Key Chain: Supply Chain Collaboration at HP
Product Lifecycle Management

January 2003

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Our Collaborative Research Programs for Product Lifecycle Management at D.H. Brown Associates, Inc.

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EXECUTIVE SUMMARY

Hewlett-Packard’s program for supply chain collaboration, known as Key Chain, realized more than $113 million in savings in its first two years, with cumulative savings targeting $445 million over a planned four year program. One factor in these savings is a reduction in sourcing costs, averaging around 10%, which directly cuts material costs. Similarly, future contracts savings have been negotiated that generate additional savings. Also, by disposing of excess inventory HP now averages around ninety cents on the dollar, which is triple the old recovery rate for end-of-life and spare parts in the past.

This dollar savings figure does not include the economic value of a 30% improvement in productivity for buyers and a 50% reduction in purchase order-to-commitment cycle time. HP’s buyers are spending, on average, 30% less time doing such menial tasks. Now they can focus on higher value-added tasks. The dollar figure for savings also leaves out savings achieved by HP’s partners. Another measure of success is the system’s broad use. About seventeen organizations within HP rely on some component of the e-procurement solution. HP has in excess of three hundred trading partners on board and about eight hundred users of the solution.

THE KEY CHAIN PROGRAM

At the program’s inception in early 2000, the term “e-Procurement” was almost exclusively applied to MRO (maintenance repair operations), or indirect materials procurement. In fact, our division was being asked to do e-procurement in a manufacturing or “direct material” space, so one of our first tasks was to define what that meant.

Given a very diverse product mix, Key Chain serves everything from handheld computers and large UNIX systems, to inkjet printers with the potential for one in every home (we hope!). The corresponding supply chains, relative to each of those product organizations, also had very different characteristics. One size did not fit all.

HP’s decentralized decision making was another concern. Decisions around the supply chain were broken out across all those autonomous product lines, horizontally. Underlying this was a major shift toward outsourcing. Almost every
major OEM has experienced this pattern. Ten years ago, about 80% of the product that HP sold was manufactured by HP, and 20% externally. That has flipped – about 80% is now manufactured by contractors, original design manufacturers, etc. As a result, contractors who are not HP employees make many of the supply chain and procurement decisions.

The real driver began to make itself clear. HP was really looking for greater synchronization across supply chain tiers. That synchronization is what this Internet technology is expected to do. As challenging as this may seem, the HP team was motivated by our own HP logo. Our tagline says “invent.” We did exactly that. The strategy we devised was to create a private marketplace or a private exchange to enable this collaboration. We call this Key Chain.

The program began with a focus on e-procurement but grew beyond that and currently addresses other key business issues. It is now a federated model covering the entire supply chain. Vasco Drecun of D.H. Brown Associates, Inc. (DHBA) has worked with us on various aspects of the program.

Derived from his presentation at DHBA’s Product Lifecycle Management Road Map™ 2002 conference, Jeff McKibben’s paper reviews Hewlett-Packard’s success with supply chain collaboration. It summarizes the planning, the architectural design, results to date and lessons learned from an innovative and successful program. For additional publications from Product Lifecycle Management Road Map™ 2002 or to view selected slide presentations, please visit the DHBA website: www.dhbrown.com.
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HP’S SUCCESS WITH SUPPLY CHAIN COLLABORATION

Hewlett-Packard’s program for supply chain collaboration, known as Key Chain, began with a focus on e-procurement. As it expanded to address a series of key business issues, a federated model evolved to cover the entire supply chain.

In the first two years of a planned four-year program, HP realized more than $113 million in savings. For example, we achieved a reduction in sourcing costs, averaging around 10%, which directly cuts material costs – reaching a maximum of 43% in some cases. Also contributing to this $133 million were future contracts where savings have been negotiated. Also, HP has improved its cost recovery on the disposition of spare or end-of-life parts. While in the past HP could recover perhaps thirty cents on the dollar, we now average around ninety cents on the dollar – triple the old recovery rate. In some cases, we even recover more on the disposition of excess inventory than we paid for it in the first place.

Above and beyond the dollar savings, the program has also realized a 30% improvement in productivity for buyers. By automating purchase order tasks, forecasts, and collaboration tasks, we have enabled HP’s buyers to spend, on average, 30% less time doing such menial tasks as babysitting a fax machine or writing e-mails. Now they can focus on higher value-added tasks.

TRADING PARTNERS BENEFIT

The dollar savings figure does not include savings achieved by our partners. As every large manufacturer knows, a supply chain involves many partners.

HP’s trading partners – suppliers – are realizing the same kind of productivity benefits. In fact, in many cases the company’s suppliers realize those productivity gains faster than HP. These benefits are clear proof that the value proposition works.

These savings imply that HP is able to compress the cycle time on its purchase order management. Typically when HP issues a purchase order to a supplier, there is a little haggling on the number of units, and the delivery date, as well as a push for a price break if something is late. That back-and-forth process has been slashed. Compression of the cycle time has reached 50%.

Overall, the benefits to HP include a more responsive, more flexible supply chain. What exactly does a more responsive supply chain mean? It means that HP does not have to carry as much inventory. In one HP division we have been able to more than double inventory turns – just by compressing the cycle time. Other contributing factors are increasing the velocity of our interaction and the responsiveness of the supply chain.
Another measure of success is the system’s broad use. About seventeen organizations within HP rely on some component of the e-procurement solution. (These components will be described later.) HP has in excess of three hundred trading partners on board and about eight hundred users of the solution.

The company’s goal has been clear – achieve a positive ROI (return on investment) in each budgetary year of the program. In the first year, the program more than covered its costs, saving about $31 million. This grew to the level of $113 million at the two-year mark cited earlier. While transactions hit 10% in fiscal year 2001, by 2004 roughly 80% of the transactions are targeted. Ultimately, the program is expected to result in cumulative savings of $445 million.

Note that the program already quadrupled the savings from year one ($31 million) to year two ($113 million). The program’s ability to triple that again to $445 million appears doable.

With that summary of the major results to date, I would like to describe the actual program – its goals, design, and architecture – as well as where it is going, and key lessons learned from it.

**THE KEY CHAIN PROGRAM**

At the outset, the Key Chain program concerned e-procurement. That used to refer to solutions that were limited to covering MRO (maintenance repair operations), or indirect materials procurement. In fact, our program was being
asked to do e-procurement in a manufacturing or “direct material” space. One of
the first things that struck us in looking at available solutions was that HP has a
very diverse product mix – everything from handheld computers and large UNIX
systems to inkjet printers. The corresponding supply chains relative to each of
these product organizations also had very different characteristics. One size did
not fit all.

Several aspects of this product diversity proved critical. A desktop PC, for
every example, may have a six-month product lifecycle and very different requirements
from a high-end Superdome computer running UNIX that involves longer
product lifecycles and more custom materials. The supply chain characteristics
diverge significantly.

DECENTRALIZED DECISIONS

HP’s decentralized decision making was another concern driving the search for a
solution. Decisions around HP’s supply chain were broken out across all those
autonomous product lines, horizontally. Underlying this was a major shift toward
outsourcing. Almost every major OEM has experienced this pattern. Ten years
ago, about 80% of the product that HP sold was manufactured by HP, and 20%
was procured externally. That has flipped – about 80% is now manufactured by
contractors, original design manufacturers. As a result, contractors who are not
HP employees make many of the supply chain and procurement decisions.
Because of this emerging situation, HP did not have a single corporate-wide way
of doing many things. Decision making was fragmented.

Consider for a moment the potential benefit of a more tightly organized supply
chain. There are thousands of suppliers, many of whom work with more than one
HP division. A disk drive manufacturer makes an industry-standard commodity
disk that can go into a desktop PC, a notebook PC, and a home PC. Coordinating
HP’s disk purchases across these three business lines can result in lower material
costs. However, each business line needs to maintain the flexibility and integrity
of it’s own supply chain, which operates as a logical “cluster” within HP’s many-
to-many supply chain network. This environment requires a “federated” solution
that can support the autonomy of individual business units without forcing our
supply chain trading partners to log onto five different websites to do business
with one company, HP.

The real driver began to make itself clear. HP was really looking for greater
synchronization across supply chain tiers. That synchronization is what this
Internet technology is expected to do. As challenging as it may seem, the HP
team was motivated by our own HP logo. Our tagline says “invent.” We did
exactly that, because we could not find any solutions on the market that could
realize this synchronization in such a complex environment. The strategy we
devised was to create a private marketplace or a private exchange to enable this
collaboration. We call this Key Chain.
ORDER AND FORECAST COLLABORATION

An initial focus in Key Chain was order and forecast collaboration. This effort is called e-Mercury, which covers online collaboration for purchase order and forecast management with HP, its suppliers, and its contract manufacturers (CMs). The archetypal case is a purchase order created in an HP ERP system, which is the system of record, typically SAP inside HP. Once that event happens, the information from that purchase order is extracted out of HP in an XML message. It is then moved to the supplier, who has a choice of accepting it or negotiating. For example, it may want to split the order out in terms of units and dates. Once the supplier reaches an agreement, the results of that purchase order are propagated back to the ERP systems of both firms. As a result, those ERP systems that remain the system of record.

We are using this Key Chain hub to enable the collaboration, not to replace our purchase order processes, which are pretty tightly coupled to running MRP with our planning systems. A similar process takes place in terms of sharing forecasts and looking for a degree of commitment from our suppliers and our CMs on forecasts.

INVENTORY COLLABORATION

A second initiative covers inventory collaboration. It is called e-SMI and it basically uses Internet technologies and web-based solutions to help orchestrate the often complex activities surrounding supplier-managed inventory (SMI).
processes. While SMI is a pretty common term, there is considerable variance in how it is implemented. When does ownership of inventory change in the process? What triggers a replenishment? How does one manage the minimum/maximum levels of inventory in a particular stocking location? Another source of complexity relates to the many different parties involved. In the simplest case, there is a single manufacturer and supplier. However, there may be a contract manufacturer with outsourcing. That may lead to a third-party logistics hub, or a vendor hub. Also, a logistics carrier may provide in-transit information to net out inventory.

Each of these instances of SMI is viewed as a single collaboration cluster. The goal is to have a single web-based solution flexible enough to accommodate those variances in the business model around SMI processes, while providing the ability to roll up a global view.

AUCTIONS

Auctions have risen to prominence because they help cut costs significantly. Consider the rapid rise of eBay, which has transformed dynamic commerce in the consumer space. Industrial applications and business-to-business (B2B) sales have also been revolutionized by auctions. Initially the focus of HP’s e-Bazaar program was not in using auctions for sourcing, but rather for supply chain execution. In times of product shortage, HP would run spot-buy auctions, a kind of reverse auction on a spot market basis. The goal was not necessarily the lowest price but to ensure supply of a scarce part.

The following is a telling example. Tantalum capacitors were in short supply about two years ago because cell phones had sucked the market dry of all those little components. This is a ten cent part that was potentially holding up shipment of $30,000 servers. Because HP made an investment in auction capability, we were actually able to source those parts at a time when Dell could not.

As beneficial as the result is, note that it did not require a big investment in technology per se. The investment is in business processes, covering several issues. How do you set the terms of the auction? How do you set the reserve price? How do you build up liquidity among the bidder pool?

Another example of HP’s use of auctions to support supply chain execution covered disposing of excess material. More recently, however, our efforts have focused more on auctions as a part of the broader RFP or RFQ process, as a decision mechanism for awarding business. This in turn incorporates other potential decision mechanisms like structured negotiation and sealed bidding.
STRATEGIC SOURCING

Finally, there is strategic sourcing. HP's BuyPower program focuses on a few key commodities that are important across the majority of HP's business. BuyPower aggregates actual purchasing activity from a spending and price perspective, drawing from spending and price forecasts, and using that information to manage the strategic sourcing of those commodities.

With these elements in place, the company can then apply risk management techniques. An excellent example of this approach is Cargill, which applies risk management techniques in the agribusiness space. As the electronics business reaches the same stages of maturity as energy and agribusiness, there is no reason why we cannot apply these same techniques. Memory, which goes into almost every product HP makes, is an excellent example. Memory is a commodity that experiences wide fluctuation in terms of price and availability over time. Yet, it is a critical element. The challenge is to create a hedge against fluctuations in memory in terms of both price and availability. Printers need memory, but we do not know how much we will need next week. Exactly how many will be used calls for a probability range.

There is high confidence on the lower end – for instance where we have stable, consistent demand for printers. To address this low-risk demand we can structure contracts that, for example, commit to buying a given number of units at a given price during a given timeframe. If HP does not follow through, it owes penalties, which can be substantial. Conversely, if HP places the orders and the supplier...

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does not provide the parts, it owes HP penalties. The structured contract actually reduces risk for both buyer and seller, which is efficient. That is how we approach the lowest area of demand. Traditional purchase orders are common for the mid-level component. For the high-risk component, HP sources it on the spot market using auctions, or creates forward options.

The point is that different components of demand have different risk attributes, and you can create specific procurement vehicles that are tailored to the risk profile of each demand component. So while this concept is intuitive, the key business question is, “Where does one set the breakpoints?” And, “What terms and conditions does one put into contracts?” Investing in the information gathering for strategic sourcing is part of this approach, but so are the analytical models and tools to support risk management.

TRADING PARTNERS

On the trading partner side, however, the story is different. Many HP trading partners are not willing or not able to invest in B2B, even a small WebMethods implementation. The majority of our trading partners access the marketplace through web browsers only. Even then, they still realize a 30% gain in productivity and a 50% compression in cycle time. Anyone with deeper pockets will want to invest in a fully automated system covering the whole process. But the more common case is that partners will use the web browser in tandem with an automated linkage, negotiate back and forth on the web browser, but ultimately pass the final documents through in an XML format that synchronizes the ERP systems.

Ideally, the majority of transactions should flow through without any negotiation. So, the browser is only used for exception management. In this way, HP has also leveraged its installed investment in EDI.

The final aspect of the IT architecture, a common integration backbone called HP’s Service Bus, handles all HP integration and messaging with full use of web services and e-services. Viewed in its totality, the integration backbone hooks up our internal divisions to our trading partners externally. This key architectural capability represents a real IT asset. It avoids the multiple point-to-point, B2B connections that were once the rule of thumb. The new system provides a control point for aggregating information, for simplifying life for trading partners, or at least coordinating how one engages trading partners in a B2B perspective.
FUTURE ISSUES

As with any common solution, HP needs to accommodate the variability across business processes and collaboration models for the broader network, specifically the collaboration clusters. Integration remains an issue. For example, we sometimes use external service providers like Converge for auctioning. They need to be integrated into the overall system.

From a technology perspective, the system needs to be ERP-neutral in order to work. There are many back-end systems with a majority moving towards SAP. Considerable legacy information remains, of course. As a result, the system requires an adapter that sits on an instance of SAP and knows how to extract an XML message when a purchase order is created, for example. It must then post that message on to the Key Chain marketplace. After that, it must supply options to our trading partner network so that they can access it. The question driving the development of the technology is, how are the trading partners going to participate in this collaboration?

LESSONS LEARNED

Briefly stated, the program started by identifying the specific value proposition or value opportunity. The focus was not on buying new technology but on defining and achieving business value.
One of the lessons we learned dealt with the need to define a road map, to create a plan for realizing the value up front. A good road map details the functionality that will result, as well as how to test it, prove it, and roll it out to the rest of the company. It is best to work with the divisions within the firm to identify who is ready, willing, and able to come up to speed on the system. And then, define how much is it going to be worth to the company. Simply put, who goes on board first based upon the value proposition? For example, the inkjet supplies division, which is a major source of HP profit, would likely be a higher priority than a smaller division, or any mature, low-margin, low-cost product area.

With a road map in place, a good design is critical. HP needed a federated model to support multiple clusters with variation across different business models.

Yet another lesson learned is not to reach for the stars. The Key Chain program proved that one can achieve considerable productivity gain out of browser-based collaboration. This, of course, is a low-cost solution for smaller firms as well as an initial step before migrating to a fully automated system. Beyond the simple starting point, build the technical foundation that will enable broader collaboration down the road. In our experience, we quickly expanded into planning and design using some of the same components of the collaborative hub architecture.

A final and very practical lesson learned is to realize an early return on investment. This will not only convince the skeptics, but also aid in scoping the project. Make sure you can do it in bite-sized chunks, prove the value, and realize gains. That permits moving forward with sustained sponsorship.