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BEST PRACTICES IN CYBER SUPPLY CHAIN RISK MANAGEMENT

DuPont Crop Protection
Operating Disciplines for Supply Chain Sustainability, Risk Management and Resilience

INTERVIEWS

George Poe
Integrated Operations Leader, Crop Protection

Robin Jenkins
Supply Chain Regulatory Risk Manager, Crop Protection

The Next New Things in Supply Chain Risk Management

- Adopting a model of governance teams that creates joint accountability and responsibility across all of the functions that touch operations and supply chain — and eliminates the inherent risk in having a single manager or function make decisions about what is safe or resilient.
- Embedding the concept of "inherency" in the implementation of resilience — from product design to supply chain development.
- Transforming enterprisewide operations — including supply chain risk management across all businesses — with formal and standardized processes to improve execution of all operations, collaborative structures to enable integrated operations, and centers of excellence to identify and manage best practices.

Company Overview

DuPont works inclusively with others to find innovative, science-enabled solutions to some of the world's biggest challenges. Its three strategic challenges are feeding the world, reducing dependence on fossil fuels, and protecting life and the environment.

Crop Protection is a $3-4 billion dollar business that operates in virtually every country around the globe. The business has 25 plants worldwide and a vast network of contract manufacturers. Its mission: Develop the technology and offerings to improve sustainable agriculture for a growing world. Consistent with the company's focus on world-class science and technology, the Crop Protection business develops herbicide, fungicide and insecticide products in order to grow healthier crops and maximize crop investment.

Supply Chain Transformation at DuPont

Supply chain risk management in the Crop Protection business must be viewed against the backdrop of a much larger operational transformation that was launched nearly 10 years ago. That transformation was intended to drive productivity and align operating disciplines and best practices across all of DuPont's businesses. This required change at the corporate level and across every business, including:

- New key performance indicators (KPIs) to drive change.
- Collaborative structures to enable integrated operations.
- Centers of excellence to identify and manage best practices.
- Formalized and standardized processes to improve execution.
- Focus on mindsets and behaviors to support best practices.

What emerged was called the DuPont Production System (DPS). What DuPont found was that disciplined operational excellence created a basis to fulfill multiple objectives simultaneously — increased efficiency and productivity as well as strengthening other goals including safety, sustainability and resilience.

For supply chain, the DPS shifted the focus from supply logistics to demand- led fulfillment. The DPS created integrated operations capabilities to improve performance and productivity, but these also drove end-to-end approaches to risk management. Under DPS, DuPont created the functional centers of excellence, including in supply chain, which provided best practices, technologies and tools that are standardized and leveraged across DuPont's 10 businesses.

One of the unique aspects of the DuPont transformation was its focus on people, A core tenet of the program was that people are simultaneously the key barriers and key enablers of the new culture of excellence needed to cope with increased global competition and operational risks. As part of the transformation process, DuPont established new training and skills development programs to effect the cultural change and collaborative approaches of the DPS.

Integrated Operations — Supply Chain

Business Integration

Strong supply chain integration within business teams and strategies.

Execution

Drive effectiveness and efficiency in execution in plans and supply chains across businesses and regions.

Center of Competency

Ensure best practices align with standards and processes.

The key goals of supply chain risk management are to respond, mitigate and pre-empt.

- **Respond:** Ensure that there are crisis management processes and procedures in place to contain the crisis and accelerate recovery.
- **Mitigate:** Entails formalized risk management and supply chain design processes that identify and mitigate risks proactively.
- **Pre-empt:** Engages the organization to redesign the supply chain to remove or reduce the risk potential (e.g. inherently safer designs to avoid hazards instead of trying to control them).

Within this framework of supply chain risk management, the Crop Protection business, like all of DuPont's businesses, emphasizes sustainability. A more recent focus for the Crop Protection business is supply chain resilience. George Poe, Integrated Operations Leader for the Crop Protection business, notes:

> "All supply chains are faced with potential disruptions. Our goal is to proactively develop processes to manage disruptions before any issues arise. And, those processes can create tangible benefits in the day-to-day operations, as well as during crisis periods."

Supply Chain Risk Management Governance

Given its focus on end-to-end resilience, the Crop Protection business has created an internal governance team which meets quarterly. The team brings together technology, sourcing and supply chain leaders, Safety, Health and Environment (SHE) leaders — all of the functions that touch supply chain operations — under a holistic umbrella of resilience and risk management. This group assesses risks and resources and tracks mitigation projects.

The key advantage of the governance team structure is that it creates joint accountability and responsibility across all of the functions that touch operations and supply chain — and eliminates the inherent risk in having a single manager or function make decisions about what is safe or resilient. This leadership team sets priorities for projects and makes sure that they are resourced appropriately.

Supply Chain Risk Management Process: Crop Protection uses a formal process for risk identification, scoring and mitigation that looks end-to-end at supply chain risks. It begins with a methodology to identify risk — ranging from geographic and geopolitical, environmental, technological, and regulatory to what-if scenarios on supplier disruption. Those risks are weighted by probability and impact factors to create a risk ranking.

The risk rankings, in turn, yield a list of projects intended to mitigate or lower the probability of the risk. This is a formalized process with risk evaluation and scoring tools, and mitigation planning and tracking.

Ideally a supply chain resiliency program encompasses the entire network of sites, suppliers and strategic partners. There is an effort to share the methodology with alliance partners so that they can go deeper with their own suppliers.

Contract Manufacturer (CM) Selection: Specifically for DuPont, contract manufacturing includes the production, re-packaging or finishing by a supplier of a product to be sold by DuPont; or the production by a supplier using DuPont provided technology of a material to be consumed by DuPont. Manufacturers in this industry are required to have registered locations, so it is costly and time consuming to make changes. George Poe notes:

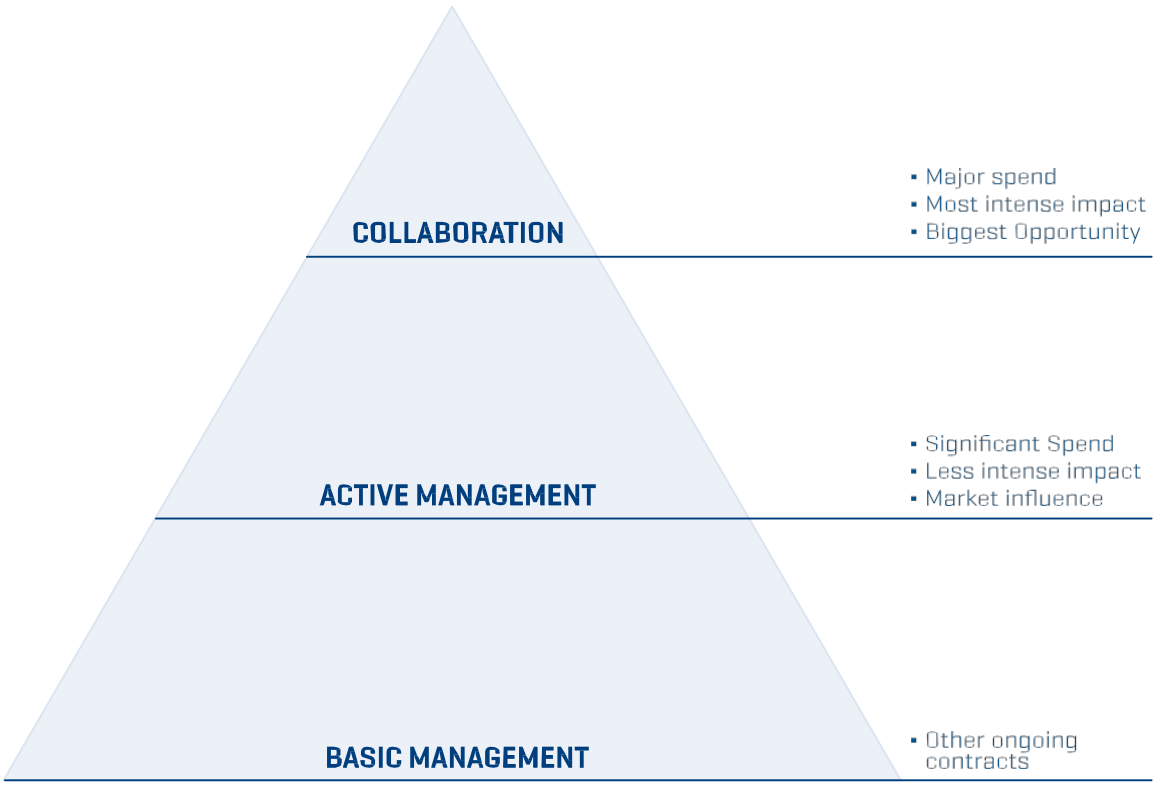
> "It's critically important to select the right manufacturers early and move to long-term, win-win relationships. DuPont uses these processes to drive higher standards of quality and reliability of supply. The proper selection of manufacturers improves risk management and supply chain resiliency."

When new CMs are evaluated for selection, the review process is overseen by the Operations Decision Board. The first decision is whether there is a willingness to share the IP or technology with others. Once that hurdle is passed, the potential pool of CMs is evaluated based on who has the right capability in the right location and the competency to do the work. CMs are evaluated on multiple risk criteria including: capability, technology, SHE performance history, financial stability and others. This information is brought before the Operations Decision Board for review and approval.

CM Oversight: Once CMs are in the network, they are subject to regular reviews and audits by multiple functional specialties — from chemists and engineers to contract manufacturing specialists. For some sites, DuPont might perform the quality assessment in their own laboratories or the final quality release. Suppliers undergo safety, environmental and quality audits. In addition, contract manufacturer risks are regularly assessed on a variety of risks as illustrated above on the risk index.

Differentiated Management of CMs: CMs for the Crop Protection business receive varying levels of engagement from DuPont managers. The more strategic CMs receive more senior-level interactions. At the top of the pyramid, about a half dozen of the most strategic Alliance Partners meet face-to-face with the Integrated Operations leader once or twice every year. Below that, key partners meet regularly with supply chain managers. And at the bottom of the pyramid, contract managers oversee commodity sourcing and supply agreements.

Figure 1. DuPont Management Engagement



Supply Chain Quality: As a regulated business, Crop Protection incorporates multiple layers of quality controls: quality managers, quality systems and quality organizations. As in the pharmaceutical industry, there are multiple products being produced in the same facility, so quality is paramount and driven by documented process standards and business guidelines.

Particularly with active ingredients, the quality challenge is to ensure that there is no cross-contamination — even at minute levels. These precautions are built into the process — from guidelines about how plants are to be constructed (the distances of production units from each other) to sequencing of production lines (what products cannot follow each other) to test methodology. At the heart of these standards and guidelines is the biology of the products and how they might interact.

Crop Protection has a global team that owns the standards and guidelines for contamination prevention. They meet regularly to review and update the standards and guidelines or create new ones. This group is linked to the quality organization to track any issues or deviations.

Transportation Security: Because some categories of Crop Protection products fall under hazardous cargo requirements, meeting regulatory requirements while optimizing performance receives considerable attention. They are in the process of redesigning the entire logistics and warehousing operation to create a stronger network.

One of the key risks is theft. Because Crop Protection products are high value and low volume, they are an attractive target. Crop Protection has created an operating committee to try to drive new standards for the industry. Some areas of focus include:

- Metrics to assess the risk of product theft;
- Better understanding of what happens to a stolen product;
- Selection criteria for third party logistics providers; and
- Standards and guidelines to manage shipment security in high-risk areas.