Managing BPM

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The Greening of Process

A little over four years ago the Supply-Chain council began distribution of a set of enhancements to the SCOR™ framework that incorporated a set of components to identify, measure, and characterize process from an environmental perspective. Last year, those standards, which had been under review, were approved for inclusion in SCOR 9.0 to be released March this year. An overview of the components will be presented by the research development team at the annual Supply-Chain World event in Minneapolis (www.supplychainworld.org) in March this year. Taking this as a starting point, I want to write today about how advanced process management can begin to look at the "environmental footprint" of process in general.

For most process work, my teams and I strive for "closed loop" process systems where virtually all inputs/outputs are present and accounted for. In general, this works very well, but, of course, there are the invisible inputs and outputs (but now starkly visible) that we might consider as *process environmental inputs/outputs*. These take many forms – everything from electricity used to power a computer to accomplish a task, paperwork which is written, distributed, and then disposed, to the water consumed and CO_2 emitted with a process. When you look at it from a detail (a phrase Celia Wolf likes: "in the weeds") perspective, there's no end – how many different waste chemicals go into the environment? Heat produced? What's the carbon footprint? Do you look at everything – buildings, travel of staff, down to the disposal of plastic wrappers?

Let's look at this first from a metrics perspective. As I discussed the problem more with different people involved, in looking just at CO_2 emissions (the "carbon footprint") a number of very simple analogies came into being. First, as agreed with several committees in the Supply-Chain Council, measurement of environmental impact looks similar to "cost". This makes sense – in the usual sense, cost is in currency (Dollars, for instance), and we look at the impact of consuming a limited resource (budget) to execute a process. From the environmental resource perspective, we basically have limited resources (clean air, water, and land), and the cost would be essentially the amount of consumed (or polluted) resource. So therefore the first set of "greenSCOR" metrics at the process level involved calculating amounts of each of these components produced or consumed (input/output) as side-effects of processes. As with other SCOR metrics, these process metrics then could be composed into "diagnostic" metrics across supply-chains, and then we arrive at "strategic" metrics at the highest level of a supply-chain or process network – to understand the "total impact" on the environment of a supply-chain network.

The next issue was to resolve the issue of environmental costs related to a single product as the result of a network of processes (here, a supply chain) and the costs related to the infrastructure of operating the processes. Do I allocate one-billionths of the "carbon cost" of my manufacturing facility to each box which flows through the facility, per unit time over a lifetime of operations? What happens if I increase production – do I decrease the carbon consumption for past processes? If I stop production in a given time window, do the resources consumed by the remaining product have to account for all "unallocated" resource? Again, we're down in the weeds.

When we look at cost as dollars, there's a fairly cut and dried way to consider it. First, there's "Cost of Goods Sold." That's defined as all the direct (raw material) and indirect material costs (paperclips and pens) for a product, as well as the labor cost of performing a process (typically manufacturing), and cost of performing the process (HVAC, transportation, and so on). There

may be some overhead cost allocations (Information Technology). But, in general, it's only the cost directly associated with a single unit product. The other process cost, what we call in supply-chain, "Total Supply Chain Management Cost" (TSCMC), is the totality of all process cost, minus "Cost of Goods Sold." In supply chain, the five main processes are "Plan, Source, Make, Deliver, Return," and COGS corresponds to "Make Cost," and TSCMC corresponds to everything else.

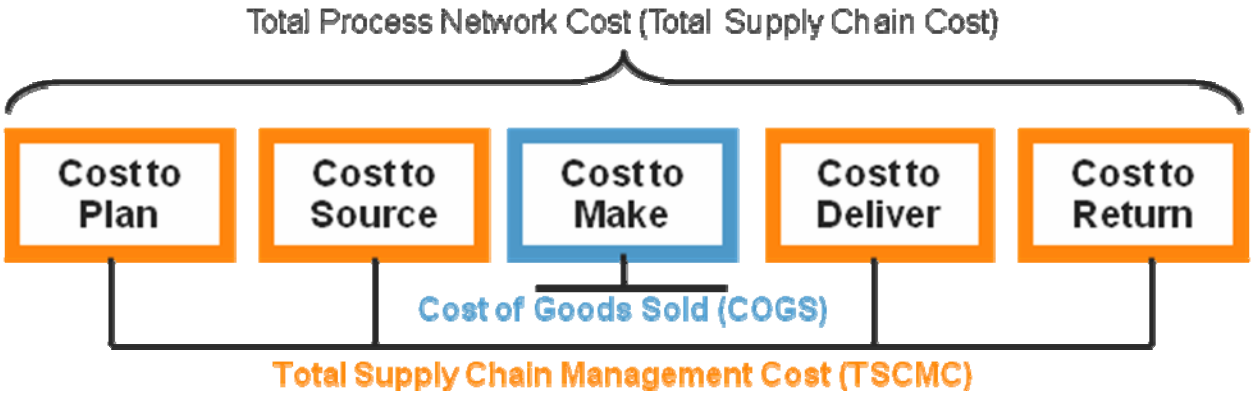

Figure 1. TSCMC and COGS for a process network

What happens when we then look at environmental process cost? Let's consider "*eCOGS*" or "*environmental Cost of Goods Sold.*" This would be then, by analogy, the resources consumed directly and indirectly to produce a unit of goods by a set of processes. So we would look at clean air consumed for a unit of refining and CO_2 produced, therefore, and water consumed by volume, tons of solid waste consumed (produced), and so on. Then there's "*eTSCMC*" or "*environmental Total Supply Chain Management Cost*" that would be the totality of all the clean air, water, and land consumed for an entire network of processes, minus the costs directly associated with unit material. We now can look at the total "environmental cost" (*eCost*) footprint for a process network (supply-chain) along with the unit product footprint. We then can decompose those footprints into unit process eCost creations for each component process with SCOR.

So, for instance, how would we look at the "carbon footprint" for a supply-chain process network? It looks just the same as financial cost:

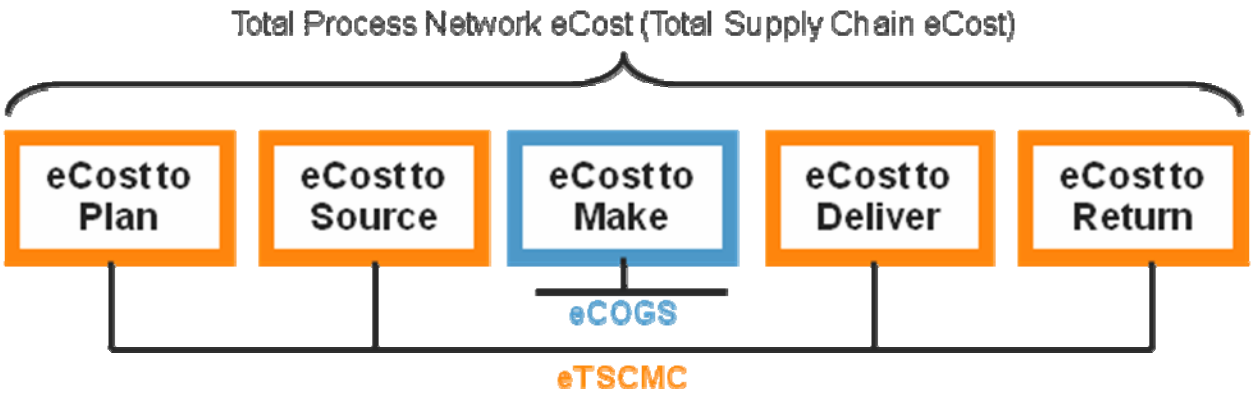

Figure 2. "e" version of a Cost Framework

We then would calculate the two impacts. eTSCMC (CO_2) has a simple formula: as CO_2 produced in Planning (minimal, electricity to use planning tools) + CO_2 Produced in Sourcing (inbound logistics fuel consumed, electricity for receiving and storage) + CO_2 Produced in Delivery (outbound logistics fuel consumed, electricity for warehousing and order management)+

CO_2 Produced in Returning (return logistics fuel consumed) and so forth. eCOGS also has a simple formula. We know that manufacturing has 5 standard steps in SCOR so we simply add them together, depending on the network configuration.

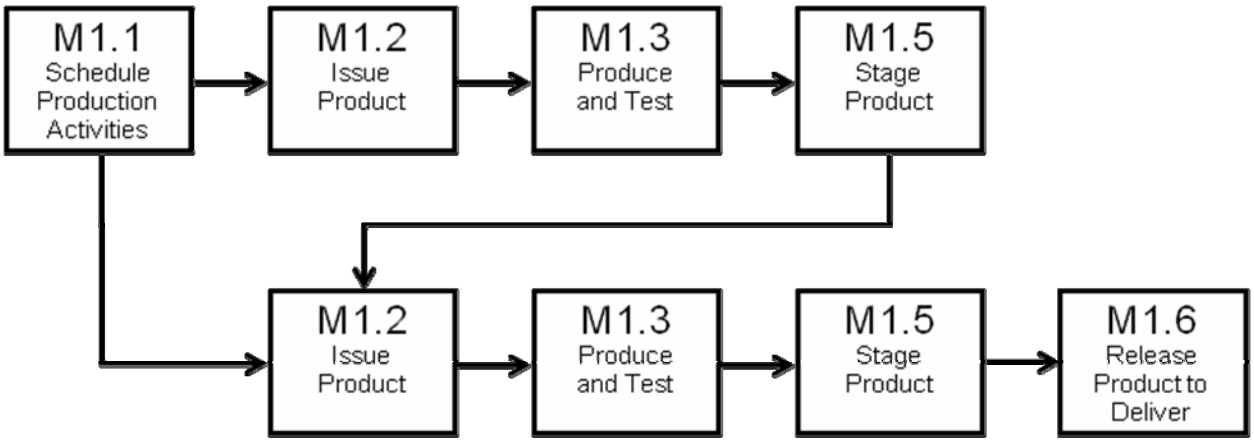

Figure 3. Example SCOR factory process network

So, it's CO_2 to Schedule Production (electricity to power scheduling tools) + CO_2 to Issue Product (from all "M1.2" processes - fuel for logistics and electricity) + CO_2 for Produce and Test (again, for all " M1.3" processes - low for assembly, potentially quite high for chemical processes) + CO_2 for packaging (zero in this diagram – in general, electricity for processes) + CO_2 for staging (logistics fuel) + CO_2 for Release (electricity, logistics fuel cost). I don't want to go further into SCOR, but you can see here that it's a very simple, reliable process to take process components from a standard network and begin to look at things like carbon costs for a product, and carbon costs for an operation.

What do we do about the impact of a factory by itself along with other infrastructure? We should look not at the total imprint, but, in those cases, look at the yield ratios – how much is produced per unit eCost for that infrastructure – much as you would look at asset yields (revenue per unit $ asset). I think you get the idea. The use of standard processes and standard metrics enables even more interesting capabilities, in particular, Benchmarking impact, optimizing impact, cross-industry impact assessment, and external auditing of impacts to a standard. The applications are endless for the metrics portion.

Second, let's look at this from a process perspective. SCOR has added a couple of key processes to the framework to manage resources, both in process enabler elements (managing performance, data gathering, and so on – processes which do not directly produce goods or services), and in manufacturing processes which handle the non-sellable results of a stream – handling refuse and waste. If you are interested in details of this process, which is fairly basic, I recommend you look at SCOR 9.0 for the detailed definition.

What's important to me about the process part, added together with the metrics part of GreenSCOR, is the whole concept of optimizing an environmental impact. From the business world, we know that "re-engineering the balance sheet" can do things like moving working capital out of a company to either suppliers (delay payment on bills, keep suppliers owners of inventory to the last moment) or to customers (accelerate payment on bills, push inventory to channels). You can move a lot of cost and capital from a process network by creative approaches to these techniques. However, you don't really optimize the supply chain as a whole; you're simply pushing your problem to others. This is "silo"-based optimization, and doesn't solve problems, it just moves them around. My friend Alyda Le Hane calls this "re-arranging furniture on the titanic." In the environmental situation, you may optimize, for example, CO_2 creation by merely pushing the creation to your suppliers or to your customers. You become very clean, but the total impact of the complete supply chain may not have changed, or, in fact, may get worse – you get

diseconomies of scale sometimes. (This is my major criticism of "carbon trading" – it's the same in some situations as creative accounting with processes and balance sheets, instead of legitimately re-engineering processes to remove the carbon.). GreenSCOR gives you a simple capability of looking at the end-to-end supply chain (we always say "Cow to Ice Cream Cone") and examining the total environmental impact without respect to "which silo" produces it.

Lastly, let's look at environmental process management from a "best practices" perspective. SCOR 9.0 has added an extensive base of best practices to mitigate environmental "costs" so that for any given supply-chain network of processes, we can look at minimizing the effects by looking inside the processes and consider organizing them around the best practices across-industry that people have adopted to improve them.

What's the takeaway? If you are looking at managing process, particularly from the "environmental footprint" perspective, I would strongly recommend looking at SCOR 9.0 framework (available in March 2008) and examining its system of process, practices, and metrics for identifying, characterizing, and managing process elements. It provides a closer to reality "closed loop" system for looking at process networks in general, and the features are rigorous, transitive (you can add together suppliers *eCOGS* up a stream to identify total impact of a given product or service), and valuable in particular for **balancing** investments in managing *eCost* along with other strategic performance components of a process network. And we know conclusively that supply chains and process networks that perform well – perfect orders (no excessive shipping), good forecast accuracy (no inventory dumping or waste), effective planning (no surprise expensive fuel consumption for expedited materials) – have the best environmental characteristics. Good "Green Processes" are good business.

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