Analysis of Vendor Managed Inventory System in Health Industry: A Case Study

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Abstract

Market is moving toward diversification, which requires more product variety, generating demand uncertainty which leads to many managerial problems such as production, planning, forecasting, inventory management, production system, and timely distribution. To reduce the risk level due to demand uncertainty, from raw materials to final customers, should undergo innovative and revolutionary changes. For continuous growth and to remain competitive, the health industries are adopting new approaches; one of them is Vendor Managed Inventory (VMI). This study work identified various elements of VMI and critically examines them to find out which are most important and suitable elements in context to health industries.

Keywords: Health Industry, Vendor Managed Inventory System.

1. LITERATURE REVIEW

Ganeshan (1999) presents a nearoptimal (s, Q)-type inventory policy for a production/distribution network with multiple suppliers replenishing a central warehouse, which in turn distributes to a large number of retailers. The model is a synthesis of three components: (i) the inventory analysis at the retailers, (ii) the demand process at the warehouse, and (iii) the inventory analysis at the warehouse. The key contribution of the model is the seamless integration of the three components to analyze simple supply chains. Herer et al. (2002) stated that the capability of concurrently deploying the lean and agile paradigms, hinges heavilyon the identification of the decoupling point, which, is enabled in turn, by postponement. Postponement strategies, however, present а cross-functional challenge for implementation. As a tactical solution to achieve leagility without postponement, introduce we

transshipments, which represent а common practice in multi-location inventory systems involving monitored movement of stock between locations at the same echelon level of the supply chain. Towill et al. (2003) compares the expected performance of a vendor managed inventory (VMI) supply chain with a traditional "serially linked" supply chain. He compared the bullwhip performance of a number of VMI supply chains with twolevel supply chains and in all cases there is substantial reduction in bullwhip effect. VMI is shown to be significantly better at responding to volatile changes in demand such as those due to discounted ordering or price variations. Inventory recovery is also substantially improved via VMI. Kuk et al. (2004) survey the hypotheses related to the effects of organizational size, emplovee involvement. and logistics integration and find how some of the acclaimed benefits of VMI were subjected to some of the key barriers common in any IT implementation and reengineering initiatives. He fined that establishing trust among supply chain members is another major barrier to the success of VMI. Xie et al. (2006) stated that VMI, vendors specify delivery quantities sent to customers through the distribution channel using obtained from Electronic data Data Interchange (EDI). A model for a VMI system is constructed where vendors can manage stock at the retailers' locations. A supply chain system in this model has been constructed which is composed of m vendors and n identical retailers. Vendors' and retailers' profits can be calculated for different retailer order batch policies. Zhang et al. (2007) discussed an integrated vendor-managed inventory model based on the assumption that the buyer's cycle times may be different and

the vendor's production cycle is an integer multiple of each buyer's replenishment cycle. A solution procedure is derived to determine the optimal investment and replenishment decisions. It is shown through numerical examples that the vendor and all buvers can share substantial cost savings from the ordering cost reduction investment. Zhu et al. (2008) stated that a hierarchy and multicycle simulation model is constructed by Multi-Agent as well. The stock strategy of(S, Q), VMI, and VMI which is combined with revenue-sharing is carried out by discrete event simulation software EM-Plant. As the result, the stock strategy of VMI combined with revenue sharing not only reduces bullwhip effect and average holding stock cost but also distributes the profit of supply chain members reasonable and coordinates the supply chain well.

Zavanella et al. (2009) vendormanaged inventory (VMI) represented an interesting approach to stock monitoring and control, and it has been progressively considered and introduced in several The research companies. proposed investigates the way how a particular VMI policy, known as Consignment Stock (CS), may represent a successful strategy for both the buyer and the supplier. The most radical application of CS may lead to the suppression of the vendor inventory, as this actor uses the buyer's warehouse to products. finished stock its As а counterpart, the vendor will guarantee that quantity stored in the buyer's the warehouse will be kept between a maximum level and a minimum one, also supporting the additional costs eventually induced by stock-out conditions. The buyer will pick up from its store the quantity of material needed to meet its production plans and the material itself will be paid to the buyer according to the agreement signed.

Arora et al. (2010) proposed a quaternary policy system towards integrated logistics and inventory aspect of the supply chain. The first policy is continuous time replenishment policy retailers' where the inventorv is replenished in every time interval. In the next three policies, inventory of the retailers will be replenished by some

definite policy factors. In addition, he developed a framework to measure the end-customer satisfaction level and total supply chain cost incorporating the inventory holding cost, ordering cost and the transportation cost.

Lee et al. (2011) presented and periodic-review analvzed а simple stochastic inventory model to examine the benefits of VMI from economies of scale in production/delivery in а global environment characterized by exchange rate uncertainty and large fixed costs of delivery. He suggest that, despite of all the inventory costs transferred from the retailer, the supplier can be better off when his fixed cost of production/delivery is larger than the retailer's fixed ordering cost. He also suggests that the benefits of VMI may be larger under exchange rate uncertainty. Shu et al. (2012) study and formulate the logistics network design problem (which incorporates the location, transportation, pricing, and warehouseretailer echelon inventory replenishment decisions) as a set-packing model, with vendor managed inventory in which the company is in charge of managing inventory for its downstream warehouses and retailers, and can choose whether to satisfy each retailer's demand and solve it using branch-and-price. Traditionally, decisions are made separately. these Furthermore he uses extensive computational experiments to compare the solution of his integrated decision-making model with the one of the traditional sequential decision-making model.

2. VENDOR MANAGED INVENTORY (VMI)

Vendor Managed Inventory (VMI) originated in the early 1980s with mass retailers demanding vendors to take up the responsibility for inventory replenishment based on sales figures made available by the retailer. Today, the concept of VMI has spread to industries outside retailing like banking as well. VMI promises a win-win situation for both the customer and the bank.

VMI also known as continuous replenishment or supplier managed inventory is one of the most IJESPR

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widely discussed partnering initiatives for encouraging collaboration and among information sharing trading partners. Popularized in the late 1980s by Wal-Mart and Procter & Gamble, it was subsequently implemented by many other leading companies from different industries, such as GlaxoSmithKline, Electrolux Italia, Nestle and Tesco, Boeing and Alcoa etc. It is a supply chain initiative where the vendor decides on the appropriate inventory levels of each of the products and the appropriate inventory policies to maintain those levels. In a true VMI setting, the supplier is given the freedom to plan its own production and decide upon the replenishment schedule as long as the agreed customer service levels are met. This enables suppliers to stabilize their production and to optimize the transportation costs. For the buyer, administration and inventory costs can be decreased.

Enhanced

collaboration between both supply chain partners should reduce lead times and minimize the risk of demand amplification in the supply chain. Regardless of how promising the theory of VMI may appear, actual results of VMI implementations can disappointing. Dong, Muckstadt, be Sabath and Fontanella, interviewed seven executives in the field of Supply Chain Management and quotes one of these saying:"Out of 10 managers VMI implementations, three or four achieve great benefits. Three or four have some benefits, but not as much as anticipated, and two or three do not get any benefits".

many benefits have While heen identified, there are also a number of challenges that may exist in practice and that can potentially reduce the benefits obtained from VMI or lead to failures in VMI programs. For instance, Spartan Stores, a grocery chain, shut down its VMI effort about one year after due in part to VMI vendors' inability to deal with product promotions. Similarly, Kmart cut a substantial amount of VMI contracts because they were not satisfied with the forecasting ability of VMI vendors.

2.1 STEPS FOR VMI IMPLEMENTATION

Each Step in

this process is extremely important. Skipping or not completing any steps will have a major impact on the success of your VMI program. Plan to invest the necessary amount of time on each step. Before you begin the setup process, both the manufacturer and the distributor must be comfortable with using EDI or some form of routine data sharing.

Step 1 – Senior Sponsorship:

Since business paradigm the is changing, senior management must make a firm commitment to this new must have process. VMI senior management sponsorship. It should be identified as a strategic objective and then communicated throughout the organization. Senior management must commit to the costs involved, and the manpower needed for setup/maintenance. For the distributor, they must also become comfortable with the concept of having someone else manage their inventory.

Step 2 – Employee Acceptance:

Get all employees to buy into the concept, especially the person currently responsible for maintaining the inventory levels. Without their acceptance, your program will never work. They must understand that VMI will not push them out of a job. It will free up some of their time to allow them to be more productive in other areas. Employees should be given a complete overview of what VMI will mean to the company and the reasons why it's being done.

Step 3 – Synchronize Files:

Synchronize the Distributors Product Files with the Manufacturers. This step alone is one of the greatest benefits you will receive from VMI. Synchronizing means that you must match the manufacturer's product data with the distributor's product data. Are there old, obsolete items on the file? Are the correct product numbers being used? Have new product numbers been properly communicated to the distributor? Any time there is a change to the product catalogue, the manufacturer must share the data with their VMI partners. Your initial data synchronization is extremely important as well as the ongoing synchronization that will be needed.

Step 4 – EDI Testing:

Extensive testing of all EDI sets to be used. The manufacturer and distributor must work very closely together to validate that the data is being properly sent/received. For example: Does the Quantity on Hand that is being received by the manufacturer match the Quantity on Hand in the Distributor's stock? Is Quantity Sold being properly sent? You should check a variety of items in different categories (A, B, C). EDI testing many take many tries and adjustments before it is finally correct.

Step 5 – Acceptance and

Measurements:

The Distributor must understand and agree with the stocking plan the Manufacturer is creating. Even though the exact method may be a proprietary method, the distributor should still have an understanding of how the plan is calculated. This will help avoid the future question: "Why did they send us this product if we don't need it?"

Additionally, predetermined Inventory Turns, Fill Rates and Service Levels should be targeted. The Distributor should monitor their current performance for comparison to later results. Both parties must agree upon the frequency of replenishment (daily? once/twice per week?). Ideally, the Distributor should have at least one year's worth of measurements prior to VMI for comparison to later results.

Step 6 – Point of Sale (POS) History:

The Distributor sends the Manufacturer his POS (Point of Sale) History file, usually 1-2 years (Disk or Email). This will allow the manufacturer to base the inventory plan on direct sale data rather than data from the distributors past ordering history. The format of the file must be compatible to the needs of the manufacturer. Then the Distributor sends an EDI #852 All Item Refresh. This tells the status and stock level of every item they have. Make sure to verify both sets of data. This will be the last and most important point. Note: The standard #852 only sends those products that had a change in position since the last transmission (if no activity took place for that item, then the item isn't sent). A #852 All Item Refresh sends every item.

Step 7: The Distributor makes a sale and enters that transaction into their computer.

Step 8: On a daily/weekly basis the Distributor sends a #852 Product Activity. This reports a change in position on any item since the last #852.

Step 9: The Manufacturer receives the #852 and updates the Distributors Stock Plan. Once an Item or Items have hit their Reorder Point (ROP), the Manufacturer creates an Order.

Step 10: The Manufacturer sends out an #855 Purchase Order Acknowledgment to the Distributor. This lets the distributor update their system with the newly created PO. During the beginning stages of your VMI partnership, it is important to have the Distributor review the #855 and point out any problems.

Step 11: The Manufacturer picks and ships the order and transmits a #857 Advance Ship Notice. This tells the distributor exactly what is being sent and when it's shipping.

Step 12: When the shipment is received,

the Distributor transmits a #861 Receipt Advice. This tells the manufacturer exactly what was received. The manufacturer can then match this to his Purchase Order to determine any potential problems (miss-shipped, etc.)

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2.2 ELEMENTS OF VMI

TABLE 1.1 ELEMENTS OF VMI

S. No.	ELEMENTS NAME	DETAIL
1	Primary Vendor Program	A primary vendor (PV) is a business concern, external to the hospital that performs many of the hospital primary logistical functions. Under a primary vendor concept, the hospital has prearranged agreements with various manufacturers to distribute their
		products through the PV at an established price. The hospital places the order with the PV through interactive computer system and generally receives order confirmation within 2-4 hours.
2	Relation between Supplier and Hospital	A close relationship between the supplier and hospital is necessary for a successful VMI program in a hospital. Under VMI concept both the parties have their mutual interests. As supplier and buyer enter into a long-term contract, the supplier will work more closely with the buyer to ensure a high quality product in order to maintain the contractual relationship. A long-term relationship will ultimately result in minimum inventories and the elimination of buyer inspection.
3	Elimination of Waste	VMI aims at the elimination of waste of any time at any stage waste under VMI concept is defined as any activity which does not add value. Seven types of wastes have been identified in health care.
4	Respect for Human Resource	Another important element of VMI philosophy in the health care is the respect for people. A contributing factor to the success of VMI is the motivation of the worker to continually produce a quality product. Strong bonds to the organization must be developed and job security must be enhanced.
5	Life Time Employment	In Japan, workers have been guaranteed lifetime employment. This leads to a work force committed to the organization, and motivated to ensure its success.
6	Automation	The Japanese use this technique eliminate dull repetitive tasks. This enables the employee to pursue more meaningful work. Fear of loss of employment through automation/robotics is non- existent due to the Japanese philosophy of lifetime employment.
7	House Keeping (orderliness, cleanliness, discipline, safety)	Housekeeping is the starting point of improvement activities. It brings hidden problems to the surface and eventually eliminates these problems. It not only cleans up the workplace but also boosts the morale of employees.
8	Quality Circles	Teams are formed from voluntary workers who meet to discuss and resolve problems within their operational area. The possible solutions to the problems are then discussed proposed to the management.
9	Job Satisfaction	Satisfaction of employees in terms of working condition, salary, recognition etc.
10	Bottom Round Management	This is management by consensus and emphasizes participation by all employees in the discussion and resolution of management issues.

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11	5's	'5S' is the name of a workplace organization methodology that uses a list of five Japanese words which are Seiri-Organization, Seiton-Neatness (Put things in order), Seiso-Cleaning, Seiketsu-Standardization Shitsuke-Discipline.
12	Team Work	Working together should be heavily emphasized by top management as it is always results in improved performance of an organization.
13	Error Prevention (Poka Yoke)	Poka Yoke, also called mistake proofing, is a simple method to prevent defects from occurring in business processes.
14	Top Management Support	Top management support has been recognized as the most important factor in the implementation of VMI because VMI is an innovative approach, which requires changes throughout the organization as well as the commitment of all people within the organization.
15	Education Program	Establish education programs targeted at the user level to inform personnel of the VMI program, its intentions, merits, and their contributions to its success. The goal is to reduce uncertainty and eliminate fear. Rumors run rampant with any new program. This only serves to confuse program direction, erode motivation, and create fear and uncertainty. Managerial and user education programs, aimed at the very people who will most often interact with a VMI system, must be established early in the program planning stages.
16	Incremental Implementation	When an organization faces a major change in how it conducts business, it is best accomplished in stages. This builds user confidence as experience increases and keeps major operational changes transparent to the user. In other words, as VMI is gradually phased in, supply availability will be unaffected and personnel will not be concerned with how the process has changed.
17	Customer Relationship Management (CRM)	CRM is software by which a patient and doctor can interact with each other. By using the software patient can enter his dietary information, recovery information, symptoms to the doctor and doctor can suggest some important instructions.
18	Flexible Workforce	Hospital services are characterized by fluctuations in demand and supply. Healthcare organizations must be able to successfully balance supply and demand for the service. A flexible workforce is an integral element of VMI. Flexible workforce is often defined as workers with the capacity to perform more than one job. Hospitals can apply this concept to its nursing area. The hospitals can redesign their nursing units according to the concept of patient focused care. This concept includes the use of workers with multiple skills so patients do not have to interact with a new person for every activity or service throughout their day.
19	Case Cart System	A case cart is a vehicle stocked with instruments and supplies designated for a single surgical procedure. A case cart can also be used for multiple cases in which a single drawer is designated for

20	Total Quality Management (TQM)	 a single procedure. The carts are filled using a standard supplies list and/or preference list specific to the surgical procedure. Case carts may be packed and distributed by the sterile processing department or prepared within the surgical services department. Carts are prepared in advance for all scheduled surgery cases, with the earliest cases of the day prepared first, and transported to the operating room. After the procedure, used items are reloaded onto the cart and sent back to sterile processing for disposal or reprocessing. Case carts are also supplied and kept in the surgery cases. TQM is a quality management strategy that seeks to integrate all activities related to quality planning, quality design, quality manufacturing and quality control in any organization.
21	Total Productive Management (TPM)	In TPM, the machine operator is thoroughly trained to perform much of the simple maintenance and fault-finding. Eventually, by working in "Zero Fails" teams include a technical expert as well as operators, they can learn many more tasks - sometimes all.TPM aims at maximizing the effectiveness of equipments.
22	Faster Communication	In today's highly competitive environment no organization can sustain if it does not have information about its competitors. Faster communication is necessary to obtain the information at a rapid rate both at the upstream and downstream of the supply chain of the hospital. For faster flow of information the hospital must use intranet, extranets, mobile technology etc.
23	Customer Satisfaction	Customer satisfaction, a business term, is a measure of how products and services supplied by a company or a hospital to meet or surpass customer expectation. Customer satisfaction is defined as "the number of customers, or percentage of total customers, whose reported experience with a firm, its products, or its services (ratings) exceeds specified satisfaction goals.
24	Planning	Planning is a managerial function. Planning includes planning for purchase, service planning, planning for materials etc.
25	Group Incentive Scheme	Incentives should be given to the employees for their good work.
26	Standardization	Standardization is the development of a set of defined reference conditions and procedures (standards) to consistently apply to a process or artifact to obtain consistent results. Establish a committee to include a Physician Advisor, Nursing, Pharmacy, Material Management, Finance, Purchasing, and Prime Vendor personnel, whose purpose is to standardize material used throughout the hospital.

3. Methodology

Every essential element of VMI may not be easily implemented and some elements are difficult to implement. These problems may be related to in appropriate understanding of VMI methodology or may be related to technical, operational and human problems.

There are some questions related to VMI system:

1. Which are the essential elements of VMI?

- 2. Which elements are important and difficult to implement?
- 3. Which elements can be easily implemented?
- 4. Which elements are highly beneficial in health industries?

This section details the procedures for the study in the following subsections:

- Research design,
- Instrument,
- Survey participants
- Data collection, and
- Data analysis.

3.1 Research Design

This study employed non-experimental quantitative research. Specifically, the design involves mail survey method, which is the most frequently used descriptive research design. This research design requires responses from the health industries personnel and further requires quantitative data analyses. To increase the internal and external validity, the sampling procedure in this study applied the stratified random sampling technique.

3.2 Instrument

A survey was designed to find out the most important elements of VMI which are easy to implement in health industries. The survey consists of comparison based on following common parameters. The parameters are Relation between Supplier and Hospital, Elimination of waste, Automation, Quality Circles, Top Management Support, Education Program, Flexible Workforce, Faster Communication and Group Incentive Scheme etc.

3.3 Survey Participants

questionnaire А regarding the importance and difficulties of VMI elements designed was and distributed/mailed in various health industries. This study uses a mail survey to distribute and gather the data. A mail survey provides the most appropriate method to obtain relevant, up-to-date information from a large number of health industries.

3.4 Data Collection

Data were collected following the selfadministered mail survey method. Selfadministered mail survey has the advantages of relatively low cost and easy access to widely dispersed samples. These people were also assumed aware of the general characteristics of the health industries.

In mailing, the survey sends with:

- The cover letter that informed an overview of the aim of the survey, identification of the researchers,
- ii) Details of the VMI elements chosen for the survey.

After sending the questionnaire, a followup postcard was sent to the participants one week later thanking for their cooperation.

3.5 Data Analysis

The data was analyzed with the help of ANOVA (Analysis of Variance) Technique.

The ANOVA technique is important in the context of all those situations where we want to compare more than two populations such as in comparing the yield of crop from several varieties of seeds. In such circumstances one generally does not want to consider all possible Combination of two populations at a time for what would require a great number of tests before we would be able to arrive at a decision.

4. RESULTS

The questionnaire was distributed in 50 health industries taking 2 employees from each health industries. The questionnaire

was collected from all the health industries successfully with a very good response. Then all the responses were analyzed. The mean score for each element was calculated. There are two tables giving the mean score of VMI elements for importance and difficulties in context of Indian health industries. Table 4.1 and.4.2 reveals the degree of importance and degree of difficulties respectively.

4.1. Degree of Importance of VMI Elements in Indian Health Industries

The following table gives the mean score of Degree of Importance of VMI elements in various health industries.

Sr.	VMI Elements		Mean Score				
No.		5	4	3	2	1	(0-500)
1	Primary Vendor Program	6	16	19	22	37	232
2	Relation between Supplier and Hospital	18	25	27	19	11	320
3	Elimination of Waste	9	33	25	18	15	303
4	Respect for Human Resource	11	8	14	32	35	230
5	Life Time Employment	10	5	15	42	28	227
6	Automation	12	16	22	32	18	272
7	House Keeping (orderliness, cleanliness, discipline, safety)	12	7	14	28	39	225
8	Quality Circles	24	32	17	15	13	342
9	Job Satisfaction	6	11	13	32	38	215
10	Bottom Round Management	5	12	17	23	43	213
11	5's	32	23	19	14	12	349

Table 1.2 Degree of Importance of VMI Elements in Health Industries

Table 1.2 Degree of Importance of VMI Elements in Health Industries

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Sr.	VMI Elements		Mean				
No.		5	4	3	2	1	Score (0-500)
12	Team Work	11	6	16	27	40	221
13	Error Prevention (Poka Yoke)	23	28	22	19	8	339
14	Top Management Support	22	35	18	15	10	344
15	Education Program	17	15	19	30	19	281
16	Incremental Implementation	5	13	14	20	48	207
17	Customer Relationship Management (CRM)	9	11	12	33	35	226
18	Flexible Workforce	20	26	32	16	6	338
19	Case Cart System	6	10	13	25	46	205
20	Total Quality Management (TQM)	38	16	9	25	12	343
21	Total Productive Management (TPM)	10	22	15	26	27	262
22	Faster Communication	16	34	18	15	17	317
23	Customer Satisfaction	38	25	23	10	4	383
24	Planning	4	24	22	21	29	253
25	Group Incentive Scheme	22	14	28	24	12	310
26	Standardization	13	8	17	30	32	240

Table 1.2 indicates that Customer Satisfaction has got the maximum value (i.e. 383), hence is the most important element of VMI for hospitals and Planning got 353, as mean score, which is second most important element of VMI whereas, Case Cart System got 205 as mean, which is the least one, hence it can be termed as least important in health industries in Indian context.

From Table 1.2, other most important elements are Relation between Supplier and Hospital, Elimination of waste, Automation, Quality Circles, Top Management Support, Education Program , Flexible Workforce, Faster Communication, Group Incentive Scheme, 5's, Error Prevention (Poka Yoke), Total Quality Management (TQM), Total Productive Management (TPM) etc.

Table1.2alsorevealstheleastimportantelementsandtheseelementsareLifeTimeEmployment,PrimaryVendorProgram,RespectforHumanResource,CustomerRelationshipManagement(CRM),JobSatisfaction,IncrementalImplementation,House

Keeping, Bottom Round Management, Team Work, Standardization etc.

4.2. Degree of Difficulties of VMI Elements in Indian Health Industries

Table 1.3 gives the mean score of Degree of Difficulties of VMI elements in various hospitals.

Sr.	VMI Elements		Mean Score				
No.		5	4	3	2	1	(0-500)
1	Primary Vendor Program	12	17	14	32	25	259
2	Relation between Supplier and Hospital	6	23	18	15	38	244
3	Elimination of Waste	8	10	13	25	44	213
4	Respect for Human Resource	37	26	17	7	13	367
5	Life Time Employment	6	22	21	24	27	256
6	Automation	13	5	15	20	47	217
7	House Keeping (orderliness, cleanliness, discipline, safety)	6	18	17	23	36	235
8	Quality Circles	7	16	19	23	35	237
9	Job Satisfaction	26	34	22	15	3	365
10	Bottom Round Management	9	13	15	24	39	229
11	5's	31	28	26	10	5	370
12	Team Work	12	14	8	31	35	237

Table 1.3 Degree of Difficulties of VMI Elements in Health Industries

Table 1.3 Degree of Difficulties of VMI Elements in Health Industries

(Continued.....)

Sr. VMI Elements Respons				se		Mean Score	
No.		5	4	3	2	1	(0-500)
13	Error Prevention (Poka Yoke)	15	17	24	21	23	280

14	Top Management Support	8	14	23	25	30	245
15	Education Program	10	7	15	29	39	220
16	Incremental Implementation	9	22	18	24	27	262
17	Customer Relationship Management (CRM)	10	18	34	23	15	285
18	Flexible Workforce	6	12	13	20	49	206
19	Case Cart System	35	37	10	12	6	383
20	Total Quality Management (TQM)	17	19	24	31	9	304
21	Total Productive Management (TPM)	32	36	17	12	3	382
22	Faster Communication	8	11	14	32	35	225
23	Customer Satisfaction	10	17	30	27	16	278
24	Planning	34	27	24	12	3	377
25	Group Incentive Scheme	6	17	18	23	36	234
26	Standardization	12	15	17	9	47	236

From the above table the most difficult elements are Primary Vendor Program, Respect for Human Resource, Life Time Employment, Customer Satisfaction, 5's, Error Prevention (Poka Yoke), Total Quality Management (TQM), Total Productive Management (TPM), Planning, Incremental Implementation, Customer Relationship Management (CRM), Case Cart System, Job Satisfaction etc.

The least difficult elements from Table 1.3 are House Keeping, Bottom Round Management, Team Work, Standardization, Relation between Supplier and Hospital, Elimination of waste, Automation, Quality Circles, Top Management Support, Education Program, Flexible Workforce, Faster Communication, Group Incentive Scheme, Quality Circles etc.

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