34

BEST PRACTICE
Supply Chain Optimization at Yihaodian

Gang Yu and Ping (David) Yang

1 Introduction
Founded in July 2008, Yihaodian (YHD) is a leading Business to Consumer (B2C) e-commerce company in China. In this chapter, we introduce the company’s supply chain strategy and its innovations on supply chain models. We focus on supplier logistics centers, pallet pooling services, aggregated supplier delivery, and cross docking logistics. Due to its advanced supply chain design, Yihaodian accomplishes eighteen inventory days-on-hand and 8% stock-outs leading the e-commerce retailers.

2 Company Overview
Yihaodian (YHD) is the first online supermarket in China. Growing at a Compound Monthly Growth Rate (CMGR) of 28% in its first four years, the company exceeded $2 billion in Gross Merchandise Volume (GMV) by the end of 2013.

YHD differentiates itself by building all of its own back-end systems. With a technology team of approximately 1,000 people, YHD has independently developed numerous supply chain management systems and technology, obtaining multiple patents and 124 software copyrights. This has become a key competitive advantage for the company. At the same time, YHD has also insisted on building its own fulfillment network.

The company currently has six distribution centers located in Shanghai, Beijing, Guangzhou, Wuhan, Chengdu, and Quanzhou that serve all areas of Mainland China. These distribution centers have a total storage space surpassing 220,000 square meters. In addition, YHD established 254 local distribution hubs within major cities in China to handle last-mile delivery. The company plans to continue adding distribution hubs in other cities to fulfill most orders with its own delivery network.

In May 2011, YHD formed a strategic partnership with Walmart and was acquired by the retail giant in July 2015. Powered by Walmart’s extensive offline retail network, YHD has become the largest online supermarket in China, selling millions of products online including food and beverages, beauty products, cleaning, baby care, electronics, furniture, health and wellness, shoes, and apparel. Moreover, YHD provides various value-added services to its customers, suppliers, and logistics providers such as e-commerce, marketing, and online software; YHD is in a leading
position in terms of providing data support and service applications for its customers. YHD’s main competitors are Tmall and JD. According to the 2015 China Digital Power Study by Kantar Retail, a report to benchmark China’s e-commerce industry, YHD (66.7%) took third place after JD (73.9%) and Tmall (71.3%) in “The Best of the Best” ranking. YHD’s advantage in the online retail industry is hard to replicate given its history, support from Walmart, and unique business model.

### 3 Industry Landscape and YHD’s Supply Chain Strategy

For retailers, regardless of what the front-end looks like, how the products are presented, whether it is online or offline, and what marketing methods are deployed, the core business of retail is to deliver a desired product to the customer at a certain time and location while ensuring its quality. This fulfillment process cannot be realized by the front-end of the business, but relies upon a well-established supply chain system. Therefore, supply chain management should be hailed as every retail business’ core competency.

Tmall and Jingdong Mall (JD), the two largest B2C online retailers in China, are the best examples of this point, both having invested heavily in their respective supply chain systems. Cainiao Network, a subsidiary of Tmall, strives to build an intelligent logistics network with a registered capital of $1 billion and three rounds of financing totaling $48 billion. Cainiao focused its efforts on the integration and transfer of information across all parts of the supply chain, so the actual products and materials could be moved around less frequently to improve efficiency. Even online e-commerce platforms as large as Alibaba have not given up on building their own logistics network.

On the other hand, JD takes building its own supply chain system even more seriously. In the beginning of 2009, JD decided to form its own logistics company. Upon receiving a $150 million investment from the Tiger Global Fund in January 2010, Liu Qiangdong, JD’s CEO, announced that half of the investment would be spent on building its own fulfillment network. This network included three more distribution centers in Beijing, Shanghai, and Chengdu totaling more than 100,000 square meters, fifteen to twenty secondary distribution centers, and hundreds of local distribution hubs across more than fifty cities. In March 2010, JD announced the completion of its four distribution centers covering China’s Northern, Eastern, Southern, and Southwestern regions. In April 2011, JD completed a $1.5 billion C-round financing and planned to use most of the funding on the development of its supply chain and technology systems. The company announced a plan to build seven primary distribution centers in 2011, before spending an additional $1 billion on logistics in the next three years. By that time, 70% of its 2009 B-round financing of $21 million had already been invested in logistics. JD’s independent supply chain system enabled the company to provide “personalized” services for its customers.

From a strategic standpoint, YHD shares the same view with its competitors in that a well-established supply chain is an important competitive advantage for any e-commerce retailer. However, YHD’s case is slightly different given the nature of its core product selections—grocery and general merchandise items. On one hand, customers frequently consume and purchase these fast-moving consumer goods (FMCG). As a result, customer acquisition costs tend to be low while retention tends to be high. On the other hand, these items can be bulky, heavy, and prone to damage, while at the same time constrained by short shelf lives and limited margins. As a result, supply chain management is even more important for a retailer like YHD as any development in its supply chain system would become YHD’s best entry barrier against future competitors.
In light of the above, YHD has always placed supply chain management at the forefront of its strategic focus. Inventory days-on-hand and stock-outs are usually to measure the performance of its e-commerce supply chain. For example, through continually optimizing its supply chain process, YHD reduced its inventory days-on-hand from 60 days to 18 days, as compared to 30 or more days for traditional retailers. (For comparison purposes, JD’s inventory days-on-hand is about 38 days.) Stock-outs were reduced to 8% for self-run products and 3% for top-selling products. Moreover, while an average distribution order (DO) for YHD often contained more SKUs than that of a competitor (about 6 times that of JD’s), YHD was still able to achieve an average warehouse picking time of only 50 seconds. (Warehouse picking time is the time from starting the first SKU to the completion of picking all the SKUs in this order.) Such achievements cannot be realized without YHD’s continual investment in supply chain optimization and innovation as outlined below.

4 Supply Chain Models and YHD’s Innovation

To understand supply chain management and its optimization, we must first understand the structure of a supply chain and its constituents. In general, a traditional supply chain model can be expressed as shown in Figure 34.1.

From Figure 34.1, we can see that, in order for a product to reach a customer, multiple transfers of the product are needed which will inevitably translate into costs. The depiction above is
Best Practice: Supply Chain Optimization

actually a best-case scenario. In reality, a traditional retail supply chain often includes even more layers of transfers between manufacturers and wholesalers, as well as between wholesalers and retailers. Such processes can be very costly in terms of shipping, handling, labor, and warehouse leasing, all of which ultimately pass onto customers. Comparing the cost flow and value flow of this model, cost is easily incurred during the process of delivering a desired product to a customer, very often on non-value-added processes.

As a contrast, e-commerce promises to disrupt the traditional model by minimizing non-value-added processes while maintaining a responsive and scalable supply chain system utilizing advanced IT technologies. For example, additional storage and picking cost in the distribution center can be avoided if the cross-docking logistics are applied. The e-commerce supply chain model is shown in Figure 34.2.

In Table 34.1, we compare the cost structure of a traditional retailer’s supply chain versus an e-commerce retailer’s supply chain.

Needless to say, today’s e-commerce retailers have not yet achieved the ideal cost structure outlined above. This is why YHD continued to optimize its supply chain and logistics system within the past few years.

4.1 Supplier Logistics Center (SLC)

With the rapid development of e-commerce and the constant expansion of online product offerings, online retailers are increasingly under pressure to expand their warehousing capacity. YHD already operates multiple warehouses reaching almost 400,000 square meters. Simply adding more space to deal with the increased demand and SKUs is by no means practical. SLC is one way to deal with YHD’s limited space by aggregating supplier inventory into a third-party operated logistics center located near a YHD fulfillment center. Currently this logistics center is exclusive for YHD. The SLC model is shown in Figure 24.3.
<table>
<thead>
<tr>
<th>Cost</th>
<th>Traditional Retailers</th>
<th>E-commerce Retailers</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple inventory</td>
<td>High</td>
<td>Low</td>
<td>A traditional supply chain contains multiple layers with each layer holding its own inventory; e-commerce replaces this with one large, centralized distribution center.</td>
</tr>
<tr>
<td>Multiple transportation cost</td>
<td>High</td>
<td>Slightly lower</td>
<td>In a traditional model, transportation cost is high due to multiple transfers and the lack of an economy-of-scale; e-commerce solves this problem with a centralized distribution center.</td>
</tr>
<tr>
<td>Multiple inventory management</td>
<td>High</td>
<td>Slightly lower</td>
<td>Inventory management cost is saved in the e-commerce model mostly due to the reduction of labor.</td>
</tr>
<tr>
<td>Channel handling cost</td>
<td>High</td>
<td>Slightly lower</td>
<td>Handling cost at each channel is reduced in the e-commerce model due to the simplification of the supply chain process.</td>
</tr>
<tr>
<td>Store rent</td>
<td>High</td>
<td>Extremely low</td>
<td>E-commerce uses virtual storefronts and reduces overall and marginal cost significantly.</td>
</tr>
<tr>
<td>Store staff</td>
<td>High</td>
<td>Slightly lower</td>
<td>In general, e-commerce platforms have a cost advantage.</td>
</tr>
<tr>
<td>Last mile</td>
<td>Extremely low</td>
<td>Slightly higher</td>
<td>Traditional retailers essentially transferred last mile delivery costs to customers; e-commerce retailers need to deliver the products, and costs can be particularly high where the fulfillment network is not well established.</td>
</tr>
</tbody>
</table>

### Figure 34.3 SLC Model

*Source: YHD.com*
Best Practice: Supply Chain Optimization

SLC essentially aggregates suppliers to a location near a YHD fulfillment center. There are several benefits to this aggregation. The first benefit is an increased turnover due to lower safety stock levels at YHD’s own fulfillment center. SLC shortened the distance between suppliers and YHD, thereby shortening the distance between suppliers and end customers. As a result, YHD can carry less inventory and set lower safety stock levels, resulting in improved turnover and days-on-hand. YHD reduced SLC inventory days-on-hand from 18 days to 9 days.

The second benefit is the economy of scale and increased efficiency from letting the SLC operator handle front-end supplier logistics. The SLC not only shares inventory risk with YHD such as high inventory level or stock-out but also saves YHD from having to deal with multiple suppliers. YHD is able to simplify its front-end logistics without sacrificing product variety.

Next is the benefit of rapid response and a lower risk of stock-outs. Another advantage that comes with bringing suppliers closer to its end customers is rapid response. In order to attract customers, online retailers often offer promotions that are sometimes in response to a competitor move and can be quite unpredictable; this may result in either frequent stock-outs or unreasonably high safety stock levels. SLC facilitates communication between suppliers and YHD and enhances YHD’s rapid response capability given its proximity to a YHD fulfillment center.

The impact of an SLC is quite noticeable. Compared to a supplier lead-time of ~6 days, SLC can deliver to a YHD fulfillment center within 6 hours. Moreover, YHD’s days-on-hand is merely 18 days, while goods tend to stay at the SLC for about 9 days. All of these contribute to improved cash flow for YHD.

It is worth noting that the SLC model does not entail a complete transfer of supplier inventory; a supplier only keeps a portion of its inventory at the SLC where it is closer to the customer. The SLC provides operational and storage services at a reasonable cost, while in the process eliminating various non-value-added services for the supplier. Non-value-added services can be found in the second paragraph in Section 4.2.

On the back-end, YHD created a customized version of its Warehouse Management System (WMS) for the SLC’s third party operator. This WMS is also connected to YHD’s internal PMS (Purchase Management System) and WMS (Warehouse Management System), allowing for constant information sharing and rapid response.

### 4.2 Pallet Pooling Service

YHD partners with pallet suppliers and upstream product suppliers so that goods are delivered to YHD’s fulfillment center already placed on top of standardized pallets. Instead of unloading each cotton box individually from the delivery truck, pallet pooling allows the entire pallet of boxes to be unloaded and then moved around in the warehouse. Once the pallet is unloaded, another standardized pallet will be returned to the supplier and carried back to the supplier’s warehouse. Inbound quality assurance will be conducted inside the warehouse after receiving the products. In case of damages and quality issues, a guaranteed remedy will be made.

The cost of unloading and moving the products is a type of channel handling cost as mentioned in Table 34.1; such processes are deemed non-value-added and can be extremely costly. Pallet pooling effectively solves this problem. In general, product transfers between different channels (e.g., suppliers and YHD) generate the following costs: unloading, checking, testing, warehousing, and transferring. These costs have a linear relationship with the number of operation units. If the operation unit is a box, then the costs linearly increase with the number of boxes. If the operation unit is a pallet, then the costs linearly increase with the number of pallets.

Therefore, by reducing the operation unit from multiple boxes to a single pallet, YHD’s pallet pooling services can reduce channel handling costs significantly. Moreover, since pallets can be
moved around with machines, labor costs associated with the process are also reduced. Not surprisingly, this innovation has increased efficiency for YHD by 90% and reduced product damage by 50%. YHD’s pallet pooling service is demonstrated in Figure 34.4.

YHD’s pallet pooling service benefits suppliers in several different ways:

- First, the pallet-pooling service dramatically reduced loading time and provided a more flexible delivery schedule. For a 12.5-meter (41-foot) van, loading time can be reduced from 3–4 hours to merely 20–30 minutes with pallet pooling, increasing efficiency by more than 90%. With the loading docks no longer under pressure, a supplier can choose from more available time slots and enjoy more flexible scheduling.

- Next, it prioritized “Green Channel” for suppliers using pallet pooling. On the loading docks, YHD grants priority to suppliers that have signed up for pallet pooling, accelerating turnover of the vehicles.

- Third, there is a reduced labor cost for suppliers given the use of equipment for transporting pallets. YHD provides the equipment for suppliers to unload and move the pallets, reducing the labor needed; a supplier can also hire temporary workers at YHD’s fulfillment center. All of these reduce handling costs for a supplier.

- Finally, they benefit from better preservation of goods and less damage incurred in the unloading and moving process. Pallet pooling and the associated mechanized operations allows for better protection of the products and less damage and loss. For example, product damage for a liquor business was reduced from 2% to below 1% after pallet pooling. Pallet pooling creates real value for a supplier in addition to improving efficiency.

In addition, YHD also benefited from this service due to higher utilization of its loading docks and lower labor costs. For YHD, setting up the pallet pooling service and getting its suppliers onboard was no easy task. Major issues include standardization of the pallets, recycling, quality control, cost allocation, and maintenance. In order to solve these problems, YHD decided to
partner with a third-party pallet provider that will be responsible for operating, recycling, and maintaining the pallets. All pallets belong to the company, and YHD leases the needed pallets from this company and returns any unused pallets at the nearest recycling station. The cost is allocated according to the occupied time of different partners. With pallet pooling among the manufacturer, logistics provider, and YHD, the total number of pallets needed in aggregate has been reduced, and each party is spared from having to manage its own pallets.

Moreover, YHD used various incentives such as the “Green Channel” mentioned earlier to encourage suppliers to sign up. Participating suppliers include P&G, Unilever, Nestle, Suntory, Coca-Cola, Kimberly-Clark, Kao, and Pepsi. YHD’s own experience dictates that for pallet pooling within a 150 kilometers radius, savings can reach as high as 15%–20% of the total logistics cost.

### 4.3 Aggregated Supplier Delivery

Aggregated supplier delivery is another one of YHD’s programs that relate to front-end logistics integration. For suppliers with smaller scale and less frequent deliveries, pallet pooling may not be as desirable or practical. YHD aggregates these suppliers’ orders and recommends a logistics provider to collect each individual order and deliver them together to YHD’s fulfillment centers. This is particularly valuable for suppliers that are smaller in scale and do not have delivery capabilities. Figure 34.5 demonstrates the difference between a traditional delivery model and YHD’s innovative solution.

Specifically, aggregated delivery adds the most value for two types of suppliers. First, we look at suppliers that used to deliver to YHD directly yet had limited scale. Suppliers of this type tend to be small, and direct delivery can be very costly without the benefit of scale. With the aggregated delivery program, a third-party logistics provider will pick up the products from the supplier and deliver them to YHD. This saves the supplier from having to invest in its own delivery network, effectively reducing its fixed cost. Moreover, the supplier no longer has to deal with the hassles of scheduling and queuing, as well as any potential issues that may come up during delivery.

Second are the suppliers that used to deliver products to YHD via transshipment. These suppliers are typically of even smaller scale, and used to deliver their products to an LTL (Less-Than-Truckload) freight company who will then deliver to YHD. Conceptually, the LTL freight company is similar to the logistics provider chosen by YHD in the aggregated delivery model. However, the LTL freight company cannot achieve economy of scale with YHD since it is delivering to multiple destinations. Also, different LTL freight companies may have different service

![Figure 34.5](https://www.yhd.com/images/figure34.5.png)  
**Figure 34.5** The Shift from the Traditional Delivery Model to YHD’s Aggregated Delivery Model  
*Source: YHD.com*
capabilities and delivery standards, making it hard for YHD to monitor performance. These issues often result in problems such as delays and product damage, incurring additional costs for YHD.

With the implementation of the aggregated delivery program, YHD has achieved the following things:

- It has achieved reduced communication friction between YHD and suppliers. Suppliers and logistics providers used to make appointments with YHD via email, sometimes resulting in miscommunication or delayed responses. In lieu of emailing back and forth, YHD built a supplier portal (SP) where logistics providers and suppliers can schedule appointments with YHD through a shared online system free of charge. After as many as thirty rounds of modifications to further optimize this system, the SP currently does not require any human intervention and allows for real-time information sharing between suppliers/logistics providers and YHD.

- Next, the company has achieved real-time feedback on the status of a purchase order. Historically, suppliers and YHD do not have the capability to track the fulfillment status of a purchase order. YHD made such a large number of purchase orders on a daily basis that it would be impossible for anyone to track the progress of each individual order. On the SP platform, such information can be updated in real-time without any human intervention. This allows employees and managers to monitor all orders simultaneously and make timely decisions.

- Third, the company has achieved a more efficient appointment system. Before the implementation of this program, suppliers made appointments offline, and the delivery schedule was controlled manually; suppliers did not know how to use YHD's Supplier Portal, and YHD did not have enough information on the amount of cargo delivered unless this was communicated in the email. This often resulted in logistics providers making inappropriate delivery reservations. Nowadays, with such information readily available on the SP, YHD is more informed of the amount of cargo and other logistical details beforehand, and is in a better position to evaluate whether or not a logistics provider's reservation is reasonable. For example, after checking the SP, YHD may suggest the logistics provider to reserve the loading dock for more or less than half a day.

- Fourth, the company attained economy of scale by aggregating supplier orders (as mentioned above).

### 4.4 Cross-Docking Logistics (CDL)

CDL is a well-known logistics strategy invented by Walmart to increase supply chain efficiency from the 1980s. The idea is to use fulfillment centers not for storage but as a connection point between manufacturers and retailers/customers. YHD is the first e-commerce company in China to use this technique:

In essence, CDL entails products ‘passing through’ the fulfillment center without being stored or picked. The products are unloaded from incoming trucks and directly entered into the CDL system; on the outbound docks, the products are sent to pallets and delivery trucks via a conveyor belt with little or no storage in between.

*(Boysen and Fliedner 2010)*

It is generally believed that in a CDL supply chain system, fulfillment centers act as coordination points instead of storage points. In a typical CDL system, the goods are sent from the manufacturer to the fulfillment center and then transferred to outbound trucks to be shipped to
Best Practice: Supply Chain Optimization

retailers as soon as possible. The goods typically spend very little time in the fulfillment center, usually not more than twelve hours. The model adopted by YHD is often referred to as terminal cross-docking logistics, whereby products received from suppliers are not stored but are instead sent to its designated destination. Terminal CDL categorizes and merges orders according to the departing trucks and requires orders from two or more vendors be sent to the designated destination at the same time. As a result, order arrival time as well as the designated locations must be well coordinated.

Generally speaking, YHD uses Shanghai and Guangzhou as coordination centers and designates Wuhan, Quanzhou, and Chengdu as terminal destinations. The benefit of CDL is relatively straightforward for YHD: goods received from suppliers are not stored but directly sent to outbound areas or onto outgoing trucks. YHD’s CDL may take various forms depending on the fulfillment center’s operating environment.

PMS is YHD’s internal IT system that handles CDL. Each team takes an order from PMS and completes the order as commanded. Assuming Wuhan is the terminal destination, we will explain how YHD’s IT system supports CDL. First, YHD’s procurement staff sends out a purchase order that may be fulfilled by multiple suppliers. Then, PMS chooses a supplier considering factors such as cost and supplier lead times. PMS also needs to determine whether or not to use CDL for this order based on YHD’s delivery lead times and the availability of trucks. For example, for a core product such as imported milk, CDL may take too long and the system may choose direct delivery instead. Once PMS has chosen to use CDL for a particular order, this order will be labeled accordingly with the same information updated in WMS. The WMS’ staff will be able to see the CDL nature of this order (receipt only, no storage), and TMS staff will receive an order to prepare for delivery. Finally, TMS can issue in-transit information and update this in PMS for YHD’s procurement staff to monitor and intervene if needed.

It is clear that YHD’s use of CDL relies heavily upon its internally developed IT system. Without such a system, CDL may cause excessive inventory or frequent stock-outs. YHD’s current model maximized the benefits of centralized procurement while at the same time reduced the cost of directly delivering from the Shanghai fulfillment center.

5 Performance Improvements

After the implementation of the aforementioned supply chain innovations such as SLC, pallet pooling, aggregated delivery, and CDL, YHD has achieved significant performance improvements:

- Improved inventory turnover and decreased days-on-hand from 48 days to 18 days; goods stay at the SLC for only 9 days, improving YHD’s overall cash flows
- Reduced stock-outs from 16% to 8%; stock-outs for top-selling products also reduced from 9% to 3%
- Reduced lead time; SLC lead time is only 6 hours versus 6 days for a supplier
- Improved loading efficiency; for a 12.5-meter van, loading time is reduced from 3–4 hours to 20–30 minutes, representing a 90%+ increase in efficiency
- Lower loading and picking costs saved through cross docking.

6 Future Development

Although significant value has been generated through supply chain optimization, there is still tremendous room for improvement. YHD is working on the following areas.
6.1 Collaborative Planning, Forecast, and Replenishment (CPFR)

CPFR requires a retailer to make forecasts and plans along with its various partners (e.g., suppliers), so that cost savings may be achieved through more accurate forecasting and faster replenishment. YHD collaborates with its suppliers to establish sales targets and procurement plans, and attempts to reach a middle ground when demand predictions differ. For online retailers, frequent promotions further distort the demand curve (Figure 34.6) and requires YHD to build an even more efficient collaboration channel with its suppliers, to offer more predictable promotions and update suppliers in real time when exceptions occur. Furthermore, YHD built the Supplier Portal for information sharing with suppliers online. Up to date, more than 5,000 suppliers have joined the platform.

With the rapid geographic expansion of YHD’s business, multi-level inventory is creating new challenges for the company. YHD’s target is to fulfill 80% of orders with local fulfillment centers. The rest of their orders will be fulfilled by larger fulfillment centers in Shanghai, Guangzhou, and Beijing. However, due to demand fluctuations, a large portion of the orders are currently being split into multiple distribution orders. Moreover, many suppliers do not have the capability to ship nationally. All of the above increased operational costs for YHD. Therefore, YHD will continue to collaborate with suppliers to solve these supply chain challenges. Currently, YHD is considering integrating its procurement function with that of Walmart’s.

6.2 Data-Driven Supply Chain Management

With the invention of the “November 11” and “December 12” promotional days in China (similar to “Black Friday” in the US), unexpectedly high demand spikes created significant supply chain pressures for online retailers. YHD strives to provide the best customer experience despite such uncertainties in the online retailing industry.

![The Demand Curve](Source: YHD.com)
YHD currently has more than 400,000 square meters of fulfillment center space with 3 million SKUs and 70 million users. In addition to its scale, YHD’s integrated supply chain also involves many processes such as procurement, stocking, delivery, and returns that are all interconnected. The scale and complexity of the system represents significant challenges for a supply chain manager.

First, the massive amounts of highly complex data may cause managers to lose focus. A manager may have access to numerous reports on the quality and efficiency of each supply chain process and business unit, such as warehouse shipping-out efficiency reports and warehouse order split rate reports. The more data there is, the harder it is for a manager to stay focused and uncover the most important issues.

Second, due to the size and complexity of a supply chain system, managers may only see a small part of a bigger picture. In order to make a decision, multiple data points must be viewed together. For example, efficiency data must be viewed together with the incurred cost, and it must be viewed in comparison with similar data from a competitor.

Third, data may be difficult to analyze due to the lack of comparison. For example, a 10% split rate of orders is actually reasonable among all the warehouses, but the same number between two warehouse is not acceptable according to the historical data. Without historical data or other information to validate, managers may not be able to make well-informed decisions.

Data-driven supply chain management is YHD’s solution to the aforementioned problems. YHD has built its own big data platform to 1) aggregate, combine, and present the data in a graphical manner for managers to make quick decisions, 2) mine data and identify correlations between data points to inform managers of connections between various aspects of the supply chain process, 3) monitor each step of the supply chain process in real time, and 4) formulate supply chain strategies based on a holistic view of the entire system (Figure 34.7).

YHD’s success is largely related to the optimization of its supply chain system. Supply chain optimization is especially important to YHD whose products are bulky, heavy, and prone to damage, yet constrained by short shelf lives and limited margins. Just like a traditional retailer, the

**Visualization of the efficiency**

- Compliance efficiency analysis
- Bottleneck analysis for warehouse

**Supply chain surveillance room**

- Cost/quality/efficiency synthesis display
- Dashboard for warehouse manager
- Dashboard for purchase manager
- Dashboard for delivery manager

**Historic data mining**

- Supply chain key performance
- Configuration for warehouse operation (tasks, staff, etc.)

**Synthesis evaluation system**

- Auto-PO effect evaluation system
- Sale forecast effect evaluation

*Figure 34.7  The Plan for the Data Analysis Platform*

*Source: YHD.com*
essence of e-commerce remains to be the delivery of the right products to the right customers at the right place and the right time, and supply chain management is a critical component of this process. YHD’s practice to continually optimize its supply chain has proven its great value, and such value cannot be achieved without leadership vision, constant innovation, and a desire for relentless improvement.

References and Bibliography
