Part Six

Supply Chain Management

Learning Objectives

After learning this part, you will be able to:

- Gain an understanding of the characteristics of supply chain management
- Get an overview of supply chain management philosophies, principles and their implications for enterprises
- Devise a supply chain system fit for a manufacturing firm or retailing firm

Case 17

Managing Growth at SportStuff

In December 2000, Sanjay Gupta and his management team were busy evaluating the performance at SportStuff over the last year. Demand had grown by 80 percent over the year. This growth, however, was a mixed blessing. The **venture capitalists**[1] supporting the company were very pleased with the growth in sales and the resulting increase in revenue. Sanjay and his team, however, could clearly see that costs would grow faster than revenues if demand continued to row and the supply chain network was not redesigned. They decided to analyze the performance of the current network to see how it could be redesigned to best cope with the rapid growth anticipated over the next three years.

Sanjay Gupta founded SportStuff in 1996 with a mission of supplying parents with more affordable sports equipment for their children. Parents complained about having to discard expensive skates, skis, jackets, and shoes because children outgrew them rapidly. Sanjay's initial plan was for the company to purchase used equipment and jackets from families and any surplus equipment from manufacturers and retailers and sell these over the Internet. The idea was very well received in the marketplace, demand grew rapidly, and by the end of 1996 the company had sales of $0.8 million. By this time a variety of new and used products were sold and the company received significant venture capital support.

In June 1996, Sanjay leased part of a warehouse in the outskirts of St. Louis to manage the large amount of product being sold. Suppliers sent their product to the warehouse. Customer orders were packed and shipped by UPS from there. As demand grew, SportStuff leased more space within the warehouse. By 1999, SportStuff leased the entire warehouse and shipped to

customers all over the United Sates. Management divided the United States into 6 customer zones for planning purposes. Demand for each customer zone in 1999 was shown in Table 6-1. Sanjay estimated that the next three years would see a growth rate of about 80 percent per year, after which demand would **level off**[2]. Sanjay and his management team could see that they needed more warehouse space to cope with the anticipated growth. One option was to lease more warehouse space in St. Louis itself. Other options included leasing warehouses all over the country. Leasing a warehouse involved fixed costs based on the size of the warehouse and variable costs that varied with the quantity shipped through the warehouse. Four potential locations for warehouses were identified in Denver, Seattle, Atlanta, and Philadelphia. Warehouses leased could be either small (about 100,000 sq. ft.) or large (about 200,000 sq. ft.). Small warehouses could handle a flow of up to 2 million units per year whereas large warehouses could handle a flow of up to 4 million units per year. The current warehouse in St. Louis was small. The fixed and variable costs of small and large warehouses in different locations are shown in Table 6-2.

Table 6-1　Demand for each customer zone in 1999

Zone	Demand in 1999	Zone	Demand in 1999
Northwest	320,000	Lower Midwest	220,000
Southwest	200,000	Northeast	350,000
Upper Midwest	260,000	Southeast	175,000

Table 6-2　The fixed and variable costs of small and large warehouses

Location	Small Warehouse		Large Warehouse	
	Fixed cost /($/year)	Variable cost /($/unit flow)	Fixed cost /($/year)	Variable cost /($/unit flow)
Seattle	300,000	0.20	500,000	0.20
Denver	250,000	0.20	420,000	0.20
St. Louis	220,000	0.20	375,000	0.20
Atlanta	220,000	0.20	375,000	0.20
Philadelphia	240,000	0.20	400,000	0.20

Sanjay estimated that the **inventory holding costs**[3] at a warehouse (excluding warehouse expense) was about $600 **F*, where *F* is the number of units flowing through the warehouse per year. Thus, a warehouse handling 1,000,000 units per year incurred an inventory holding cost of $600,000 in the course of the year. Inventory cost calculating formulas are shown in Table 6-3.

Table 6-3 Inventory Cost calculating formulas

Range of F	Inventory Cost
0-2 million	$250,000 + 0.310F
2-4 million	$530,000 + 0.170F
4-6 million	$678,000 + 0.133F
Over 6 million	$798,000 + 0.113F

SportStuff charged a flat fee of $3 per shipment sent to a customer. An average customer order contained four units. SportStuff in turn contracted with UPS to handle all its **outbound shipments**[4]. UPS charges were based on both the origin and the destination of the shipment and are shown in Table 6-4. Management estimated that inbound transportation costs for shipments from suppliers were likely to remain unchanged, no matter what the warehouse configuration selected.

Table 6-4 UPS charges

	Northwest	Southwest	Upper Midwest	Lower Midwest	Northeast	Southeast
Seattle	$2.00	$2.50	$3.50	$4.00	$5.00	$5.50
Denver	$2.50	$2.50	$2.50	$3.00	$4.00	$4.50
St. Louis	$3.50	$3.50	$2.50	$2.50	$3.00	$3.50
Atlanta	$4.00	$4.00	$3.00	$2.50	$3.00	$2.50
Philadelphia	$4.50	$5.00	$3.00	$3.50	$2.50	$4.00

New specialized terms

1. venture capitalist 风险资本家
2. level off 维持平稳
3. inventory holding cost 存货持有成本
4. outbound shipment 外埠运输

Case summary

SportStuff 公司的增长计划

2000 年 12 月，Sanjay Gupta 正在与他的管理团队忙着评估上年的业绩。今年的需求增长了 80%。然而，这种增长是喜忧参半。支持该公司的风险资本家对销售的增长和由此带来的收入增长感到非常高兴。然而，Sanjay 和他的团队清楚地认识到，如果需求持续增长，而供应链网络不重新设计，成本的增长将快于收入的增长。于是，他们决定分析公

司目前的网络绩效，探寻重新设计供应链网络的模式，以最好地适应下一个三年快速增长的需求。

Sanjay Gupta 在 1996 年创立了 Sportstuff 公司，其使命是向一些家长提供买得起的子女所需的运动设备。父母们抱怨不得不扔掉昂贵的溜冰鞋、滑雪板、夹克和鞋子，因为孩子们长得太快，穿不下它们了。最初的计划是收购已用过的运动装备和衣服或者生产者或零售商多余的产品通过网上营销，这一想法取得了良好的业绩——1996 年底获得了 80 万美元的销售额，并得到了很多风险资本的支持。

1996 年 6 月，公司租了圣·路易斯郊外的一个仓库，供应商将产品运送到此地，客户的订单在此打包并由 UPS 运输。随着需求的增长，Sportstuff 在仓库租用了更多的空间。到 1999 年公司已租下全部仓库，产品运到美国各地的客户。管理层将全美划分为 6 个顾客群，1999 年每个地区的需求总额如表 6-1 所示。Sanjay 预见未来三年公司需求将会每年增长 80%，然后稳定下来，因此需要更多的仓库来应付预期的增长。一个可选方案是在圣·路易斯租用更多的仓库；其他的方案是，在全美范围内租用仓库。租用仓库涉及固定成本（根据仓库的大小计算）和可变成本（根据运送产品的数量而定）。公司在西雅图、丹佛、亚特兰大和费城确定了 4 个潜在的仓库位置。不同地点的大、小仓库费用如表 6-2 所示。租用的仓库中小的面积为 10 万平方英尺，大的面积为 20 万平方英尺；小仓库每年货流量为 200 万件，大的为 400 万件，目前在圣·路易斯租用的是小仓库。

Sanjay 估计了一下存货成本（不含仓库费）大约为$600*$F$，$F$ 代表每年的货流量。那么，一年中一个仓库处理 100 万件产品大约需要存货成本 60 万美元。存货成本核算公式见表 6-3。SportStuff 公司为一件产品支付大约 3 美元运输费，一个客户订单包含 4 件产品。SportStuff 公司将其所有外埠运输业务交付给 UPS 运作，UPS 根据原产地和目的地收费（如表 6-4）。管理层估计不管如何配置仓库，来自供应商的内向运输成本保持不变。

Questions for discussion

1. What is the cost SportStuff incurs if all warehouses leased are in St. Louis?
2. What supply chain network configuration do you recommend for SportStuff?

Hint for analysis and Reference answer

1. What is the cost SportStuff incurs if all warehouses leased are in St. Louis?

The warehousing cost is the function of inventory holding cost, warehouse leasing cost and transportation cost. In 1999, the total cost SportStuff incurs if all warehouses leased are in St. Louis is $2,418,375 (525+722.75+1,170.625).

2. What supply chain network configuration do you recommend for SportStuff?

In 2000, the total demand reached 27,450,000 (57,600, 360,000, 468,000, 396,000, 630,000, 315,000), the total cost SportStuff incurs if all warehouses leased are in St. Louis is $4,022,125 (905,000+1,010,000+2,107,125). When total demand reached 4,941,000, leasing

large warehouses in Denver and Atlanta is more cost-effective compared with leasing only in St. Louis. When total demand reached 8,893,800, adding warehouses in Philadelphia and Seattle is more reasonable. You need to determine the location and the size of and the number of units flowing through the warehouse per year. Based upon the above information, you can configure a specific supply chain network.

Case 18

Birth of a Sweater

How does today's global supply chain work? Take the seemingly simple task of creating a linen sweater by Eileen Fisher, a Li & Fung customer. Eileen Fisher supplies the design, boxes of labels and the address of a warehouse in Irvington, New York. Li & Fung chooses and hires all the suppliers and sub-suppliers and arranges shipments from the raw materials stage to the warehouse. "We stitch together supply chains," says managing director William Fung, four years younger than Victor.

Here's one of them: Every two months a 150-ton shipment of high-quality flax leaves France for the 40-day boat ride to Tianjin, a port on the eastern coast of China. The **bales**[1] are loaded onto trucks for the 255-mile drive west to Shuozhou, a traditional coal-mining city of 1.3 million people that's about 200 miles from Beijing. On downtown streets donkeys pull wooden carts piled high with leeks until they (the donkeys, not the leeks) are stir-fried in a favorite local dish.

Inside the gates of Shanxi Shuofang Flax Textile, a state-owned company, a dozen peasant women wearing face masks sit in a warehouse amid mountains of French flax. They pick straw and other impurities out of what looks and smells like hay in a barn. The cleaned flax is taken to the building next door, where it is fed into a series of French-made machines that spin and comb it into long strands that look like a teenager's blond ponytail. The machines were shipped to Shanxi Shuofang a decade ago after a French factory closed when it became cheaper to spin yarn in China. This is the only factory in China with such sophisticated equipment, according to the factory manager. The combed flax, soft as hair, is bleached, dried and fed into another set of machines that spin the fiber into yarn and roll it onto spools. Working around the clock in three shifts, the factory's 750 workers spin the flax into 2,000 spools of yarn a day to earn their $1.25-to-$2 daily wage. Five women sit on the floor and pack each 10-inch **spool**[2] into plastic bags, which are put on trucks and driven 1,116 miles south to Guangzhou. In a factory there the yarn is dyed lime green, pink, white, coral or purple.

Fourteen hours after dyeing begins, the colorful yarn is put on another truck for the two-hour drive to Everbright Knitting Factory in Dongguan, not far from Hong Kong. There's a basketball court in the factory courtyard there for future Yao Mings, workers' dormitories have

a **complimentary**[3] cell phone charging station, and unskilled workers earn $4 a day—nearly twice the region's minimum wage—all in an effort to hold on to employees in southern China's export hothouse.

Colorful spools of yarn are taken from the **loading dock**[4] to the factory's third floor, where workers stand ready at 400 knitting machines. The yarn is woven into linen panels, which are linked together with special sewing machines until a sweater takes shape. Each is pulled over a torso-shaped fluorescent light and checked. Ninety-five percent pass inspection and are thrown into 4-foot-tall washing machines, then into giant dryers. When they come out, the rough linen feels soft. They are ironed, Eileen Fisher labels are hand-stitched to the sweaters, there's another quality check, and finally **price tags**[5] with **bar codes**[6] are attached. The price is $148—more than a month's wages for the workers who stitched the sweaters together and four months' wages for those in the flax-combing factory. The goods are packed by hand into dear bags, then placed into **cardboard boxes**[7].

Those boxes are sent down the **freight elevator**[8] and put on trucks for the two-hour drive across the Chinese border to a Hong Kong shipper's warehouse. Ninety percent of *Li & Fung*'*s* clothing shipments go by boat, but more expensive clothing or brands that aim at the most fickle fashion set are shipped by **air freight**[9]. At the Trans Global Logistics warehouse in Hong Kong the sweater boxes are counted, weighed, measured and slapped with a **bar-coded sticker**[10] that contains shipping details. Then it's into 5-foot-high metal airport cargo containers and onto yet another truck for the half-hour drive to the Hong Kong-airport's cargo loading facility. Seven minutes after the truck drives through the airport's guarded gate, the Eileen Fisher goods glide down a giant **conveyor belt**[11] to an oversize X-ray machine. One recent shipment headed for John F. Kennedy Airport via Seoul on Asiana Airlines, the Korean carrier with the lowest air freight rate that week for 800 pounds of brightly colored sweaters.

One boat, three factories, five trucks and two airplanes later, the French flax had journeyed nearly around the world, reincarnated as a designer sweater ready for Christmas shoppers in Manhattan's stylish Soho neighborhood.

In the mid-1990s *Li & Fung* acquired the Eileen Fisher account when it bought a company called Dodwell and set about deepening the relationship. Dodwell simply found a factory to produce what the firm told it to. The *Fung* brothers went deeper, including offering sources for yarn and other materials. "She does very nice, elegant styles, and the fabrics are key," William says. If styles change and Eileen Fisher needs fabrics with crinkles, *Li & Fung* can source from its Indian suppliers.

Questions for discussion

1. How is Li Fung's apparel supply chain stitched together? Can you map out its supply chain?

2. How does Li Fung create value both for the client and for itself?

New specialized terms

1. bale　捆，包
2. spool　线轴
3. complimentary　免费的
4. loading dock　装货月台
5. price tag　价格标签
6. bar code　条形码
7. cardboard box　纸箱
8. freight elevator　货运电梯
9. air freight　航空运输
10. bar-coded sticker　条码标签
11. conveyor belt　传送带

Case summary

针织衫的诞生——利丰

通过 Eileen Fisher 和利丰的合作展示了现代供应链的运作方式。作为客户，Eileen Fisher 只需要提供设计，标签盒和位于纽约欧文顿的成品仓库的地址，利丰选择和雇用所有的供应商和子供应商，并安排从原材料阶段到仓库的发货。该公司的总经理 William Fung 表示："我们将供应链连接在一起。" William Fung 比 Victor 小 4 岁。

利丰每隔两个月会将原产于法国的 150 吨优质亚麻经由海运运到天津，再把一捆捆亚麻再装上货车运往 255 英里外的朔州。朔州是一个传统的煤矿城市，人口 130 万，距离北京约 200 英里。在市中心的街道上，驴子拉着高高的装满韭菜的木车，直到它们（是驴子，不是韭菜）被炒成当地最受欢迎的菜肴。

在一个国营纺织厂内，十几个农妇戴着口罩把杂质去除。然后亚麻被投入隔壁的世界上最先进的法国的纺织机，把亚麻梳理成长条。十年前法国工厂关闭的时候，这些纺织机就运来了。据工厂管理人员介绍，这是中国唯一拥有如此先进设备的工厂。梳理过的亚麻被漂白烘干投入纺织机，纺成亚麻线，然后卷到线轴上。工人们三班倒，750 个工人一天能纺 2 000 个线轴，每天的工资从 1.25 美元到 2 美元不等。5 位女工坐在地上把线轴装入塑料袋，装上卡车后运往 1 116 公里外的广州。在广州的工厂里，亚麻纱线被染成石灰绿，粉红色，白色，珊瑚色或者紫色。

染色 14 小时后，彩色纱线被装入另一辆卡车，经过 2 小时的运输送到东莞的永明针

织厂。在那里工厂为了留人，在厂区内为未来的“姚明”们设了篮球场，工人的宿舍安装了免费的手机充电站，非熟练工一天都能挣 4 美元，是当地最低工资标准的 2 倍。

彩色线轴被从装货月台运到工厂三层，工人们在 400 台纺织机前，把纱线纺成亚麻布块，再用特制的缝纫机把布块缝成衣服。每件衣服都要经过检查，95%的衣服通过了检查，被投进 4 英尺高的洗衣机，然后是巨大的烘干机。从机器出来后，粗糙的亚麻变的很软，经过熨烫，手工缝上 Eileen Fisher 标签，再经过一次质检，最终贴上带条码的价格标签。售价是 148 美元，比中国亚麻梳理厂工人 4 个月工资还高。衣服被手工包装进昂贵的袋子，再装入纸箱。

装了箱的亚麻衣服下货运电梯后又被装上卡车，经过两小时运输送到香港的发货人仓库。利丰 90%的衣服采用海运，但是昂贵的衣服或时装品牌选择空运。在全球物流公司的香港仓库，箱子经过清点、称重、测量、贴物流标签，被装入 5 英尺高的金属制航空集装箱，再经过半小时的公路运输送到香港机场的货场。进了机场大门 7 分钟后，Eileen Fisher 的货物从巨大的传送带滑向特大的 X 光机，将搭乘最近一班韩亚航空经由首尔前往肯尼迪机场的航班出运，该承运人本周为 800 磅以上的彩色服装提供最优惠的运费。

法国亚麻经过一次海运，三家工厂，五次汽运，两次空运，周游了整个地球，重生为一件圣诞季在曼哈顿高档街区销售的时装。

利丰集团在 20 世纪 90 年代中期买下名叫 Dodwell 的公司时接管了 Eileen Fisher 的账户，并开始深化双方的关系。Dodwell 只是简单地找了一家工厂，按照公司的要求进行生产。冯氏兄弟更进一步，包括提供纱线和其他材料的来源。“她做得很棒，很优雅，面料是关键。”William 说。如果 Eileen Fisher 的设计风格转变，需要带褶皱的布料，利丰则会从印度采购。

Hint for analysis and Reference answer

1. How is Li Fung's apparel supply chain stitched together? Can you map out its supply chain?

In the apparel supply chain, Li Fung acts as the core enterprise. In the downstream, there are clients that outsource their production and distribution to Li Fung. In the upstream, there are many raw materials suppliers, production factories around the world ready for cooperation with Li Fung, and many logistics service providers offer their service to Li Fung.

The network chain structure should be mapped with Li Fung as the core, with upper stream suppliers and down stream clients.

2. How does Li Fung create value both for the client and for itself?

Li Fung is the first company to propose “soft three dollars” idea, that is, to reduce logistics cost by optimizing the logistics network. By owning almost every process of production and distribution, and making use of its worldwide resources, Li Fung helps the client to concentrate on processes that the client is good at, like branding and marketing. Meanwhile, Li Fung improves its importance as a global supply chain management company, as well as creates profits.

Case 19

Dell Computers: using the supply chain to compete

The personal computer sector was still in its infancy when, in 1983, medical student Michael Dell began buying up remainder stocks of outdated IBM PCs from local retailers, upgrading them in his college dorm, and then selling them on at bargain prices to eager consumers. Dell abandoned his studies soon afterwards to concentrate on his growing computer business. By 1985 his company, Dell Computers, had switched from upgrading old IBMs to building its own machines, but Dell was different from other computer manufacturers of its day. The machines themselves were technologically unremarkable, but it was the way in which they were sold-directly to the customer—that gave Dell a unique advantage over established, product-focused, PC makers.

While the industry leaders vied amongst themselves to introduce PCs with ever more impressive technology, little consideration was given to the mundane business of supply chain management. The computers they produced were invariably **made-to-forecast**[1] and because of the way they were sold—through shops, resellers, and systems integrators—were then destined to languish for an average of two months in warehouses or on shop shelves before being purchased by the customer. Meanwhile Dell remained focused on the end user, thus avoiding the inherent double jeopardy created by the dynamics and economics of the industry. Firstly, around 80 percent of the costs of manufacturing a PC are component costs, and component costs have been falling since the industry's inception, particularly the all-important processors that continue to fall in price by an average of 30 percent per year. The longer these components wait to be sole, the worse value they become. Secondly, there is the risk that a step-change in technology may make millions of pounds' worth of finished PCs obsolete overnight, forcing manufacturers to either compensate resellers for unloading stocks at a loss, or incur the costs of shipping them to developing countries where they can be sold off cheaply.

By selling directly to the customer, Dell was able to configure and assemble every PC to order, thus avoiding the risks associated with carrying finished inventory, which in turn enabled it to maintain its cost advantage over its conventional rivals. Dell's low-priced machines with their bespoke configuration became an attractive alternative for those customers who were

confident enough to buy direct.

For many years, received wisdom in the industry considered Dell's position to be nothing more than that of a successful **niche player**[2]. It was widely believed that the majority of business-to-business customers and indeed consumers buying PCs for the home, would always prefer to purchase their equipment through traditional channels, where help would be at hand should something go wrong and consumers could see and touch the products before purchase. In a bid to break out of its perceived niche, Dell embarked on a brief flirtation with conventional retail distribution channels. The move was a mistake. Retail sales plummeted as soon as Dell offered a new PC through its direct channels. Dell was obliged to compensate the retailers for their losses. As a result, the company posted its first ever loss ($36m) in 1993. The ill-judged foray was a salutary lesson in the perils of attempting to operate through conflicting distribution channels and a vindication of its original low-cost **direct sales strategy**[3].

Dell pulled out of the retail market in 1994 and retrenched with a vengeance, rebounding immediately with profits of $149m. From this point on Dell concentrated on finding ways to leverage the strengths of its original direct sales strategy, concentrating on minimizing inventory and increasing return on capital employed. Leanness, flexibility and above all time compression were the keys. Over the next three years Dell's operations were closely reexamined to squeeze every possible moment of **non-value adding time**[4] out of its procurement and assembly processes. By 1997, Dell was not only a model of JIT manufacturing, but had applied its own exacting time standards to the rest of its supply chain. It had specified that the majority of components have to be warehoused within 15 minutes of Dell's three factories (in Austin, Texas; Limerick, Ireland; Penang, Malaysia), and many components are not ordered from a supplier before Dell receives a customer order. To achieve such levels of co-operation and integration, Dell has reduced its number of suppliers from 204 companies in 1992 to just 47. At the same time, it has preferred to source from suppliers close to their plants rather than from more distant offshore suppliers, even though the local manufacturing costs may be higher.

For Dell's Limerick plant, at least 40 percent of components are produced and supplied on a JIT basis, a further 45 percent of components are held in supplier hubs, located close to Dell's factory, the suppliers restock their own warehouses and manage their own inventories, delivering to the factories on a consignment stock basis. Bulky finished subassemblies, such as monitors and speakers are treated differently. Instead of shipping them to Dell's factories, they are sent directly to the customer from the suppliers' hub (located close to the market rather than close to Dell's factory), saving Dell approximately $30 per item in freight costs. Dell is billed for the components only when they leave the suppliers' warehouse in response to a customer order, so that the components themselves are likely to spend only half a day as Dell's own inventory. The supplier receives payment approximately 45 days later.

Where the suppliers of essential components (such as disk drives) cannot be assembled as quickly as the computers can be bolted together, Dell is pressing the suppliers to shorten their own lead times, but in the meantime, their components must be built to forecast. Fortunately, demand for components is much more predictable than demand for finished goods, though shortages of some critical components (most noticeably microprocessors) continue to be a problem across the industry. Here again, the direct sales method places Dell at an advantage over those makers who use traditional routes to market. Because Dell communicates directly with its customers, it is able to shape demand through its telephone sales by steering customers towards configurations using readily available components.

Meanwhile Dell has forged ahead with Internet sales as an even more cost-effective version of its direct-sales approach. Dell is not the first or the only PC retailer to venture into cyberspace, though by 1997 it was certainly the most successful, mainly because no other manufacturer was better placed to make such a move. Within six months of opening for business through its Website, Dell was clocking up Internet sales of $1m per day, with sales through the channel growing by 20 percent per month. Far from remaining a small niche option, direct buyers now account for a third of all PC sales in the US, up from only 15 percent in 1991. Internet sales have been slower to take-off in Europe and Asia, but they are rising and are set to climb higher in these increasingly computer literate societies.

To place an order, customers simply dial into the Website and follow the on-screen instructions. The software allows them to monitor on-screen the price impact of each option as they configure their PC, then tap in their credit card or account payment details, before finally placing the order at the click of a mouse. The customer receives confirmation of the order within five minutes of its placement, not more than 36 hours later their bespoke PCs are trundling off the production lines and onto the delivery trucks. Most of this time is spent not assembling the machines, but testing the machines and loading software. Dell can expect to see payment for most sales within 24 hours of order placement, while rivals such as PC market leader, Compaq, must wait around 35 days for payment through primary dealers. Even other direct sellers are apt to take over a fortnight to convert an order in cash.

By the end of 1997, Dell was growing at a rate that was more than three times the industry average and had become the world's second biggest PC maker (by unit sales). Third quarter revenues were up 58 percent to $3,188 m. Finished goods inventory and **work in progress**[5] stood at a combined figure of just $57 m, with a further $244 m in raw material and other items, giving a total inventory of around 11 days of sales. Dell's growth and return on investment are the envy of the industry and have been reflected in the staggering rise of Dell's stock price. Other established industry players have tried to emulate Dell's direct sales formula, but have retreated after running into the same channel conflicts as Dell had encountered in 1993 with it's

foray into retail sales. In the meantime, Dell is moving on to its next big growth opportunity the network server business where through its partnership with network equipment manufacturer 3Com Corp, it hopes to apply its PC and time-saving know-how to reduce the lengthy period needed to test the compatibility of each newly launched computer or networking device. By supplying 3Com with new computers as soon as they are introduced, the partners hope to slash the existing 60-90 days testing period for new equipment to just two weeks. Acting together to bring new solutions to the market more quickly, the partners were set to outpace their rivals and make a lasting impression on the network server business.

Questions for discussion

1. What is Dell's supply chain strategy? How Dell operate its logistics network?
2. How much benefit did Dell gain from its supply chain operation? Briefly describe the performance of Dell's supply chain, for example in inventory, lead time.
3. In your opinion, what can Chinese companies learn from Dell's success in logistics and supply chain operation?

New specialized terms

1. made-to-forecast 按预测生产
2. niche player 市场钻缝者
3. direct sales strategy 直销策略
4. non-value adding time 非增值活动占用的时间
5. work in progress 在制品

Case summary

Dell：利用供应链开展竞争

在个人电脑（PC）仍处于起步期的 1983 年，医疗专业的学生 Dell 低价买入 IBM 公司过时的模块，并在自己的大学宿舍里进行升级，然后以低廉的价格出售给渴望购买这些电脑的消费者。随后他放弃学业专注于电脑业务并在 1985 年成立了自己的公司，销售 Dell 计算机，但 Dell 与当时的其他电脑制造商不同。机器技术上不出色，但是却运用了直销方式，这形成了 Dell 独一无二的竞争优势。

当行业领先者致力于 PC 技术差异化竞争时，他们很少考虑平淡无奇的供应链管理业务。他们根据预测制造的计算机，因为通过商店、中间商和系统集成商销售，到达顾客手中之前在仓库或货架上平均滞留两个月。与此同时，Dell 致力于终端客户，从而规避了行

业的双重风险。首先，由于PC发展初期，产品80%的成本来自组装，然而处理器的价格每年平均以30%的速度下降。这些组件等待使用的时间越长，它们的价值越低。其次，技术更新换代导致库存PC一夜之间过时，损失严重，迫使制造商要么赔偿经销商的损失，要么承担低价售给发展中国家的运输成本。

通过直销的方式，Dell能根据订单组装PC，避免了持有成品库存的风险，从而树立了相对于传统竞争者的成本优势。Dell的可定制配置的低价机器对自信直接购买的客户很有吸引力。

多年来，行业对Dell的定位只不过是成功的市场钻缝者。他们深信大多数顾客，还是习惯于从可感知的传统渠道购买，因为电脑一旦出现问题，总能得到帮助。于是Dell也开始冲破市场缝隙，尝试传统零售渠道。这种转型决策是错误的。只要直销新电脑，零售额就急剧下降，Dell不得不赔偿零售商由此带来的损失。1993年首次出现的3 600万美元的赔偿给Dell带来了教训，双重销售模式的冲突证实了低成本直销战略的可行性。

Dell在1994年撤离传统渠道，其利润迅速反弹，达到1.49亿美元。从此Dell专注于发挥直销战略的优势、最小化存货、增加资本回报。精益化、灵活性以及最重要的缩短时间才是关键。接下来的三年Dell在采购和组装环节反复压缩非增值活动占用的时间。到了1997年，Dell不仅仅是准时制的制造商，而且还向其余供应链成员提出了精准的时间标准。Dell具体要求零部件15分钟以内到位，并且在接到顾客订单之前许多部件并不从供应商那里订购，为此大大减少了供应商数量，从1992年的204家减少到47家。与此同时，Dell优先考虑选择距离工厂近的供应商，尽管当地制造的成本会高一些。

工厂至少40%的零部件在准时制基础上生产和供应，另有45%的部件会存放在靠近Dell工厂的当地供应商的物流中心。供应商给自己的仓库进货并管理自己的库存，再以寄售方式配送到工厂。区别对待显示器和扬声器之类的笨重成品部件，部分组件不送到Dell工厂而是直接从供应商那里送到顾客那里，靠近市场而不是靠近Dell的工厂，每件产品大约为Dell节约了30美元的运费，这样能节约时间和费用，加快资金周转。只有当这些组件响应客户订单离开仓库时，Dell才会为这些组件付费，因此这些组件本身作为Dell的库存可能只需要半天时间。供应商大约在45天后收到货款。

当供应商的主要部件（如磁盘驱动器）不能被迅速组合时，Dell就会给供应商施加压力以缩短他们的供应时间，但与此同时，他们的部件必须根据预测生产。由于部件相对于成品其需求更易预测，尽管某些关键部件（最明显的是微处理器）的短缺仍然是整个行业的一个问题。Dell在这方面再次体现出相比传统渠道的优势。因为可以与客户实现直接沟通，Dell可以通过电话销售状况引导客户的需求，使其使用当前可用的配件。

Dell打造了自己在网路销售方面的优势。虽然不是最先和唯一进入网络销售的商家，但是取得了最大的成就，主要是因为没有其他制造商更好地做出这样的举动。在6个月内通过其开放网站，1997年每天的网上销售额高达100万美元，而且每月以20%的速度增长。远不是在市场分一杯羹而已，在美国，直销额占了电脑总销售额的三分之一，而1991年互联网销售额仅占15%。网络销售在欧亚地区起步较慢，但在这类“机民”率日益提

高的社会将不断攀升。

要下单，客户只需登录网站，按照屏幕上的指示操作。在 Dell 的网络销售系统中，顾客可以完成选择电脑配置并监控不同选项对价格的影响，然后点击信用卡或账户支付信息，最后点击鼠标下单完成电子支付，顾客订单会在 5 分钟内获得确认，36 小时内他们定制的电脑就会从生产线上下来，装上送货卡车。大部分时间不是花在装配机器上，而是花在测试和加载软件上。Dell 公司在 24 小时内收到订单支付款，远远优于竞争对手如 PC 市场领导者——Compaq 的 35 天。其他直销商则需要两周时间才能把订单变为现金。

截至 1997 年底，Dell 以高于行业 3 倍的增长率，成为世界第二大 PC 制造商（按单位销售额计算）。第三季度收入增长 58%，达到 3.18 亿美元。成品库存和在制品总额仅为 5 700 万美元，原材料和其他物资的库存只有 2.44 亿美元，销售总库存时间只有 11 天。Dell 的投资回报率与股价均令业界垂涎。其他老牌同行试图模仿 Dell 的模式，但是又因陷入与 Dell 1993 年经历的涉足门店销售相同的渠道冲突而撤出。Dell 开始通过与网络设备制造商 3Com 公司的合作进军下一个具备高增长潜力的网络服务器行业。Dell 希望应用其 PC 和省时的诀窍减少新推出的电脑网络设备的兼容测试时间。双方希望通过合作将新设备测试期从 60～90 天缩短到 2 周，以便超越对手向市场更快推出新的解决方案，在网络服务器行业获取持久竞争力。

Hint for analysis and Reference answer

1. What is Dell's supply chain strategy? How does Dell operate its logistics network?

Over 40 percent of Dell's components are produced and supplied on a JIT basis, a further 45 percent of components are held in supplier hubs, located close to Dell's factory. The suppliers restock their own warehouses and manage their own inventories, delivering to the factories on a consignment stock basis, such as monitors and speakers are treated differently. Instead of shipping bulky finished subassemblies to Dell's factories, they are sent directly to the customer from the suppliers' logistics center (located close to the market), saving Dell much time and freight costs.

2. How much benefit did Dell gain from its supply chain operation? Briefly describe the performance of Dell's supply chain, for example in inventory, lead time.

Dell has forged ahead with Internet sales as an even more cost-effective version of its direct-sales approach. Within six months of opening for business through its Website, Dell was clocking up Internet sales of $1m per day, with sales through the channel growing by 20 percent per month.

By 1997, Dell was not only a model of JIT manufacturing, but had applied its own exacting time standards to the rest of its supply chain. It had specified that the majority of components have to be warehoused within 15 minutes of Dell's three factories, and many components are not ordered from a supplier before Dell receives a customer order. To achieve

such levels of co-operation and integration, Dell has reduced its number of suppliers from 204 companies in 1992 to just 47. At the same time, it has preferred to source from suppliers close to their plants rather than from more distant oversea suppliers.

3. In your opinion, what can Chinese companies learn from Dell's success in logistics and supply chain operation?

Chinese companies should focus on minimizing inventory, increasing return on capital, improving the flexibility of their supply chain through cooperating with their upstream and downstream partners and effective information sharing with end users, implementing JIT manufacturing and trying to squeeze every possible moment of non-value adding time out of their procurement and assembly processes.