone in supply chain knows what they need to do their job and understands roles, responsibilities, and how their job affects upstream and downstream operations.
15. Transparency of supply chains – all relevant information (capacity, capability, quality) is shared with all partners in the supply chain
16. A culture of innovation prevails.
17. Maximum alignment exists between industry needs, educational provisions, and government programs and policies. Industries have easy access to programs and policies that provide assistance.
18. Government programs are cooperative and well aligned to provide efficient use of tax dollars.
19. Adaptive/learning/responsive/reactive supply chains
20. Tools are available to help supply chains be adaptive for optimization, responsive to needs, and reactive to changes. The supply chain systems learn from experience and achieve a dynamically optimized steady state.
21. Total cost is taken into account in every decision that is made throughout the supply chain
22. Administrative actions do not stop or slow down physical products from moving through the supply chain (to minimize operational and administrative wastes.)
23. Continuity of business operations is "engineered in" supply chain operation.
24. DoD is the tangible example of the *enterprise supply chain of the future* in the next five years.

6.3 Issues for Next Generation Supply Chains: Culture and Skills

Issue 1: There does not exist a framework for transformation or a business case for network-centric partnership throughout the entire supply chain

- OEMs and Small and Medium Enterprises (SMEs) do not have a good understanding of what "trust," "innovation," and "total cost," mean with regard to the enterprise supply chain.

- OEMs and SMEs do not have the level of awareness to see the gap between their current

state and the vision for an integrated, digital SC.

- Certification of members of supply chain as "collaborators" – "single's ad" for businesses to find like-minded enterprises who want to collaborate.
- Supply chain adopted as a tactical decision rather than as a strategic decision.
- Instilling collaborative curricula at business schools who supply executives to industry
- Template for risk- and reward-sharing across companies
- Groundwork for metrics that govern the partnering relationships
- Lack of understanding of the concept of "total cost" in financial performance
  - Total cost is not just $piece price + $logistics
  - Foundation for a business case for collaboration
  - Business decision-making; what is the impact on my bottom line for participating in a collaborative environment

Issue 2: More-effective alignment is needed of the 15 government agencies that have an interest in manufacturing/ supply chain issues a) among themselves and b) collectively responding to industry needs.

- There is effort going into developing solutions, but that effort is fragmented and some is redundant. There is no accountability across agencies and sometimes limited communications within agencies.
- Due to agency missions, they focus on specific parts of the supply chain. Each has its own interest, but none focuses on the overall enterprise.
- There are programs and policies designed to help SMEs but they are not seen as accessible or helpful as they should be. The programs, in general, lack a common vision. Also, many companies are not aware of these programs and policies.
- Legislative 'handcuffs' exist that prevent/limit government and commercial suppliers from participating in collaborative/integrated supply chain relationships.
  - Example: Berry Amendment

Issue 3: There is no uniform solution provider to give small companies accessible, affordable tools required to participate in the next generation network-centric supply chain.

- MEP has historically been focused on point-solution for small and medium sized companies (sub-tier suppliers to OEMs).
- OEMs, which are focused on supply chain issues, are outside of the historical focus of the MEP program
- MEP clients tend to be below the first and second tier levels of the supply chains. As such, they are below the radar screen of the OEMs.
- There is no current strategy or set of standard training classes focused on bringing

knowledge of integrated supply chain to MEP clients.

- There are common needs (competitive price, on-time delivery, quality, tech support, innovation, etc.) for all OEMs across all industries. This could define the core MEP supply chain template.
- There is no universal pipeline from which small and medium sized companies can easily access information
- There is a need for federal, state, regional, and local governments to work with the entire industrial base (OEMs through the supply chain).

Issue 4: Need common infrastructure (software and technologies) to allow companies to participate in an integrated supply chain.

It is recognized that there are issues associated with common software and other technology tools. Free enterprise must prevail. However, the lack of common solutions results in interoperability issues that cripple supply chain performance. These issues need to be addressed in a fair way that leads to problem solution.

- Need to define the common vehicle for infrastructure before common training can be developed
- The common infrastructure would serve as a basis for common metrics

Issue 5: Lack of academic and educational resources and curricula to provide knowledge, research, and training to educate the next generation supply chain workforce.

- Manufacturing is not a popular topic with academia.
- Competition between research universities for funding and students limits universities interest in "public good" investments
- The curriculum needs to extend from the universities through the elementary levels.
- Often community colleges can better respond to specific needs.
- The concept of the "knowledge supply chain" embraces the OEMs setting needs and requirements and working with the educational system to fulfill the needs.

Issue 6: How can implementation be accelerated for the companies/agencies that are already working on implementing integrated supply chains?

6.4 Top Issues for Next Generation Supply Chains: Culture and Skills

From these six issues, the group defined the following four issues as the most compelling and as those requiring solution. The rest of this chapter is devoted to the plan for solution.

Issue 1: There does not exist a framework for transformation or a business

case for network-centric partnership throughout the entire supply chain

Issue 2: We need a more effective alignment of the 15 government agencies a) among themselves and b) collectively responding to industry needs.

Issue 3: Need common infrastructure (software and technologies) to allow companies to participate in an integrated supply chain.

Issue 4: Lack of academic and educational resources and curricula to provide knowledge, research, and training to educate the next generation supply chain workforce.

6.5 Building the Roadmap – Defining Major Issues

Issue 1: There does not exist a framework for transformation or a business case for network-centric partnership throughout the entire supply chain

Solution 1: Develop a model for a business case for total supply chain integration based on total cost. This model should address the stakeholders and should address risk, reward, and total cost issues across the supply chain. It is recommended that government accept a lead role in developing this model.

Task 1: Convene government, academic, and industry to define the foundational principles for the model and get buy-in

Task 2: Develop and document a rich set of quantifiable metrics

Task 3: Include in the model the "hooks" to determine the business case for each class of stakeholder and make the model extensible for use by members of the supply chain for their specific evaluations.

Solution 2: Create a working group to identify and address barriers to implementing an integrated SC and outline tactical solutions to those barriers. It is recommended that the Department of Commerce, and specifically NIST, take the lead in organizing and facilitating the operation of the working group. The working group should live up to the name and facilitate the creation of important strategies to overcome the most important barriers to successful supply chain integration. The emphasis of this body is on the short term – tactical solutions. The working group would serve as an advisory body to NIST and the IWG in fostering cross agency cooperation for delivering solutions. The ISO framework strategy is seen as a good model for replication.

Task 1: Charter and convene a working group

Task 2: Conduct a study that builds on the output of this workshop to define and prioritize the barriers to supply chain integration.

Task 3: Assure the inclusion of legal issues like antitrust, satisfaction of participation mandates and other requirements.

Solution 3: Develop a structured methodology and toolset for achievement of SCI at the

strategic level. This solution will develop a scaleable, robust toolset for identifying and evaluating options, selecting the best options, guiding implementation and other components of a SC strategy.

Task 1: Develop a roadmap that defines the path to achieving strategic success in SCI

Task 2: Develop a toolset, defined by the roadmap that will support strategic decision making for all members of the supply chain.

Task 3: Provide the capability to adapt the toolset to include specific differences in laws and cultures, levels on the supply chain, skill levels, and other consideration.

Solution 4: Develop assistance and incentives to accelerate the companies/agencies who are successfully working on implementing integrated supply chains. Similar to the Baldridge program and the impact that it had on quality, Department of Labor, Department of Commerce cooperation could deliver a similar program for supply chain excellence. It is important that consideration of such a program include as a "ground rule" the fact that all levels of the supply chain would be included.

Task 1: Charge the working team of solution 1 with the assignment of assessing the need for a supply chain excellence program and making a recommendation based on that assessment

Task 2: If the recommendation of task 1 is positive, in concert with the IWG on manufacturing R&D, establish a Subpanel of the working team, with both industry and government representation, to put forward a structure and plan for a program.

Issue 2: We need a more effective alignment of the 15 government agencies a) among themselves and b: collectively responding to industry supply chain integration needs.

Solution 1: Develop an alignment strategy and combined roadmap for the 15 government agencies for SCI based on a cataloging or existing activities, a gap analysis, and a prioritized set of target solutions. The Inter-agency Working Group (IWG) for Manufacturing R&D, the IWG for Manufacturing Competitiveness, and other IWGs should work together to achieve this alignment.

Task 1: Adopt the findings from this workshop and this document as the beginning point for a national SCI activity.

Task 2: Catalog all current and planned initiatives related to supply chain funding, regulations, policies, etc. Consider a knowledge based dynamic system for accomplishing this task.

Task 2: Conduct a gap analysis, identify redundancies, and define priorities.

Task 3: Develop a project slate for development and deployment of needed solutions.

Task 4: Assure that implementation planning includes supported access strategy for SMEs.

Issue 3: Need common infrastructure (software, technologies, and methodologies) to allow companies to participate in an integrated supply chain.

It is emphasized that the provision of a toolset must be in concert with the models and framework defined for issue 1 of this chapter. It is also noted that this issue is very important in establishing a SCI culture, but specifically belongs in the interoperability track.

Solution 1: Building on the models of issue 1, solution 1, generically define information needs at various levels of the supply chain and define standard protocols for communication of essential information.

Solution 2: Form a new group or partner with an existing group to promote a culture of standards for supply chain integration.

Issue 4: Lack of academic and education resources and curricula to provide knowledge, research, and training to educate the next generation supply chain workforce.

Solution 1: Develop a grant program from Dept. of Labor to define the structure of, and requirements for, next-generation supply chain curricula.

Solution 2: Work with the National Science Foundation and other organizations to promote manufacturing research and education funding. Specifically promote the establishment of an Engineering Research Center and NSF Industry/University Cooperative Research Centers (I/UCRC) that deals with supply chain issues, and develops and distributes supply chain curricula.

Solution 3: Develop and pilot workforce education and training programs/curricula based on the Next Generation SC requirements from Solution 1.

Track E				Timeline										
WBS	Issue/Solution/Task	Metric	PRI	FY '07	FY '08	FY '09	FY '10	FY '11	FY '12	FY '13	FY '14	FY '15	FY '16	FY '17
1	There does not exist a framework for transformation or a business case for network-centric partnership throughout the entire supply chain													
1.1	Develop a model for a business case for total supply chain integration based on total cost. This model should address the stakeholders and should address risk, reward and total cost issues across the supply chain. It is recommended that government accept a lead role in developing this model.													
1.1.1	Convene government, academic, and industry to define the foundational principles for the model and get buy-in													
1.1.2	Develop and document a rich set of quantifiable metrics													
1.1.3	Include in the model the "hooks" to determine the business case for each class of stakeholder and make the model extensible for use by members of the supply chain for their specific evaluations.													
1.2	Create a working group to identify and address barriers to implementing an integrated SC and outline tactical solutions to those barriers. It is recommended that the Department of Commerce, and specifically NIST, take the lead in organizing and facilitating the operation of the working group. The working group should live up to the name and facilitate the creation of important strategies to overcome the most important barriers to successful supply chain integration. The emphasis of this body is on the short term – tactical solutions. The working group would serve as an advisory body to NIST and the IWG in fostering cross agency cooperation for delivering solutions. The ISO framework strategy is seen as a good model for replication.													
1.2.1	Charter and convene a working group													
1.2.2	Conduct a study that builds on the output of this workshop to define and prioritize the barriers to supply chain integration.													
1.2.3	Assure the inclusion of legal issues like antitrust, satisfaction of participation mandates and other requirements.													
1.3	Develop a structured methodology and toolset for achievement of SCI at the strategic level. This SOLUTION will develop a scaleable, robust toolset for													

Track E				Timeline										
WBS	Issue/Solution/Task	Metric	PRI	FY '07	FY '08	FY '09	FY '10	FY '11	FY '12	FY '13	FY '14	FY '15	FY '16	FY '17
	identifying and evaluating options, selecting the best options, guiding implementation and other components of a SC strategy.													
1.3.1	Develop a roadmap that defines the path to achieving strategic success in SCI													
1.3.2	Develop a toolset, defined by the roadmap that will support strategic decision making for all members of the supply chain.													
1.3.3	Provide the capability to adapt the toolset to include specific differences in laws and cultures, levels on the supply chain, skill levels and other consideration.													
1.4	Develop assistance and incentives to accelerate the companies/agencies who are successfully working on implementing integrated supply chains. Similar to the Baldridge program and the impact that it had on quality, Department of Labor, Department of Commerce cooperation could deliver a similar program for supply chain excellence. It is important that consideration of such a program include as a "ground rule" the fact that all levels of the supply chain would be included.													
1.4.1	Charge the working team of SOLUTION 1 with the assignment of assessing the need for a supply chain excellence program and making a recommendation based on that assessment													
1.4.2	If the recommendation of task 1 is positive, in concert with the IWG on manufacturing R&D, establish a Subpanel of the working team, with both industry and government representation, to put forward a structure and plan for a program.													
2	We need a more effective alignment of the 15 government agencies a) among themselves and b: collectively responding to industry supply chain integration needs.													
2.1	Develop an alignment strategy and combined roadmap for the 15 government agencies for SCI based on a cataloging or existing activities, a gap analysis, and a prioritized set of target solutions. The Inter-agency Working Group (IWG) for Manufacturing R&D, the IWG for Manufacturing Competitiveness, and other IWGs should work together to achieve this alignment.													
2.1.1	Adopt the findings from this workshop and this document as the beginning point for a national SCI activity.													

Track E				Timeline										
WBS	Issue/Solution/Task	Metric	PRI	FY '07	FY '08	FY '09	FY '10	FY '11	FY '12	FY '13	FY '14	FY '15	FY '16	FY '17
2.1.2	Catalog all current and planned initiatives related to supply chain funding, regulations, policies, etc. Consider a knowledge based dynamic system for accomplishing this task.													
2.1.3	Conduct a gap analysis, identify redundancies, and define priorities.													
2.1.4	Develop a project slate for development and deployment of needed solutions.													
2.1.5	Assure that implementation planning includes supported access strategy for SMEs.													
3	Need common infrastructure (software, technologies, and methodologies) to allow companies to participate in an integrated supply chain. It is emphasized that the provision of a toolset must be in concert with the models and framework defined for ISSUE 1 of this chapter. It is also noted that this ISSUE is very important in establishing a SCI culture, but specifically belongs in the interoperability track.													
3.1	Building on the models of ISSUE 1, SOLUTION 1, generically define information needs at various levels of the supply chain and define standard protocols for communication of essential information.													
3.2	Form a new group or partner with an existing group to promote a culture of standards for supply chain integration.													
4	Lack of academic and education resources and curricula to provide knowledge, research, and training to educate the next generation supply chain workforce.													
4.1	Develop a grant program from Dept. of Labor to define the structure of, and requirements for, next-generation supply chain curricula.													
4.2	Work with the National Science Foundation and other organizations to promote manufacturing research and education funding. Specifically promote the establishment of an Engineering Research Center and NSF Industry/University Cooperative Research Centers (I/UCRC) that deals with supply chain issues and develops and distributes supply chain curricula.													
4.3	Develop and pilot workforce education and training programs/curricula based on the Next Generation SC requirements from SOLUTION 1.													