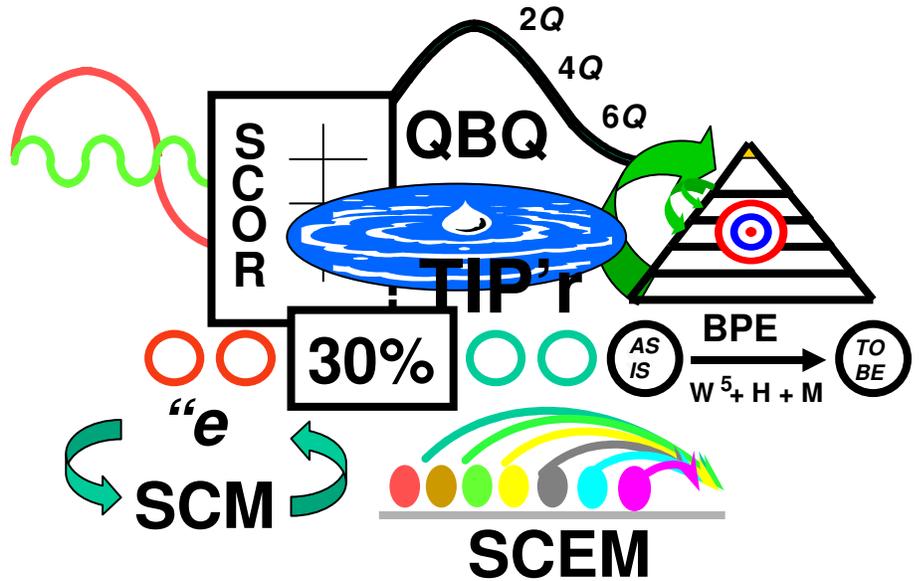




It's all in the way we listen.



# Supplicons™

*Ten steps for building a collaborative supply chain*

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## Ten Steps to Building a Collaborative Supply Chain

Two of the hottest buzzwords in the emerging business hype of the new century are *collaboration* and *supply chain*. Everybody wants to collaborate because it sounds cool and it may even make some sense. Mention supply chain or supply chain management (SCM) and you will sound like you know your business process and are about to make it more efficient. Put collaborate and supply chain together in the same sentence and you get collaborative supply chain (cSC), an even hipper three-letter acronym. You can come across as a person who might have all of the answers. The question is, do you? Do you really know what a collaborative supply chain is all about? Do you know how to put one together? Or, are you just jumping on the buzzword bandwagon like everyone else?

Speaking the latest 'in'-speak can be seductive. Marketing departments do this all of the time. The 'supply chain' is in so they repackage their current products to fit the new trend. All it takes is the creative stroke of a pen and supply chain products hit the market in mass. We buy and install them, and wait for the promised results. They don't come, we wonder why, and we move to the next 'in' technology. Maybe *collaborative* supply chain will work where plain old SCM failed. Does this mean the supply chain, collaborative or not, was not a good idea? Certainly not. The problem was with the understanding, the interpretation, and the expectations. The problem was in confusing advertised solutions with the underlying business problems.

So let's go back to the basics. We want to solve our business problems, or more specifically, our supply chain problems. This should be our primary objective, not the installation of software or implementation of the latest technological solution. Although doing so may be the means to end, it is not our primary goal. Solving business problems starts with understanding business concepts. This is where supply chain does its part. The term supply chain, which is always used together as if they were one word, is a concept, not a product or a solution. Add the word management collaborative to form cSC and it is still a concept, one that is more refined, but still a concept. This means that, in spite of the marketing hype, there are no magical supply chain products or no cSC 'silver bullets' that will fix your supply chain. There are, however, solutions, strategies, methodologies *and* products that can be used to improve *parts* of the supply chain.

The question then is how do we build a collaborative supply chain, or better yet, how do we improve the one we already have? After all just about every business is part of at least one supply chain and just about every business collaborates to some degree as part of their everyday business process. The answer is to do it one step at a time or should I say, with ten steps over time. If you stay with the basics and understand not only *what* is happening by *why* it is happening, you will have a good change at achieving measurable results.

To help show the way, PSC has created Supplicons™, ten easy to understand steps that describe how to build a collaborative supply chain. Each step uses a graphical icon to discuss a different aspect of the building process, hence the term Supplicons. As you read about each Supplicon, you will gain an understanding of what is going on, why it is happening, and how to go about developing a solution that will improve your collaboration and in turn, the efficiency of your supply chain. Then, you know what products to select and what process to implement. Then you will build a better collaborative supply chain.

## Step #1 – Understanding the Technology Shift of 2001/2002

The year 2000 was the year of the 'e'. Whether it was e-commerce, e-business or just the Internet presence, the 'e' prevailed. Businesses were built with venture capital, soft dollars, e-money and e-dreams. Caught-up in the e-frenzy, we checked our business sense, if not our common sense, at the door. Consultant firms booked engagements that were payable in what was supposed to be ever increasing stock. Technology manufacturers over-built inventories to meet anticipated, if not wishful, demand. Burn-rate was the new measure of success. So were long hours and no social life. Clicks-and-order was in and bricks-and-mortar was out. The race to capture the virtual world and win the e-lottery was on.

By 2001, the race was over, the bubble burst, and the realities of business returned. Stocks plummeted and businesses folded. Those that caught the fever returned to the basics – cost reduction and increased productivity. Some made it, but for others it was too late. There were few winners and a lot of losers. Among the winners were the graphic artists, those IPO owners who hung on long enough to cash out before the stock dropped, and a few investors who know how to time the market. The losers were more numerous – the economy, investors and day traders, the day-to-day workers, those working in the technology infrastructure, and whole businesses. The technology-driven 'e' traded places with the business of running the business -- supply chain management (SCM). Business was back, but it would never be the same. The economic down turn of 2002 only added to the problem.



Although the "e" is no longer on top, it is alive and well despite the failure of so many dot-coms and the market's behavior. It stimulated our imagination and demonstrated that there were other ways to do business than over the telephone and facsimile. It gave us the confidence to do business without paper. It opened our minds to other possibilities. It continues to show us the power of the technology that will be the catalyst for business transformation for years to come. It will help us to achieve the balance we need as it moves from front-end revenue generation to back-end cost reduction.

In an unintended way, the downfall of the "e" forced us to revisit cost savings in a way we might not have were it not for the severity of the accompanying economic downturn. The real-time realities of supply and demand have launched a renaissance in business basics with costs reduction and margin improvement coming from the all too familiar trouble spots – manufacturing, distribution, and financial services. The return, however, is not a re-setting of the clock but more of a re-direction of movement. The goals are the same, but not the way they will be being met. The re-direction is being achieved through the adoption of the concepts of collaborative business, EDI, XML and other such forms of "e" that must be deployed as we work together to increase productivity, remove unnecessary steps from the supply chain process, and improve the business partner relationships. It is the 'e' and related Internet technologies that are driving the use of collaboration to greater heights. It is the 'e' that is enabling supply chain managers to focus on reducing waste, eliminating redundancy, minimizing inventory, and increasing productivity. It is the "e" that is enabling the separation of information for activities so we can communicate concurrently while processes continue to move along consecutively.

The "e" also taught us a lesson that technology by itself is rarely the answer. It is, more often than not, only the path to answer, the enabler of better things to come. Without the lessons of 2000, we might not have returned business basics to deliver value in 2002. This is why the supply chain and its management are on top. It is what drives everything else. The future lies in the understanding and use of the Collaborative Supply Chain (cSC) to drive cost saving across business boundaries and company lines. Taken to new heights, cSC will deliver new products to new markets faster, at lower costs, and with less inventory and waste.

## Step #2 -- Understanding the Shifting Market

Anyone with business savvy will tell you that to find out where to point your business, follow the money. The same advice applies to finding where to find the collaborative supply chain (cSC) action. Just follow the money. It will point out the market shift from business-to-consumer (B2C) to business-to-business (B2B).

Almost everything we buy, from cars to cokes, comes from large enterprises. Although we may make the actual purchase at a local store, the product originates from companies that have multiple plants and lots of workers. The money, therefore, typically flows from the consumer at the bottom of the pyramid to the top where companies with more than 3000 employees make up about 5% of the market. This is B2C, the 'battle ground' of the dot.com craze. This is where businesses had hopes of increasing revenue by adding lots of customers and capturing market share.

The money then flows down from the top to the next two tiers and the home of small and middle market businesses (SMB). This is where we find the middle size manufacturers, distributors, and financial services that make up the other 95% of the market. This is also the land of B2B, where contracts prevail and where money moves more slowly and in larger amounts.



The difference between B2C and B2B is more than the initials. The level and complexity of business in B2B is an order of magnitude more challenging. B2C has just a few transactions – purchasing, shipment and payment – and the exchanges are limited to many-to-one. B2B, on the other hand has many transactions – solicitation, designing, purchasing, production scheduling, quality control, warehousing, distribution, shipping, delivery, returns and payment to name a few -- and the exchanges are expanded to many-to-many. The increase in complexity is why B2B is the focal point the collaborative supply chain and where the opportunity for improving the business process through electronic means is almost unlimited. This is where the better the collaboration, the lower the cost to the end consumer, and therefore, the better the ROI.

### LOB is in, IT is out

Along with the shift in the market, there has been an accompanying shift within the corporation. The technology decision maker is no longer the Director of MIS, but the line-of-business manager. With business basics, cost reduction, and return on investment at the top of the list, it is the LOB manager who gets to make the call. The shift was not a matter of choice. In the time of unlimited budgets, the IT department could spend with a will. Their customers were all internal so MIS had no bottom line visibility. Their responsibility was limited software selection and installation, not whether or not it did the job. The only downside was absolute failure.

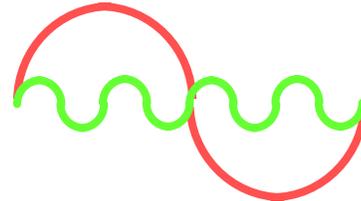
This, of course, has changed. LOB managers, stung with the reality that, in most cases, the indiscriminant throwing of technology at a problem did not yield the desired results, are now taking a more careful (and more responsible) look at the business problem before making technology solutions. They want to be assured up front that the recommended solution will do the job. The result is that decisions are now being made more from a business point-of-view than from one of technology.

The good news is that it is about time that cause and effect -- responsibility and authority -- are linked. The bad news is that we have had over a decade of abdication if this responsibility, so it will take some time before LOB managers are ready to fully assume this role. Nevertheless, the shift is here to stay. IT managers will reassume there right-full role of advise and execution while LOB managers will return to the driver's seat and take over the steering wheel.

### Step #3 -- Control your inventory and you control your costs.

From the beginning of time, inventory has been the universal problem solver. Not enough product on the shelves? Increase finished goods inventory. Having problems with production? Add more work in progress inventory (WIP) or increase the level of raw materials. Need to meet sales quotas? Offer quantity discounts and fill the warehouses. The customer is happy – there is plenty of product available -- but *you* are losing money because inventory is the most expensive way to solve a problem. There is the interest rate on the money borrowed to buy the inventory. There is the inventory you had to throw away because of a change in consumer demand. There is the inventory that was lost or damaged. And last, but not least, there is the cost of managing and handling of inventory. So, if you don't need it, don't have it. Inventory is too expensive. Any more than a day's (or in some cases a week's) inventory is bad.

Inventory is measured in 'turns' or cycles. Divide 365 by the number of days of inventory on hand and you have the number of turns. The idea is to 'turn' your inventory as often as possible - the smaller the number of days on hand, the greater the number of turns. In the days of make-to-stock, when buyers bought large quantities, particularly in fashion and heavy industry, purchases were made only once or twice a year. The red line in the Supplicon shows make-to-stock inventory with one-two turns. The *area under the curve* represents the cost of maintaining that inventory.



As managers became more cost conscious and moved to a make-to-order form of doing business where their suppliers carried the cost of carrying the inventory, their purchases became more frequent and in smaller quantities. The green line shows make-to-order inventory many more turns throughout the year -- smaller batches of inventory bought more frequently. The area under the green curve is less, therefore the costs is less. As the turns increase, the amount of inventory (and therefore the costs) decreases. The ideal is the 'order-of-one' where you have no inventory and approach a flat green line.

#### Inventory is the Symptom

Having a problem with your inventory? Buy an inventory management package. Although this seems logical, more often than not, it is not the answer. Inventory is always the symptom, never the cause. High inventory levels or low inventory turns means that something is wrong somewhere in the business process. We only have to look to ourselves and see why this makes sense. For example, if we are feeling sick and have a temperature, we can take aspirin and go to bed. If the temperature persists, then we go to a doctor who listens to our lungs, orders an x-ray, or sends a sample of our blood to the lab for analysis. The doctor is more interested in the cause of the temperature, not the 'what', but the 'why.' Once the 'why' is understood, then the remedy can be prescribed.

The same logic applies to inventory. Inventory is the measurement, the indicator, the call for action to examine the business process to find its cause. Whether it is the result of bad planning, human error, systems breakdown, changes in the market, or just plain bad luck, you have to find out why before you can implement a fix. You can't just stop production or write-off the inventory to satisfy the investors. This is not a solution, but only a delaying tactic. You have to go to the cause if you are going to implement a permanent fix. And the fix may not be in the inventory management department or directly associated with inventory management. It may be in previously not thought of places, even outside the company and beyond your direct control.

So when it come to inventory, remember that it is the 'what' that leads to the 'why' that leads to the 'how' to better manage you supply chain.

## Step #4 – The 30% Rule

It used to be that we could solve our business problems by ourselves. Production inefficiency, inventory problems, order-processing mistakes, or whatever, the problems were within our 'four walls' and we could take what action was needed to fix them. That, of course, was in the old days when labor was cheap and inventory fixed just about anything. But the times have changed, costs are up, and margins are slimmer than ever. We are now more dependent on our customers for more accurate forecast and our suppliers for more timely deliveries. And they are the same with us. So, if we are going to continue to reduce costs, we will have to work together.

The new business model has shifted from 'inside-out' to 'outside-in.' We are no longer the center of 'our universe,' but just a single link in a supply chain that extends all the way from the consumer to the raw material supplier. Our 'outside the box' relationships now extend at least two links in each direction. We can no longer be limited to our distributors at the front door and our first tier suppliers at the back door. If we are to control cost, provide better levels of service, and remain competitive, we have to be part of the extend supply chain and learn to cooperate if not collaborate. The question is how often and to what extent? The answer is – a lot!

To understand why, lets go back to the basics. Businesses run on information. We know this because we all have computers, systems, and networks process that move and store information. But where does most of that information come from? If you look closer at your business process, you will notice the most of it, at least 70%, comes from or goes to businesses, organizations, and other such entities outside of your enterprise's domain. Your distributors and customers send purchase orders, product inquiries, and status requests. You respond with invoices and shipping notifications. You also send purchase orders, material inquiries, and status requests to your suppliers, and they respond with invoices and shipping notices. And this is just 'direct' information. You also send bank and tax payments, payroll data, medical claims, government forms and sundry e-mails. You, like the rest of us, are clearly interdependent with your suppliers and customers.



Since there is direct association with information, costs, and the flow of materials, this also means that you only have direct control over 30% of what you actually do or make. This, in turn, means that theoretically, without collaborating with your trading partners, you can only reduce up to 30% of the total cost of a product or service. In actually practice, since you can't make something for nothing, the figure is much less. Hence, we have the 30% rule: If you are going to stay in business, you must go after the other 70%.

The 30% rule means that manufacturing costs are not longer the target. The 30% rule means that the attention is shifting to distribution costs and the supply chain. If you are lucky enough have no competition, then this is not your concern. However, this not being the case for most of us, industry by industry, we are moving toward cooperation and collaboration as we search for ways to drive costs out of our supply chains.

So stop looking inside the box for all of the answers. They are no longer there. Also, stop applying spot fixes and single solutions. A tactical approach without some strategic planning doesn't work either. Today's answers are to be found outside the comfort zone. They will cross systems and organizational boundaries. They will be strategic and tactical. They will require a lot more work but the result will be a lot greater. So think the total process and you will find a total solution. Think collaboration because you can no longer do it alone. Follow the 30% rule and go after the other 70%.

## Step #5 – A Simple Method Makes Improving Your Supply Chain Easy

Contrary to the current hype, a supply chain, even one that is collaborative, is not new. We have had collaborative supply chains for hundreds if not thousands of years. We have just not done a very good job of making them efficient and are now in search of new ways to make them work better, faster and cheaper. We need a new model.

The approach we use at PSC is our Business Process Evaluation (BPE). A BPE is a structured process that defines the *current state* of an organization's business process and uses industry practices and standards to assess what it will take to achieve a desired *future state*. It is a high level, overall, end-to-end look at the organization or process that results in the recommendation of projects, products or solutions needed to make specific improvements.

The BPE's roots go back to what we learned in high school journalism class. You remember, the five 'W's (Who, What, Where, When and Why) and an 'H' (How) we used as a guide to make sure our stories covered the facts and were complete. PSC uses the same process when we evaluate a business process, both at the macro level and as we drill down to the micro level. We examine each step in the supply chain separately and as part of the overall process to discover ways to make improvements. The only difference is that we have added the letter 'M' for measurement. We believe that metrics are important and bring discipline to the process.



Lets pick a typical topic, inventory, and go through the 'letters' as we take a closer look.

**What** is about what is happening, and what are the intended results. You have too much inventory, not enough turns, or too many write-downs. As a result, your cost of goods sold is too high and you want to make some changes. You need to become more cost conscious in order to remain profitable. What is the symptom, the first step in the journey toward finding a solution.

**Where** is the step or steps in the overall process that are involved with or contribute to the What. Do you have too much inventory? Where? Inventory is everywhere so it is important to identify which location is having the greatest cause-and-effect. Is the problem in finished goods or raw materials management or somewhere in between with work-in-progress (WIP) inventory?

**Who** is the human involvement in the overall process, not just those directly in charge of inventory, but also those other 'actors' that provide input or receive output. They are the 'customers' and 'suppliers' of information. When it comes to inventory, there are more people than you might think. Some order inventory, others manage inventory, still others manage the processes that drive inventory. There are customers and distributors at the front door and suppliers, transportation managers and receiving clerks at the back door They all need to be identified -- everyone. It is better to have too many and remove some later than to have too few and miss the critical input needed to solve the problem.

**When** is the point-in-time that the What, the When and the Who occur. When is when an inventory problem occurs or when an event occurs that contributes to the inventory problem. It is both when it starts and how long it takes. Is the inventory management process executing in the right order? Could some of the events be concurrent or must they all be consecutive? The When is critical because it is the time component ...and time is money!

**Why** is the most important of the 'Ws'. Uncover the Why and you can determine the How. There are a lot of 'good' Why questions that need to be asked so they can lead to a lot of 'good' How answers. Why does the inventory exist? Why is it so expensive? Why is its management so time consuming? Can the inventory be eliminated or replaced? Why, why, why?



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**How** is the action needed to make the improvement? Do you need an inventory management system or is the root problem somewhere else? How can the inventory be better managed? How can it be reduced or totally eliminated? The How becomes the actions, activities and projects that deliver the desired result.

Last, but not least are the **Metrics**. There has to be some way to measure what is going on if you are going to make improvements. Inventory levels or turns are just the starting point. They are the various costs associated with inventory...and time measurements as well. Determining what to measure and how to measure it in a consistent, uniform way is important. Metrics have to be able to 'talk' to each other if they are going to achieve their full potential. So measure well, because the bottom line is the bottom line. Drive a 'stake in the ground' and measure anything and everything, and remember, if you can't measure it, you shouldn't be doing it.

### **Make Your Approach a Science, not an Art.**

How do you eat an elephant? You know the answer -- one bite at a time. The same logic applies to improving your supply chain. Since you don't have unlimited time and resources, you need a road map and a methodology to make sure what time you have is well spent. This is where having a structured approach, a method, comes into play. If you have a method you will know how to eat the supply chain elephant without getting lost along the way or developing a stomach ache.

The transformation to a new business model is something that can and should bring sweeping change to the entire enterprise so it is important that the method you chose assures that the change made is the change intended. This is particularly critical when implementing a collaborative supply chain strategy because the changes you make to the processes within your organization will have a direct affect on the processes of others outside of your organization -- trading partners who are also involved with other supply chains and with other trading partners. A method will organize your efforts and carry you through the tough times when the intended results seem to be elusive if not totally unattainable. It will make it easier on all involved, internally and up and down the supply chain.

So, make your approach a scientific one, not a work of art. Let us show you how we can work together using our industrial strength knowledge of the collaborative supply chain and the BPE process to take you beyond the 'what' to determine the 'why', the 'how', and the metrics. If the BPE methodology can find the root cause, then finding the right solution is made that much easier. You have to know where you *are* before you know where you *should go*, so it is essential to start off on the right foot. Doing so will assure that each bite is like the next one, that the actions and their measurement are consistent across department and company lines. Doing so will assure good results, no matter how long it takes.

## **Step #6 – Separating Information from Actions**

Building a collaborative supply chain will require a basic change in our thinking -- organizationally and culturally. The logic is simple. If we separate information from actions and activities and allow it to move independently from those actions and activities, we can find out when things happen as they happen or maybe before they happen. The technologies are already here. We now have Supply Chain Event Management (SCEM) systems, instant messaging, and other workflow technologies that enable everyone involved to know what is happening or what is about to happen before we find out the hard way. Turning the logic into reality, on the other hand, is another story. Separating information from actions will require a major change in the way we have been doing business. And change, as we all know, comes slowly, particularly where it involves trust. Change is always easier said than done. The benefits, however, are too huge to ignore. Reduced inventory, better synchronization, faster time to market, greater flexibility and

responsiveness to market shifts, improved relationships, lower cost, and best of all, more profitability. And if this was not enough, there are the always-present competitive pressures. If you don't collaborate and your competition does...well, you have little choice. Collaboration is not an option.

So if collaboration is not an 'if', but a 'when' option, then how do we do it? The short answer is by sharing supply chain information in a timely manner, by making it available to all who need it, inside and outside the organization, up and down the supply chain. Before we can do this, however, we must solve two problems. Selecting the right information to share – we don't want to give away company secrets – and making it available when it is most useful. The solution, separating information from activities, solves both problems.

Since the beginning of time we have always moved information associated with an action with that action. This is the way we have always worked. The information daisy chain starts with the consumer and works its way down the supply chain to the lowest tier supplier. The consumer places an order, the retailer relays the order to the distributor who relays the order to the manufacturer, the manufacturer converts the order to a production schedule, the production schedule drives a bill of materials, the BOM triggers the procurement cycle with the first tier suppliers, and those suppliers repeat the process with their suppliers. The process is reversed as the suppliers ship the raw materials that become the components that become the finished goods that work their way back up the chain to the distribution channel and on to the consumer. The process repeats itself during the payment cycle, only this time with information about money -- payments and refunds -- instead of products.

Both the production and payment processes are consecutive which means the associated information flow is also consecutive. Since any process, no matter how efficient, is filled with waiting, delay, error and float, this means that the information flow is also filled with waiting, delay, error and float. They are linked. If you are about to run out of red paint, you need to know this before you make red cars. You will need that information well before the cars get to the paint booth or the line will have to be shut down. So, if you want to be able to take corrective action before you become aware of its need, you have to break the link -- you have to separate the information from the action so it can be managed concurrently. The sooner, the better.

**To Whom It May Concern**

Separating information from activities so it can be shared instantly and concurrently is made possible today through the Internet and broadcasting-and-subscribe technologies. Simply stated, information can be broadcast from a single point (any point) to every other point in the supply chain whether it is needed or not. While broadcasting may seem inefficient, with today's technologies, it can be easily filtered and therefore become quite efficient. Those who need it can subscribe, those who don't can ignore it and it will go away. Again, consider the red car example. When a customer orders a red car, the production scheduler and the supplier of the red paint both get the information at the same time. If there is plenty of red paint, the message is ignored. If there is a shortage, the dealer, the production scheduler and the customers are all notified at the same time. Decisions can be made, orders and schedules changed, or alternated sources of red paint can be activated.



**SCEM and RFID**

We are all aware of Murphy's Law. No one, no business is immune. We try to defeat it every day. We can't and you shouldn't try. What you can do, however, is know when Murphy strikes as he strikes, or if you are lucky, before he strikes. This is what Supply Chain Event Management (SCEM) and Radio Frequency Identification (RFID) are all about. SCEM is an early warning system that connects every link in the supply chain. If there is a shortage of red pigment or the



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delivery truck was delayed, the sooner this information is made available, the better the chance to minimize the adverse effects. RFID is the technology that senses and transmits the information. RFID tags can tell you where everything is, where it has been, and where it is going. Remember, the value of information is inversely proportional to the time it takes to receive it. You only have to ask a stock market day trader about the importance of timely information. The same logic applies to the supply chain. This is why SCQM and RFID are the newest, latest acronyms.

### **The Role of Lean and ERP**

Originally the facilitator of manufacturing improvement in the 1990's, Enterprise Resource Planning (ERP) and its cousin, Lean Manufacturing, are, in some ways, becoming more of a bottleneck than the solution. Both concentrate on operations inside the "four walls", which in today's market (that extends from the customer at one end of the supply chain to the suppliers at the other) makes them clearly out of step with the actual process. They are only dealing with a fraction of the information required to be efficient as well as effective.

ERP and Lean are also based on the principle of infinite capacity. As a result, a rush order from a customer is assumed to be fillable without any constraints. Likewise, a supplier shortage is assumed to have no impact on a customer order. This, of course, is unrealistic, particularly in the age of reduced inventory.

The answer is let ERP and Lean do their job they were designed for – the factory floor – while keeping them from becoming the barrier to the timely movement of information required for the overall business process.

### **Cultural Change**

Separating information from consecutive processes and making it concurrent will require a major change in the way we think. It will be easier said than done because it requires change and change, as we all know, is not easily made.

It will also require a major change in the way we structure our relationships with our business partners. Separating and sharing information will require a new level of trust. Cost-base, oppressive and adversarial relationships of the past will have to be replaced with cooperation and trust. The word 'partner' will have to be re-defined to mean partner in the truest sense. The 'new' partnership that is the result will be the very essence of collaboration. The more and better the collaboration up front, the fewer problems down the road.

The technology is here. The problem will be in changing our ingrained habits to take advantage of it. Partnership and collaboration. Collaboration and change. Change and partnership. They go full circle, hand in hand. Change, change, and more change.

## **Step #7 – Six-Sigma Can Build a Better Supply Chain**

For the past two decades, quality has become an obsession. Zero Defects. Quality is Job #1. Six-Sigma. There is never enough time to do it right the first time but there is always enough time to do it right the second, third or fourth time. We have heard these slogans and more as we come to grips with what it takes to stay in business in a world-class market. Poor quality is hazardous to one's business health. Stopwatches and testing stations are now part of every process. Statistical Process Control and Computer Integrated Manufacturing are on the shop floor, while EDI, bar coding, and workflow are being deployed to take time out of the overall supply chain process. Six-sigma has become the mantra of the production department as companies large and small compete for the national recognition of the ISO 9000 and the Malcom Baldrige Award.

### Products vs. Process

In the 1950s, when labor was cheap and time was less of a concern, our focus was on the making of quality products. Quality was 'assured' at the end of a process. Quality Assurance (QA), a separate department with its own staff and budget, tested finished products. Those products that passed were placed into the distributions channel, those that failed were returned for rework or sent to the junk heap. By the 1980s, as we began the drive for six-sigma and perfection, we discovered that with the rising costs of labor, the QA approach became more expensive – too expensive. The battle to achieve near-perfect quality was taking its toll. Even some of the Malcom Baldrige Award winners were going out of business. We were about to learn something.

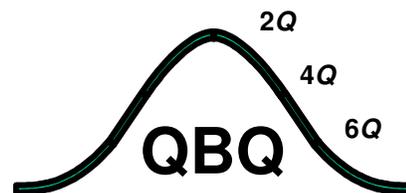
What we learned was that it was not the quality of the **product** that was the problem, but the quality (and therefore the cost) of the **process** that was out of control. We learned that while the value of the products we were making was determined by the marketplace and costs of those products was in the process that made them. In other words, the product was a representation of the process. It was the process that deserved the attention, not the product. Create a high quality process and you will automatically produce a high quality product.

### Quality on the Fly

With the shift in focus to the quality of the process, all efforts are directed on the identification of poor quality as it occurs and on making the appropriate 'on the spot' corrections before going forward. The math is simple. If the poor quality is discovered at the point of infraction, the time needed to restore good quality is kept to its absolute minimum. There is no time wasted on the continued production of products that will sooner or later be discarded. Even if the entire process is shut down until the poor quality is corrected, it is still cheaper in the long run.

But how do you implement quality on the fly? The answer lies in the bringing together of Six-Sigma and the collaborative supply chain technologies. Do this correctly and you can make  $1+1=3$ . To understand just how this is possible, we have to review the basic concepts of Six-Sigma.

Six-Sigma is a quality management concept based on the statistical measurement term know as six-sigma. Six-sigma is the sixth standard deviation on a normal distribution curve and signifies the ability to catch defects 99.999998 percent of the time. The theory is that the closer you design and measure the quality of your product or process to six sigma standards, the easier it becomes to dramatically reduce or eliminate all errors.



The Six-Sigma concept begins with the standard distribution or "bell curve." Take, for example, a standardized college exam. The majority of test takers, 68%, will score within one standard deviation, or sigma, of the mean. Over 95% will score within two standard deviations, or conversely, less than 5% will score outside of the two-sigma deviation. And so it goes until we reach the class brain (alias curve buster) and the class dunce who are the only ones to score outside of the greatest or six-sigma deviation.

When applied to the concept of quality control, each 'sigma' denotes a different level of quality. To achieve 99% quality, product variations would have to be less than plus or minus three-sigma. While this might seem like successful performance, in reality it would be as if 300,000 pieces of mail were lost daily or more than 30,000 newborn babies were dropped at delivery every year. This is nowhere good enough in today's business environment.

### The Rolling Effect

Realistically, practical quality control begins at four-sigma. This is because four-sigma is the upper limit of human performance. If you have a one-step process that is performed by a human, the



It's all in the way we listen.

maximum outcome will be four-sigma. Most processes, however, consist of multiple steps. The problem is that when humans perform a significant number of those steps, the outcome is not four-sigma but only two or three sigma. This reason for this is what is known as rolled throughput yield or 'the rolling effect.' Rolled throughput yield is the net result of the effect of multiple parts and/or steps. If, for example, a product contains 100 parts and requires 100 steps to order, receive, process and assemble the parts and the quality of each part/step is at the four sigma level, the net level of quality per unit is  $200 \times 0.000062$  or 0.0124 defects per unit. The resultant rolled yield would be 98%, or somewhere between two and three sigma. In other words, the compounding effect of multiple parts/steps of the process determines the quality rating of the output or final product. Hence the catch: If you want a six-sigma product you have to have seven or eight-sigma performance at each individual step. Since there is no such thing as seven or eight-sigma (six-sigma is the best possible), the best you can hope for is a process with six-sigma at each step that will, depending on the number of steps, produce a four or five-sigma product.

As you can see, the key to high quality is in keeping as many parts or steps as possible at the six-sigma level. This is relatively easy to do for mechanized processes, but virtually impossible for manual processes. Performance rarely goes above the four-sigma level for predominantly human activities such as sales order processing, accounts payable, wire transfers, shipping and receiving, and purchase order preparation. While these activities, which are inter-enterprise as much as intra-enterprise, do not directly affect product quality, they do exert considerable impact on process quality and therefore overall product costs.

### **Humans and Quality Don't Necessarily Mix**

The point is that the key to high quality is linked with the removal of the human element wherever possible. On the supply chain side of the ledger where the human element remains the most dominant, the newer supply chain technologies of Just-in-Time (JIT), Vendor Managed Inventory (VMI), Electronic Funds Transfer (EFT), Electronic Data Interchange (EDI), and the Internet make this possible. With these tools, errors are eliminated, time is greatly reduced and control enhanced. Without them, the quality level for individual events cannot exceed four-sigma level. Without them, overall product quality can never rise above two-sigma. Without them, the collaborative supply chain cannot be built which means the quality race can never be won.

### **1+1=3**

Six-Sigma level quality management cannot be achieved without collaboration technologies. It is as simple as that. And, even when implemented, overall quality may not reach the four-sigma level unless the focus is on the process, not the product. The key to success is QBQ – A Quality process Begets a Quality product. The cost and quality of a product or service is determined by the quality of the process that makes and delivers it. The more collaborative the process, the higher the quality of that process. The higher quality of the process, the lower the cost of the product. Therefore, the effectiveness of continuous improvement is directly proportional to the degree of collaboration. Collaborate internally and you achieve a certain level of quality. Collaborate up and down the supply chain and you will reach even greater heights. Get collaboration and Six-Sigma working together in the right combination and you will have 1+1=3. Remember QBQ. The better the quality of the process the better the quality of the product.

## **Step #8 – The Right Metrics, The Right Road Map**

We may not know the importance of metrics, but we use them every day. The most common one, the one we can't avoid, is the ubiquitous 'bottom line.' Your bankers, investors, employees, customers and suppliers are all connected to this metric. It is the 'temperature' of your business. Are you healthy or are you ailing? They all know, sometimes before you know, because your bottom line is connected to their bottom line.

The problem with measuring the bottom line is that it is of little managerial value. It is high level and historical. It is too little 'too late.' The income statement and the balance sheet only deliver the results, not the cause. They tell the What, not the Where, When, and Why. As a consequence, they don't lead to the all import How. The same logic applies to inventory turns. Measuring inventory is measuring the symptom, not the cause. So choose your metrics carefully making sure that you understand what drives each metric and measure that as well.

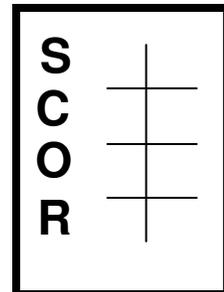
The metrics of choice today are the key performance indicators (KPIs) that drill down and measure the actions and activities of each person and each step in the process. KPIs are needed for both internal operations and external. To keep ahead in today's rat race, you also need to measure the performance of your suppliers and how well you serve your customers. KPIs lead to benchmarking and benchmarks that will catch your attention and focus your attention on what is important and what it not.

**Do you know what you are measuring?**

There are two kinds of metrics used to benchmark a business -- relative and absolute. The first kind, relative, is used to measure your self against your self. Today, you make 10 widgets an hour. Next week you make 15 widgets an hour. You claim a 50% increase in productivity. This raises two questions. The first question is did what did you change to increate the productivity. The second question is how does your productivity compare to your competitors? This is where industry standards and absolute benchmarks such as those provided by the Supply Chain Council's Supply Chain Operations Reference (SCOR) model come into play. In order to collect the right (and therefore meaningful) data, there has to be agreement on what to measure and how to measure it. If you use the SCOR card to improve your collaborative supply chain, you will have a much better idea of how your business in performing than those who do not.

**Are you fixing the right problem?**

The problem with improving a business process is that if you are not careful, you will spend your money fixing areas that don't matter, and overlook those areas that do. If the industry standard for making widgets is 10 per hour, then your effort to improve to 15 may not be all that beneficial. On the other hand, if the industry standard is 50, then you have a long way to go. With limited funds, you have to apply your resources where they will do the most good. This is why many companies are using SCOR to target which problems to attack first, to determine where there is the greatest ROI.



PSC knows that 'if you can't measure it you shouldn't be doing it.' We also know that good metrics are in short supply and that choosing the right ones is very important. This is why we are charter members of the Supply Chain Council's PLAN Committee, where the rules are being written and the metrics are being defined. This is how we will help our clients get ahead and stay ahead.

**Step #9 – The Cultural Supply Change**

A collaborative supply chain also means a cultural supply change. No, this is not a misprint but more of a malapropism. Nobody likes change. Nobody likes going out of business either. This creates a dilemma. We must decide if the pain of where we are is worse than the pain of where we want to go. If it is, then, and only then, will change happen.

At PSC, we have always believed that people make choices for change based upon how they will benefit from those changes. We also believe that most people would rather stay in their comfort zone unless they are forced out of it, whatever their personal reasons might be. To make a change requires a degree of risk. When our clients tell us that they are having problems, they are

experiencing a degree of pain. The question is, however, just how much pain? Is the pain of staying less or worse than the pain of changing? Is the pain of staying significant enough for them to risk leaving their comfort zone? Is the pain of staying greater than the pain of the unknown -- which will be the pain of where they are going? Everything has its price (meaning pain) -- change above all. It is just a matter of choosing which you are willing to withstand. But you have to have pain. If not, with no pain there is no change and therefore, no gain. Change does not come easily.

### Collaboration is a Team Sport

To be collaborative means to cooperate for the benefit of the **whole** supply chain, not just a single link. This creates a problem with the concept of pain driving change. More often than not, the application of an improvement at one point will yield improvement at another. Stated in terms of pain, it may be necessary to inflict pain in one place in order to relieve pain in another. This means that one group may have to feel the pain of change in order to make the pain of staying for another group go away. This lack of direct cause and effect creates a cultural challenge, particularly when the groups are in different parts of the organization or in different companies. It may be necessary, for example, to implement electronic purchase orders in Purchasing in order to reduce the cost of processing invoices and making payments in Accounts Payable. Purchasing feels the pain of change – they have a new process. So does the supplier who no longer has to generate electronic purchase orders. Accounts Payable, on the other hand, gets the benefit. They no longer have the busy work of matching purchase orders with invoices by hand. That process is now done through electronic matching.

Introducing eBusiness technology and collaboration to the supply chain is known as the ripple effect. Apply it here, benefit there, there, and there. This is why you have to look at the entire supply chain if you want to achieve the best results. Collaboration is a team sport. Everyone has to work as a team if the supply chain is to be successful. Technologies such as EDI and the Internet can do their part but in the final analysis, it is the people and their willingness to change that will make the difference.



### The 'Personal' Factor

Compounding the change management is the effect it has on our personal-self. Achieving a truly effective collaborative supply chain is not possible without some personal and personnel sacrifice. For example, if you talk to the Purchasing Manager about using electronic purchase orders, there will be little push back. Electronic purchase orders will have little direct effect on his or her daily life. On the other hand, if you discuss the matter with the Accounts Payable Manager, the reaction will be stronger and more negative. The AP Manager has much more at stake. Electronic matching can reduce his or her department by as much as 80 percent and 'put them out of a job.' This quickly translates to a smaller department and less corporate prestige. So, when you are extolling the benefits of a collaborative supply chain technology to the AP Manager, all he or she will hear is "there goes my staff, my corner office, and my parking spot."

The irony is that kind of change is exactly what needs to happen. One of the major reasons so many businesses are 'in trouble' is that there is no incentive to make the tough changes. If the corporate culture continues to reward managers based on how many people they supervise, then it essentially becomes an 'advocate' for inefficiency. Until the culture is ready to reward people for less, not more, the collaborative supply chain will never happen. In the meantime, the status quo will continue as the corporation is left behind by the ever-changing world. The longer the wait, the harder to change...that is until there is one last change, the change of going out of business.

## Step #10 – Putting It All Together With TIP'r

When you get down to it, there are only three ways to take cost out of the supply chain -- time, inventory and people. All other ways are derivatives to these three. This is truly both the bottom line and the best and easiest way to the bottom line. We call it TIP'r. Lets have a closer look.

### T

ime is money. The less time you spend doing something, the less it will cost you to do it. Do things quicker and more efficiently, and you will reduce the time spent and therefore the costs. Time is the universal metric. Whether we are salaried or hourly, we are paid based on time. Service levels and consumer response is also measured in terms of time. Time-based key productivity indicators, KPI are the most helpful. They tell you the time to do this and the time to do that.

**TIP'r**

There are a lot of different kinds of time. Here are four of my favorites.

- Direct Time. The time that it takes to complete a task or event.
- Elapsed time. The time spent waiting to do a task or begin an event.
- Lost time. Time that occurs when an event that was supposed to happen does not happen on schedule or worse yet, not at all.
- Time value of money. Businesses operate on credit and cash flow. The longer it takes to convert raw materials purchased to finished goods sold, the greater the cost of the money that funds the inventory, people, and other expenses that fund the process.

### I

nventory is easy to spot. It is literally everywhere. There is the raw material inventory that is waiting to be turned into product. There is work-in-progress (WIP) inventory -- the parts of products that sit in bins between the steps in a manufacturing operation. There is finished goods inventory that sit in warehouses waiting to be delivered. There is inventory in stores waiting to be sold. And, there is obsolete inventory – products that were not sold before the expiration date or just became out of date due to shifts in the market.

**TIP'r**

Reduce inventory and you reduce the time it takes to make it, ship it, store it, and pay for it. Don't create it in the first place, and you won't have to pay for it as it moves through the supply chain. The shift in business today is from make-to-stock to make-to-order. This is what Vendor Managed Inventory (VMI) and Collaborative Planning, Forecasting and Replenishment (CPFR) are all about.

### P

eople are paid for the time they spend on the job. People are also human so they make mistakes which means they are also paid for correcting those mistakes. Replace people with automated processes and you save a lot of time making and correcting mistakes. Better yet, remove the step in the process altogether and you really save time.

**TIP'r**

Where people are not involved, there is usually a policy, practice, procedure or process. The "P" in TIP'r can represent any of these. The rules are the same. Are they necessary? Do they unnecessarily add to the complexity of an operation...and at what price? The P's have a tendency to grow over time. It is the nature of bureaucratic creep. Removed, downsized, or re-worked to fit the times, the P's offer great opportunities to improve and the other "P" - productivity.



It's all in the way we listen.

## 'r<sub>oi</sub>

Return on Investment (ROI), the universal metric for the bottom line, says it all. You have only so much money to invest in order to make a profit.

Reduce inventory and people and you save time. Save time and you have a better return on your investment (ROI). You don't need an

elaborate study or process to start building a collaborative supply chain, but you do need to be careful. In today's environment, benefits often involve the transformational impacts of leaner inventory models, improved customer service, and the surge in agility, competitiveness, revenues, and profits that these could engender. You may want to consider methodologies that do not focus on costs alone such as...

# TIP'r

- Total Cost of Ownership -- "Created to ensure that the costs of a technology investment were not undercounted."
- Return On Opportunity -- A "proprietary approach from Hurwitz Group" that "assesses an investment's benefits to business growth."
- Return on Assets -- "Shows how an IT investment can extend the value of a company's current assets."

### **TIP'r – The Bottom Line**

TIP'r and a little common sense is all you need to achieve great things. TIP'r is PSC's methodology for reducing costs and improving the efficiency of any process or organization through the reduction of **T**ime, **I**nventory and **P**eople as the fastest way to achieve a meaningful return on investment. It can be yours as well. **TIP'r** – the way to build a better supply chain. TIP'r -- the fastest way to achieve a meaningful return on investment. It is the best path to a better bottom line.