An Elixir for Supply Chain Collaboration:

Supply chain management as a topic of conversation comes close to being the fastest way to induce narcolepsy. It is very difficult to explain precisely what supply chain management is, aside from various 'woolly' definitions about the science of getting "*the right products to the right place at the right time*". On the face of it, this is hardly a phrase that indicates a discipline that is vital, complex and in some cases quite exciting.

As an example, with the prevailing interrelationship between technology and physical logistics, a long-term breakdown in the national communications infrastructure would cause serious food shortages. This is because the synchronised replenishment of supermarkets and shopping centres ensures that 'in store' stocks are kept at minimum levels, secure in the knowledge that they will be replenished several times during the day. Such sequencing depends on an elaborate choreography involving computer systems, telecommunications networks and physical assets such as distribution centres, vehicles etc.

And this is only the beginning!

Pretty soon all physical products will be the result of a complex, outsourced manufacturing process, entirely dependant upon agile and adaptable supply chain networks. This trend has been evolving over the past 20 years and is driven by the desire for customised, personalised and configurable products. This shift away from the mass-produced, 'push it out into the market' approach that originated with pioneers such as Henry Ford, will have a profound impact on society.

Surprisingly, although technology will be the enabler of this transformation, the most important factor will be the shift in culture and habit necessary to engender true trading partner collaboration. Issues such as trust, information sharing and the development of relationship networks, will be the critical factors for success. Competitive advantage will naturally depend on product design, quality and brand image, but it will also result from the agility and flexibility of the supporting supply chain network.

A brief illustration of how this might manifest itself can be seen in some of the manufacturing processes found in the high tech industry. Increasingly, product design is the result of joint collaboration irrespective of the geographic location of the designers themselves. They will often factor into the design process, the availability of components, likely manufacturing locations and product life cycle before the next iteration. At every stage in the process, technology is used to support the activity in hand and in some instances, systems are interconnected to automate the process. We are still some way from linking all of these 'flows' into seamless operations, but the trend is clear.

Obliterated Agility

In many companies the genesis of this approach was the introduction of Enterprise Resource Planning or ERP systems. Assuming the organisation was wealthy and healthy enough to stand the pain of the implementation, it emerged with tightly coupled processes that spanned the enterprise. These synchronised operations linked various departments, so that the impact of actions in one area could immediately be seen in other, related areas. This aided decision-making, resource management and financial planning.

Unfortunately it also obliterated agility, as any deviations from the underlying process flows, required reconfiguration of the ERP system and this was not

something to be done in haste. Nonetheless, successful implementations have delivered clear benefits, which is probably the only remaining incentive for those enterprises still trying to finish theirs!

Whilst this approach was useful in bringing together large corporations with several autonomous divisions or departments, it did little to enhance collaboration with external trading partners and suppliers. The need for collaboration became apparent as many organisations 'restructured', 'downsized' and 'outsourced' their operations through the late 1990's. It was of little use to have efficient internal processes, if key operational processes were now 'external' and run by someone else.

Specific systems were also developed to support the activities of supply chain planning and optimisation. The theory being that sophisticated software could support the planners who had to balance the demands of the manufacturing operations, against the supply available from the sourcing teams. These activities also extended into areas such as transportation and inventory management. In many cases, extravagant claims were made regarding the potential savings that would result from the use of such systems. However, they all depended upon having clearly defined boundaries of implementation and complex, deep integration with any other related systems. This last factor increased the cost of implementation dramatically and as with ERP, severely limited agility and adaptability.

The constraints of these systems have been recognised for a couple of years now and as a result, a number of solutions have emerged to either enhance or compliment them. Most of these have been in the area of collaborative planning and manufacturing and have also begun to support the concept of the 'extended enterprise'.

At this point, life begins to get very interesting.

The Collaborative Nervous System

Many of these solutions are still only focussed on a specific activity, such as improving the planning process, or highlighting unplanned 'events' or 'exceptions'. They are still usually deployed as 'point' solutions in specific instances; as such they require an implementation exercise. This in itself is fine, but it is not really acceptable as an effective solution in a dynamic, fast moving flexible world.

If we look at the parties involved in advanced manufacturing operations, they comprise designers, specialists in planning, procurement, manufacturing, supply chain management and customer service. All supported by a network of finance, technology and personnel resources. They probably work for different companies, all of whom have a relationship framed by the 'contract' on which they are engaged.

Because of the disconnect occurring between these parties in the extended enterprise, there are usually high levels of inventory resulting from a lack of clarity regarding order status. Sure, the information is held somewhere, but available to the community as a whole? Probably not, and if it were available, who should have the appropriate authority to see it? Also, if it becomes necessary to introduce a new party into the network, how quickly could they be admitted???

All of these challenges need to be addressed before a truly collaborative supply chain community can be constructed. The community must also engender and support agility and be adaptable to any external changes or stimuli.

Do we have a model for an adaptable, agile entity such as this? Surprisingly enough we do, it's the "Homo Sapiens" or human. The biology of man is a very complex mix of specialised organs engaged in manufacture and assembly, supported by highly complex transportation and delivery systems, all managed by a robust and distributed central control system.

Through evolution, we have refined our ability to react quickly to change, adapt to new situations and continue to build and develop communities. If a physical supply chain network could exhibit the same characteristics, it would indeed provide serious competitive advantage.

Sustainable Competitive Advantage

If we accept that the central nervous system orchestrates and manages all of the necessary operations in the human body, we need a counterpart for a collaborative supply chain community. In order to do this what features would such a mechanism need?

In essence it would need to exhibit a high degree of 'connectivity', so that it could accept or transfer data from any point in the network. It should recognise that the network may extend from raw material through to final delivery, including the related service parts, return and repair cycles. The community administration mechanisms should be capable of accommodating any number of trading partners; at whatever tier level they may be participating.

It should support and monitor the activities and operations of any number of specific functional applications such as manufacturing, warehousing and transportation across the whole community. As such it needs to be 'process agnostic', as the purpose should be to support a variety of existing workflows, rather than enforce conformance to one.

It should also provide mechanisms to resolve differences in nomenclature and frame taxonomies, so as to enable the transparent identification of products and components as they pass across the network.

The assignment of access rights and related attributes for new community members should be a swift process, which does not interfere with existing operations. It should also support the development of many communities simultaneously, as well as the growth of sub-communities within existing ones.

Security should be comprehensive, but not 'intrusive', at all levels of the community operations. It should also be possible to introduce new applications either alongside, or as replacements for, any existing ones. Event management mechanisms should be embedded within the 'infrastructure' of the network and be capable of instantaneous reconfiguration from any point.

Finally, it would make sense to provide this collaborative 'nervous system' as a network service via the Internet, rather than as a single instance in one organisation. This is because trading partners usually participate in many communities rather than just one.

But what is it that will initiate the 'collaboration' between community members?

As previously stated, issues such as trust become paramount. Almost all companies will not allow ad-hoc instructions or queries to impact their information systems. If they have spent considerable periods of time and money fine-tuning their IT infrastructure, a rogue instruction could have immense impact.

As a result, human intervention is necessary at many points where data is passed between corporate boundaries. The intolerance of EDI (electronic data interchange) transfers, only serve to illustrate how delicate information exchanges can be. However, with the advent of XML, the precision and control of data interchange improves dramatically.

Simple Trust, Simple Truth

The key determinant is trust. Trading partners must develop trust between each other as a basis for any technology based collaboration. This can only be done in stages and is established, over time, by starting with simple tasks.

This certainly goes against the prevailing opinion held by many of the supply chain software vendors. They hold that everybody should plug into a single planning engine or adopt a common process. Many of these exercises are very complex and so are hardly appropriate for building trust. They are also very expensive due to the implementation and configuration timescales. Is it any wonder that supply chain collaboration based on this approach has only involved a couple of first tier partners?

Also the premise that everybody can effectively plug into a single instance of an application is hampered by another misconception. Suppliers often work with a number of manufacturers, each having their own unique processes. It is unrealistic to assume that they can all use the same workflow. Also, suppliers would find it impossible to configure their process flows to each individual customer, as it would go against their need to consolidate operational processes in support of high volume throughput. The more customers they gained, the greater the problem becomes.

A more effective approach is to begin sharing information that is readily available to trading partners via more traditional methods, e.g. phone, fax etc. If this information is made available through a more accessible mechanism such as the Web, it need not require lengthy integration exercises. By ensuring that clear benefits are accrued to the participants at an early stage, a strong basis for trust and information sharing is established.

Over time, companies will begin to align their processes to support increasing collaboration between themselves and their trading partners. This will eventually reach the point where interoperability becomes straightforward and this is when the collaborative community actually becomes an applications 'platform'. On such a platform all manner of complimentary applications and services can be provided, each providing additional value and new opportunities.

The evolution of collaborative platforms such as described above, will resemble the emergence of the telephone networks. Interconnection generated an explosion in demand, but more importantly, provided a platform that now supports all manner of services beyond the imagination of the original designers. The extent of their ambition ran to expecting that "every town in America will have a telephone!" Collaborative supply chain platforms should also be charged on a similar basis to phone bills, i.e. by a transactional or subscription based monthly fee.

In Summary:

Complex, extended and outsourced manufacturing processes require closer collaboration between partners across the supply chain.

Trust and simple information sharing will be key to this.

ERP and Supply Chain Planning applications are inappropriate as a basis for community collaboration, as they require rigid adherence to specific internal process flows.

Any collaborative supply chain network needs a platform that can exhibit agility and adaptability in the face of constant change. In effect, it should resemble a human central nervous system.

Speed of connection and community member management will be critical requirements and the ability to resolve the differences in reference and identification, essential.

It should be available to all members of the community as a 'service' via the web, rather than requiring the installation of dedicated servers with each trading partner. In essence, available through any phone or network socket!

So are such services available today?

What might they look like?

Perhaps the renowned author Arthur C Clarke provides the answer through his Third Law:

> "*Any sufficiently advanced technology is indistinguishable from magic*." -- Clarke's Third Law

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