It was early July 2001. Gray sat down in his cubicle in HP’s open-plan office in Bristol, United Kingdom. He was preparing for the next day’s management meeting at which he had to present his recommendations for moving toward virtual manufacturing. He had three alternative routes to choose from:

• Path of least resistance: Outsource the final assembly, testing and configuration to one of suppliers of a major part (Philips).

• Create the ultimate supply chain: Develop a lowest total cost supply chain; invest in further redesign and resourcing to maximize long-term efficiency.

• Consolidation of the industry; Join forces with a competitor and outsource the final assembly, testing and configuration to it.

HP needed to take manufacturing to the next stage-standing still was not an option.

Hewlett-Packard Company

Hewlett-Packard Company (HP) was a global provider of computing and imaging solutions and services for business and home. In 2000 its sales were US$48.8 billion and it employed 89,000 people.

HP’s tape drive business unit employed 700 people, 550 of them based in Bristol, and the unit’s headquarters was in the United States. It had three main areas: digital data storage (DDS), Ultrium and Storage solutions. In 2000 sales were just under $1 billion, with DDS generating most of this. Ultrium was the product of the future; it was based on an open standard-called linear tape open (LTO)-developed together with IBM and Seagate.

Tape Drive Business

The tape drive business was part of the storage market. The storage market in general was expanding and was potentially a large market-estimated at $46 billion in 2003. Tapes were an economical way to store large volumes of digital data. Although the market had reached maturity and the time for major growth had passed, tapes still had their advantages compared with disks. As Gray explained: The tapes are regularly 7 to 10 times better than disks in cost/gigabyte stored. They will remain around for at least the next seven years.

The performance and quality of the product were qualifying criteria in the business. The key success factors were time-to-market and cost of the product. The cost was especially important in sales to original equipment manufacturers (OEMs).

The life cycle of a product was typically four years. This meant that getting product to market as quickly as possible was critical for the company, to ensure highest possible sales volumes and margins.

Tape technology was in a transitional phase. new technology-LTO and super digital linear tape (SDLT)-had been introduced to upgrade from the traditional technologies of DDS and digital linear tape (DLT). Quantum was the major producer of DLT and was the overall market leader in the tape drive business, particularly the high-end segment. HP had kept its lead in the medium segment. DDS technology-based products were still a profitable product line. (Refer to figure 1 for characteristics of tape drive products)
HP's Supply Chain for DDS Products

The supply chain consisted of four phases before final delivery to the customer. (Refer to figure 2 for supply chain of DDS product family) HP sourced the main components from third parties because they had special technology and expertise that HP did not have in-house. The tape drives were sold to the end consumer either through OEMs or resellers. In volume terms the OEM channel was larger; in sales terms the reseller channel was larger. The reseller channel pretty profitable for HP, whereas the OEM channel was less so.

Outsourcing of DDS Products

Between 1997 and 2000, HP outsourced all its models in the DDS product family, one by one. The organization did not have an overall strategy for outsourcing, and the solutions were tailored to each individual situation. HP always started the manufacturing in its own facilities in Bristol and transferred production to the contract manufacturer after the ramp-up had been done. When HP decided to outsource the final assembly and configuration of DDS2, it chose a contract manufacturer in Scotland to keep the risk of outsourcing low: the contract manufacturer was close to HP, the engineering people liked it and the price was competitive, although not the lowest.

Relatively soon after the deal, it became evident that the contract manufacturer could produce drives at a significantly lower cost than HP, largely because of overhead. Both companies put a lot of effort into managing the relationship. HP had three or four people constantly in Scotland. The core team consisted of people from materials, finance, engineering and logistics areas in the two companies. Both companies seemed happy with the situation.

HP also outsourced production of the DDS3 model to the same contract manufacturer. The decision was based on capacity and cost. In this case, HP was concerned about the resourcing of the project. Davey Maclachlan, procurement manager, explained:

We wanted the contract manufacturer to have a new product introduction team (for DDS3). It had one team that needed to manage both DDS2 and DDS3. I think the margins were so small that they had to cut resources. We also noted that they were fire fighting. It felt like their departments were not talking to each other.

For the DDS4 model, HP opted to work mainly with Mitsumi and another contract manufacturer. For the new contract manufacturer, which had to configure only one product, this arrangement was not ideal. Also the supply chain had become complex. Gray explained:

We now had three major deals with different generations of DDS products. The relationships with the earlier contract manufacturers were becoming quite difficult due to the limited future. The Mitsumi relationship was
working very well, however the overhead to manage all of these various relationships was through the roof.

New Technology and Future Alternatives

Work on developing Ultrium started in 1997. HP partnered with IBM and Seagate to develop the standard, which was in competition with the Quantum one. Production of Ultrium began in late 2000. The supply chain looked similar to that for DDS products, with three main components: mechanism, PCA and head (Refer to Figure 3).

After six month’s production of Ultrium, Gray decided to collect data to better understand the ramp-up period. He was amazed to see the level of inventory in the supply chain since production began. (Refer to Figure 4 for information on the supply chain)

Gray had come to the conclusion that HP needed to move toward virtual manufacturing and not produce any part of Ultrium. He identified four key issues that should determine the choice of the future alternative. These were: (1) strategic alignment, (2) total cost of ownership, (3) partner choice and (4) cost of production. The first two were the most important criteria. Strategic alignment included both supply chain and overall strategy of the storage division and meant that HP’s investment would be low with quick returns. The lead time across the supply chain was theoretically 90 days. Gray’s ambition was to be able to deliver a tape drive to the customer in five days. He commented:

It does not take more than a day to manufacturer one, and four days are enough for logistics.

HP had not been convinced of its contract manufacturer’s capabilities in tape engineering. HP’s experience was that its fixed cost was not reducing as much as expected, as it had to do the engineering itself. In the future HP wanted to move away from its original practice of ramping up the production in-house for six month. To this end, it had outlined three main alternatives.

Alternative 1: Path of Least Resistance

HP would give the final assembly and testing, configuration and distribution to one of its suppliers, Philips. According to Gray this was an easy-to-do alternative. Philips had superb engineers, who understood the tape business. However, Philips was a bit like HP, with high overhead, and outsourcing deal did not seem to fit with Philips’ overall strategy.

The production would be done in Austria and Hungary with five or six HP people always on site. In this case Gray needed to persuade the accountants of the intangible benefits, since the apparent savings were lower. The key issue was: What would it take for Philips to take on this business and what would be left for HP?
Alternative 2: The Ultimate Supply Chain

This would involve designing the supply chain in the right way, from scratch. HP had talked with Mitsumi, which would ultimately have capabilities to manufacture both the head and mechanism and would also take care of final assembly and testing, configuration and-potentially-distribution. Mitsumi would emerge as a major tape drive manufacturer.

Gray assumed the investment would be high, but that the return would also be high. Ultimately this alternative would provide low cost and flexibility. At the moment Mitsumi did not have enough buying power and capacities to produce the mechanism. In the past, HP had positive experiences working with Mitsumi. However, this time HP would need to assist Mitsumi with technology development and was unsure about the implications of moving in this direction.

Alternative 3: Consolidation

The third alternative included collaborating with a competitor. This approach would assume consolidation was necessary in the industry and would concentrate on supply chain efficiency rather than competition. This would be especially true as both companies would be competing against Quantum’s standard. The main question would be: Should you help a competitor to survive? The relationship would be complex and troublesome.

Decision looming

The alternatives were lined up and it was up to Gray to recommend one. He wanted to achieve efficiency in the supply chain, low cost of products and manageable relationships with HP’s future partners. But he also acknowledged the fact of the HP culture:

HP is big on consensus. Any one person can kill the proposal.
Another 12 months had passed. Derek Gray took a deep breath and sat back and reflected on the developments that had taken place in this time.

We took a long time to decide, but now we are ready to move forward. A lot of people were involved in the decision and we also lived through some internal organizational changes. The pending merger with Compaq further complicated the process on our side, but frankly there were also a number of surprises on the part of our potential partners.

Gray was relaxed since the roller-coaster experience of reaching the outsourcing decision was behind him and he could look forward to his new challenge of ramping up production at the supplier. It was July 2002. Gray had just moved to Vienna, Austria. This was not the original intention, but Gray explained:

In autumn 2001 we decided on a variation of the Mitsumi option. We believed that it was worth winning the battle for the tape drive business and thus wanted to create the ultimate supply chain, removing as many nodes as possible to improve efficiency. The idea with the Mitsumi option was to move our mechanism production, including equipment, technology and tools, from Philips to Mitsumi. We discussed our decision with the philips executive and reached agreement on the matter. Somewhat unexpectedly, however, his team resisted the transfer and (through organizational play) effectively made it impossible for us to proceed.

More time passed and Gray needed to take a fresh look at the Philips option. Philips came back with the alternative suggestion of using Flextronics as a contract manufacturer. Flextronics had an assembly plant in Hungary, few hours away from Vienna, where the Philips division was based. Gray noted:

We got quite excited about this option, as it would provide the lower manufacturing cost but with the engineering expertise of Philips. It felt like Christmas to us, it could be win-win situation. The Philips and Flextronics executives were longtime friends and this helped to establish the relationship. We felt that in the circumstances, this would be a deal worth going for. By then, we had finally said no to the Mitsumi option, and our negotiations with Seagate had slowly gone cold. Shortly afterwards, we learned about a management change at Philips. The new executive also subscribed to Philips strategy, but interpreted it slightly differently: It was no longer desirable for Philips’ to divest the mechanism manufacturing business to Flextronics as was previously proposed. At that point, we had gone through all options and in view of the significant loss of time decided simply to go ahead with Flextronics anyway. The Flextronics option provided ample opportunity for supply chain integration and was geographically close to Philips. It also provided low cost manufacturing capability in its Hungarian facility.

Gray’s Learning Points from the Outsourcing Decisions

While reflecting on the ups and downs with the outsourcing, Gray was able to identify four dimensions of learning for himself.

• “People buy from people” Individuals make a difference and can alter decisions. A change of individuals will have a huge impact on potential deals.

• “You get the vendor you deserve” Vendor management and vendor development is extremely important. A partner who is constantly driven on cost is likely to cut resources to the point of poor performance. The vendor’s performance often reflects the poorly developed vendor management practices of the customers that the vendor works with.

• “We need more accountants and lawyers than engineers” Regional benefits are extremely significant and can distort people’s thinking. The supply chain should still be the primary driver of decisions but there is a great deal of opportunity to be taken through these regional benefits.

• “Like herding cats” Large companies have difficulty organizing themselves. Bureaucracy and unclear accountability render decision making difficult. This applies to many multinationals and can be frustrating when two multinational companies try to work together.

Gray described the central learning:

Any team halfway capable but focused could make any of the options works, as long as they want to make things happen and have shared values with the supplier. One should not underestimate the value of the right team and the right skills in making almost any option work.