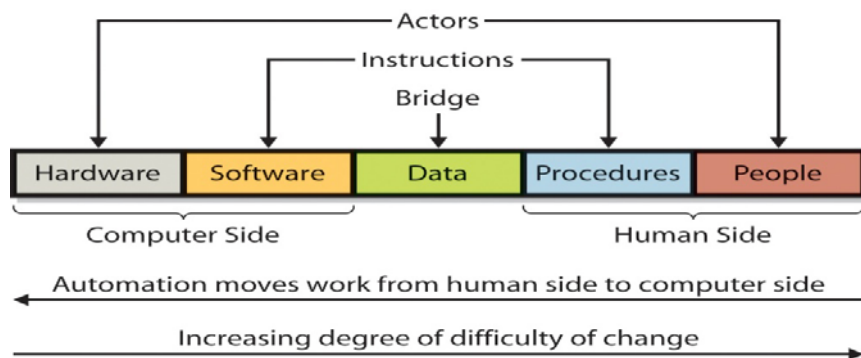# Inventory Management Systems

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**Introduction**

Inventory Management Systems is a key instrument for businesses when tracking their inventory. Typically, Inventory Management Systems are used by firms that either sell a product or manufacture a product for purposes of accounting for all the tangible goods that allow for a sale of a finished product, or parts for making a product. The size and volume of a firm help dictate whether or not a firm is in need of such a system as they can be quite extensive and costly. Large firms that have thousands of components must have a system in place for the primary objective of tracking their assets. There are three main reasons why an Inventory Management System is needed such as timing/lead time, forecasting, and utilizing economies of scale.



The Inventory Management System is no different from any other information system in that there are factors that make it successful. The basis for this report is premised on the five components as outlined in our book. These five critical components are hardware, software, data, procedures and people. As these factors are discussed throughout the next several sections it becomes

evident that they are contingent upon one another, and frankly will not function efficiently without the other.

**Hardware**

Hardware is defined as, "the mechanical equipment necessary for conducting an activity, usually distinguished from the theory and design that make the activity possible." Computer hardware includes all physical equipment that enables computers to function that consist of the mechanical, magnetic, electronic, and electrical devices comprising a computer system, as the CPU, disk drives, keyboard, or screen.



Online inventory management systems require additional hardware components than just a basic computer. First, and most importantly, a main server that houses a database is required to store the data so that information can be provided universally to all the work systems. The information can be accessed and changed by an individual, and then the updated information will be reflected in the main database for everyone to see. Individual work stations are also a necessary hardware component of inventory management systems. Work stations include computers that are compatible with the inventory management software, and they connect to the main server to access the database. Employees input data into their workstations to update the main database. Also

employees, if allowed, can access information from the main database from their workstation. This can be a useful tool to quickly check inventory levels to assist with customer service inquiries.

In addition to the necessary hardware components, there are many additional hardware pieces that can be used to help with the efficiency of the system. For example, a bar code scanner can be used to scan in/out inventory and then the transaction will immediately reflected in the system. While this hardware accessory is not required, it is much more efficient then updating the inventory levels manually. Bar code scanners can also be incorporated into a Personal Data Assistant, also known as a PDA. A PDA is a useful portable, hardware tool that is a handheld computer device. The system can incorporate a PDA as a smaller workstation because it can access information from the database, and add information to the database. A PDA with a bar code scanner is a convenient tool because when inventory is scanned, data can be directly inputted into the system while on the go. The PDA barcode scanner can be useful for a large store's employee to carry with them. They could check inventory levels for customers, and get product information without having to sit at an anchored workstation.

**Software**

A main part in implementing an Inventory Management System is the component of software. Software is the instruction for hardware that is on the computer side of the five-component framework of developing and using an information system. The system usually runs on a remote server and then the

data is delivered to clients via the internet. A software solution has a flexible scalability so as the business grows, so can the inventory control solution.

Today, there are many different types of software solutions that are available to assist in managing inventory within a firm. Before being able to utilize a system efficiently there are many factors that need careful consideration. The goal for the firm should be mapped out by both management and employees so that everyone understands the results they are hoping to get with the inventory control solution. There are a few ways to go about implementing the system.

First, realize that the reason the firm needs to implement a new system is to help the people in the business achieve their goals and objectives. Although the software solutions will be able to run substantial amounts of data through different reports and analyses, the firm must understand what exactly the software solution will need to do for them to help the business grow and be successful. If the business does not realize the need for inventory management and fail to recognize that using a software program will help them keep track of their numbers and forecast production, then it will be of little use to them overall.

Second, after mapping and thinking about how the software solution should organize the data, there should be a large amount of investigation of all the various inventory control systems that are available. Many companies offer demos to the business to help them try it and see if it will fulfill their inventory control needs. The demos will show them all the different reports that can be done, as well as, get the users familiar with the technology and see if it is something that they feel everyone could understand and use. There are different

costs associated with every different software company. The most common

pricing is per user that will be needed. Some software solutions offer a flat price

for unlimited users, and other charge a specific price depending upon how many

users there will be.
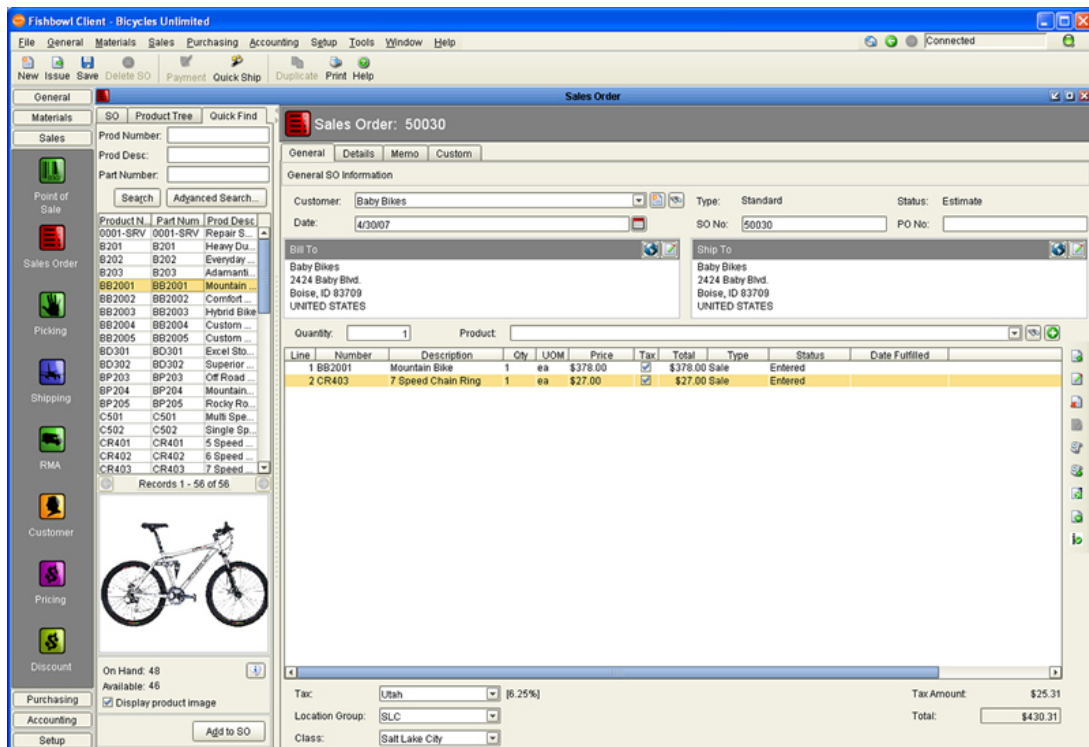


Third, sometimes it is necessary for the firm to contact and hire an

inventory control software specialist to help integrate the system and data once

the software is chosen. If management does not feel comfortable with training the

employees and/or there are not enough resources to properly train all the

employees on how to use the inventory control software, it is in the firms best

interest to spend a little more to help implement the system properly. There are a

number of reasons for this decision, and the main reason should be that because

the employees are the most important component. It is mandatory for the firm to be confident that their employees will be able to use the system. If their employees and users do not know how to use the system, then the cost of the system and the implementation will be of no value to the firm. If they have this great inventory control solution but no one knows how to run reports or use it to manage the inventory levels, then it would be cheaper and just as good for the firm to have not implemented to system in the first place.

Furthermore, it is absolutely necessary to make sure that all employees have the proper training and knowledge of the system and all the aspects of how to successfully utilize all the features. Once the employees are confident with the software, this will help the business benefit and should help them reach all their goals and objectives. Technology and trends are constantly changing in today's market, and for this reason there are continuously new and improved systems available to firms. It is the firm's responsibility to stay in touch with the ever changing technologies to make sure they are benefiting the most from the software they have in place. A few different options that are available on the market today are: Oracle, Fish Bowl Inventory, SmartTurn, and Interprise Suite Solutions.

**Data**

Data obtained through an Inventory Management System is truly valuable information. Data for this type of system provides several benefits for the company, and its vendors. In the business world, it is extremely important to ensure that a company is cognizant of inventory so that opportunities are not

missed for sales. Regardless of what type of information a person or business is trying to compile, it can be quit cumbersome. It is equally as important to know how to utilize the data so that a company can be better off.

Knowledge of current inventory levels is instrumental to a company being able to compete in the market. If the demand for their product is more than the supply, they are losing out on additional sales, and potentially losing future business from those customers, which affect the survival of some companies. On the other hand, if supply is greater than demand, a company will be sitting on too much inventory which leads to spoilage of products, outdated goods, and ties up capital or increases exposure in terms of credit/loan payments. Inventory Management Systems assist businesses with the checks and balances of their stock in that it assures the entity that every item is identified, and accounted for in the accounting department. The real big companies have actual full-time employees that manage this data full-time…it is that important.

Beyond the recording of current inventory levels, the Inventory Management System helps with other areas such as monitoring trends. As previously mentioned, it is important for a business to have an accurate amount of stock in hand to get the best of both worlds in not running out of supply and not having too much on hand. The ability to track trends is an intangible asset because businesses can study what customers like, and what they don't like. Are there more sales on the weekend as opposed to the week? Does a company's product cater to men, women, young adults, and adults? We see that an Inventory Management System extends outside of just inventory levels. It can

help in identifying certain trends so that a company can work with their operations management, and marketing management to tailor specifically to their customers' desires.



**Inventory Value Summary** (Currency amounts in thousands)

| Inventory Category | On-Hand Value | Intransit Value | WIP Value | Total Value | Change | Percent of Total |
|---|---|---|---|---|---|---|
| Computer Assembly (COMP.SUBASSY) | 1,361 | 996 | 4,038 | 6,395 | 25.00% | 42.00% |
| Purchase Items (PUR.MISC) | 796 | 597 | 3,028 | 4,421 | 8.00% | 29.00% |
| Outside Processed (ITEM.OUT) | 398 | 298 | 1,515 | 2,211 | -4.00% | 15.00% |
| Handheld Computer (COMP.HAND) | 265 | 199 | 1,010 | 1,474 | -7.00% | 10.00% |
| Uncategorized (ITEM.UNCAT) | 133 | 99 | 505 | 737 | 5.00% | 5.00% |
| Grand Total | 2,953 | 2,189 | 10,096 | 15,238 | 27.00% | 100.00% |

Figure 3: KPIs and analytics give real-time insight into inventory levels and trends

Reviewing these trends, habits, and patterns will allow companies to forecast their inventory. Forecasting inventory is predicating what the demand of the product is going to be in the future, and this is extremely difficult to do since no one really has that crystal ball. However, this will allow a company and its vendors to make sure that they are maximizing their sales opportunities, allocating their capital and resources appropriately, and many other aspects of their business. This information is just as important to their vendors as it is them.

It was interesting to see that many of the businesses that we visited with utilized a very elementary tracking and monitoring system for their inventory. The

businesses that did were of course the larger companies, and they utilized high-tech Inventory Management System programs. The procedures will be discussed later, but it was interesting that most of the small, medium, and even two companies based their forecasting on the year priors performance. Some would utilize excel to track inventory, others would use access, but only a few would rely on an actual program to predict inventory needs based on criteria such as past performance, determining peak times, and what products are more popular in certain areas.

Crest Beverage, an alcohol distributer, is able to forecast what product sales best in particular areas of San Diego County, and in what stores. This will allow them to utilize this sales tool so that they can provide this data to the store purchasing their product in an attempt obtain addition shelf space. Best Buy and Wireless Superstore are in an industry where products change constantly. While they may attempt to predict accurately, it is difficult in that they do not know how customers will respond to new products. They do not want to get caught in a situation where they have millions of dollars in an inventory that is no longer in demand, and they cannot offload that product.

**Procedures**

Inventory management is different at every company. It doesn't matter the size of the company or the industry the company is in they will all have different procedures to follow for every step of inventory management. When talking about the five-component framework procedures are defined as: the procedures that the four other components use. So this refers to the procedures for the hardware,

software, data, and people. Procedures is on the human side of the diagram and it is categorized under instructions. When discussing inventory management our team found that every place has their own procedures for these components and it mainly depends on the management.
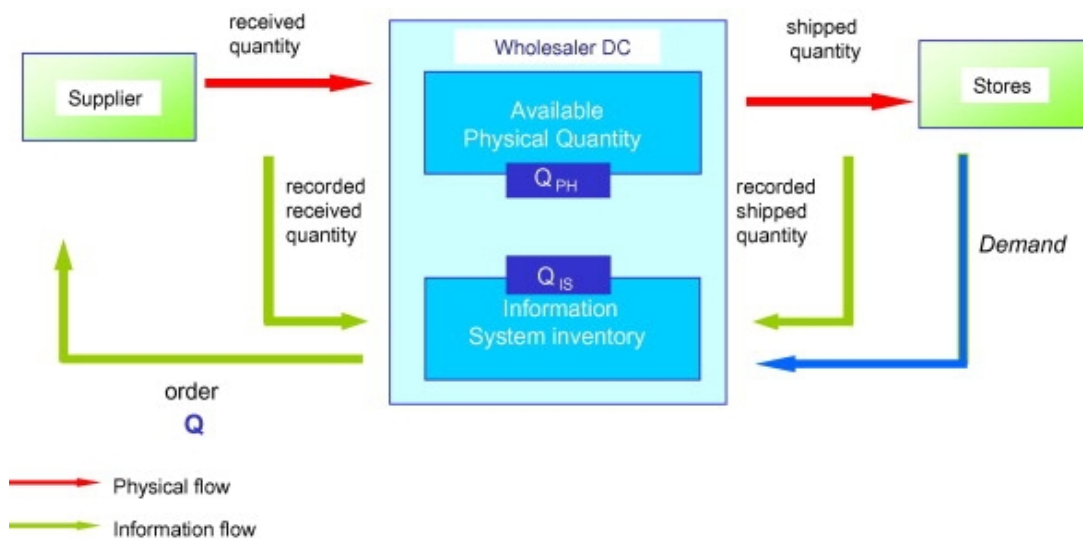


We went to many different companies in many different industries. Some of the companies that have not been mentioned are Gap, Trader Joe's, Giovanni's, Original Roadhouse Grill, Bill's Country Kitchen, and Bing Crosby's. We asked the same questions to these places concerning their procedures with inventory management. Some of the questions that were about procedures would be: What type of inventory system does your company use? How does your company project future inventory? How many people does it take to do inventory? How many hours does it take to do inventory? Do vendors help? We recorded the companies' answers to these questions and compared them to

other companies. We noticed a wide range of different procedures when it comes to inventory control.

The different procedures can vary in many ways depending on the products, the size, and the management choices of the company. Some of the variables in inventory management would be: frequency, workers, labor hours, teams, vendor involvement, and outside inventory consultants. Frequency would be how often an inventory count is being conducted. Workers refers to how many workers does it take to do an inventory count, and how many labor hours does it take to complete the inventory. If a company takes inventory once a week and it takes twelve employees 4 hours to complete an inventory count, then inventory management can be costly to the company. Vendor involvement is when the vendor helps keep track of inventory levels and helps manage the inventory. An example of vendor involvement would be Wal-Mart. Wal-Mart does not do inventory involving their own employees and their own labor hours. If vendors want to be on the shelves at Wal-Mart then they keep track of their own inventory and send shipments when needed to keep inventory stocked. Wal-Mart is a rare example of vendor involvement because the inventory management relies all on the vendors. In other retail stores this is not the case because the stores do not have the power and control that Wal-Mart has on their vendors. Last, there are outside consultants which would have the responsibility of coming in and helping a business with their inventory management, but having nothing to do with the company and the inventory.

After interviewing many different companies in different industries we found some interesting results on the procedures used in inventory management. Bing Crosby's, Original Roadhouse Grill, Giovanni's, and Bill's Country Kitchen were all similar because they are in the restaurant industry. Being that you have to keep the food fresh they all did a manual inventory once a week with one to two employees and it takes on average one to two hours, with an acceptance to Bill's Country Kitchen which does inventory count twice a week. All these places did their inventory management all on their own with no help from their vendors. We found that all the other companies that were interviewed had a greater variance in terms of their procedures. Best Buy being a large corporation retail store they use a web-based inventory control system called, Receiving Service System (RSS). The inventory count is updated with every purchase or incoming order electronically, and reflected every business hour (8 times per day). Best Buy also does a manual inventory count to make sure their numbers correspond with the online inventory numbers. They perform this inventory count once a day that involves twelve employees and takes about two to three hours to complete. The vendors of Best Buy do help with the inventory management. They are able to oversee current and future ordering history and help to forecast the needs of Best Buy. Another store we interviewed was GAP, and their procedures vary from the above companies as well. GAP uses Radio Frequency Identity, RFID, which is applied to the product for the purpose of identification and tracking the products using radio waves. They also use an LRT gun which scans in and out the products. Once every six months GAP uses WIS vendor inventory, which is a

team usually about 20 people, that comes to the store to take inventory with one employee and one manager. This process which happens twice a year takes about 9 hours when doing full inventory check. WIS helps GAP count all their inventory and then the Manager and employees recount after inventory is taken to double check numbers. As you can see these results are only from a handful of companies we interviewed and all of their procedures varied for company to company. Inventory management can be extremely costly depending on the size of the company and the procedures the company implements.

**People**

The most important component in the Five-Component Framework is people. People and hardware are the both components that can take actions according to this model. You need people to manage the inventory and you also need a method to keep track of it. A recent study showed that the three highest costs in dealing with inventory is the interest on capital investment, cost of personnel, and the cost of storage. Cost of inventory control system/software is only 1.5-2% of total inventory value (Naples).

Even with the best inventory control system if there is a lack of people managing the control system and looking over the inventory then the data will be inaccurate. People that manage the inventory system for a company are to be trained in case the system were to go down or for some reason would become unusable. All of the businesses that were interviewed had data backed up manually. Even though it is stored in a database the back-up inventory list is used as hard copy just in case of a malfunction.

When considering new software it is vital for the company to consider the most important component, People. The people that will be in charge of controlling the information that is processed into the system, and also the people that are entering the information need to be knowledgeable with the programs that they are working with. The larger the company that is being managed the more users of the same system you will have.

Setting limitations for employees is important to keep in mind. Employees are assigned different tasks in the work place, some having more responsibility then others such as having access to certain information that others do not. A well-structured inventory controlled system is one that can keep the different levels of security between employees secure for the company.

During our investigation we found that management made most of the inventory decisions. Wal-mart was the only retailer that we found to be controlled by the suppliers. Humans checked the inventory level and order forms before making decisions on what to order. There is some inaccuracy in systems because of several things some being loss of inventory, theft, damaged goods, customer returns, defective goods, and more.

As previously mentioned, the businesses that we focused on were restaurants and electronic retail stores. Both of these industries rely on inventory to be kept up to date. In the restaurant industry there are perishable goods and keeping track of them is required for health and quality reasons. With new technology being produced everyday the holding cost for the retailers inventory comes at a high cost. In order to reduce the holding cost of companies people

must go through and check the items manually to make sure they are in good condition and not outdated.

Software is always changing and the users (People) must critique the software and comment on ways to improve it. Giving feedback on inventory control systems is key to improving programs or changing to completely different software. In cases of implementing new or redesigned software can be a whole process of training employees how to use the new programs. It can be time consuming.

After interviewing different companies in many different industries we realized that there are a wide variety of ways to manage inventory. A company's goal should be to do what is the most efficient and less costly for their company. Through our results we noticed that many of the small companies use a physical inventory system, meaning that their employees count the inventory by hand once a week or less frequent depending on the procedures, and many of the larger companies use an online inventory system, meaning a computer does the work and usually it is backed up every once in a while with a physical count.  But, there is a reason why small companies are not choosing to implement these online inventory systems because they are extremely costly. One example would be Radio Frequency Identity, these small components that are attached to products to keep an accurate count of inventory and tracking can cost from 50 cents a piece to well over hundred. The difference in cost is depending on if there is a battery in the RFID. A company could have many different products and the RFID's would need to be attached to every single one. This can lead to a very

costly add on to the tracking of your product. A small company with not too many products to manage would not need to implement this because it would not be beneficial for the company. Also, in the restaurant industry this product would not be efficient or suitable. There is no way it would be efficient for a restaurant to scan every piece of food in and out of the restaurant.



On the other hand a company like Wal-Mart or Best Buy needs to have the RFID trackers on their products because this is more efficient for the company. Another aspect to implementing online inventory would be a LRT gun. These are not as advanced as RFID's but, this helps a company manage inventory by scanning in and out products through a barcode. These can be costly to a company as well, because usually they need more than one to run a business efficiently. The LRT guns run anywhere from $200-$600 a piece. That does not include the maintenance on them, or the installation of all your products. Once again this is another factor that makes online inventory very costly. Last,

would be for an outside company to come in and do a routine inventory count for you. This would be an example of GAP that had an outside company come in twice a year for an inventory count then backed up by their own employees. All though we could not find any prices of this service through our research, but we would imagine this to be an extremely costly service. For a consulting company to provide an inventory count for your company probably bases their rates on: how long it will take them, what they are managing, and how many employees it will involve. Overall, companies need to weigh out the cost versus the benefits. In some situations adding these inventory management systems would benefit their company and help cut cost, but in other situations these systems will be expensive and not beneficial.

**Conclusion**

There are various ways companies control their inventory, finding the correct program/software that suits the need of each business takes careful consideration. However, from our perspective the outcome of inventory control systems are heavily influenced by the users, for example employees, as well management. Implementing the Five-Component Framework is an ideal way of organizing the main needs of the company.

| ,,,,,,,, | Size of Company | 1.) What type of system for inventory? | 2.) How they project future inventory? | 3.) How often is inventory taken? | 4.) How many people does it take to do inventory? | 5.) How many hours? | 6.) Do vendors help? |
|---|---|---|---|---|---|---|---|
| Bing Crosbys | Large | | Last two years | Once a week | 1 | 1-2 hours | No- only with wine |
| Original Roadhouse Grill | Medium | Manual- then order over the phone | Previuos Year | Once a week | 1 | 1-2 Hours | No |
| Giovannis Pizza | Small- Family owned | Manual- order inventory over phone | Previuos Year | Once a week | 1 | 30 min- 1 hour | No |
| Bill's Country Kitchen | Small- family owned | Manual- order inverntory as needed over the phone | Make assumptions on expected volume based on peak eating times and seasons | Twice a week | 2 | 2-3 hours | No |
| Crest Beverage | Large- private company | Manually count physical product, key in results to software which is held in a large online database in their network. | Software forecasting system, Vermont Info Process IQfcast | Daily with 1 person, Monthly with 4 people | 5 | 4hours everyday, 4 hours at the end of the month with the team. | No |
| Best Buy | Large Corporation | Web-based inventory control system called, Receiving Service System (RSS) | RSS program, "Inbound allocated" | Updated with every purchase or incoming order electronically, and reflected every business hour (8 times per day) | 12 | 2-3 hour check for physical product. | YES, Sales managers are able to oversee current/future ordering history and help! |
| Wireless Superstore | Small | Currently we just take inventory manually | We keep an Excel sheet for every month and based off that we determine what products are in demand. Also we use a Access system to track sales, however we are in the process of chanching it. | Take inventoty once a week. We need to order inventory every week because of special orders and new products being developed so quickly. | It olny takes one person to take inventory. Management ususally just reviews it. | it takes about 1-2 hours a week. | No, manager controls it. |
| Gap | Large | RFID - LRT guns - WIS Vendor | Look at amount from last year and amount they have on hand currently, every week. | Inventory taken every 6 months, looked at every week. | 1 manager and 1 store employee stays to help their WIS vendor, roughly 20 people from WIS. | Takes about 9 hours when doing full inventory check. | WIS helps them count all their inventory. Manager and employees recount after inventory is taken to double check numbers. |
| Trader Joe's | Large | Manual - then order through buyer. | Look at amount of product sold and decide how well it sold and how much they will need for future. | Inventory looked at everyday. | There is usually a few managers who keep an eye on how the products are selling - depending on shelf space usually, and then they contact the buyers to let them know how much is needed. | It only takes them a few minutes to look the how much is sold. | No vendors are allowed to help control inventory. |

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