

Quick Response in the Textile Industries

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Abstract- The main aim of this paper is to find out the necessity of the QR in business, QR implementation [QRI], the relationship between QR and the supply chain, advantages and disadvantages of QR .This is a summary of the paper based on the book, Quick response- Managing the supply chain to meet the consumer Demand, by Bob Lowson, Russel king and Alan Hunter and some other articles. This article will try to find out the correct path and strategy to success in the production sector. We should gather more knowledge after the further study of different articles and this is the primary process. The article shows the advantages from which manufacturing could achieve: for instance-to improve planning, reduce stockholdings, increase production and improved communication. The producer needs to get the instant supply of the products in order to meet the customer new demand. This is the reason why one must have a good relationship and communication system with the whole production and delivery system. As well as he must have to concern about the transport system.

Index Terms- QR= Quick response, SKU= Stock Keeping Unit, SCM= Supply Chain Management, EDI= Electronic Data Interchange, PoS= Point of Sales, EPoS= Electronic Point of Sales, FMS= Flexible Manufacturing System, UPC= Universal Product Code, SCM= Shipping Container Marking, CAD= Computer Aided Design, CAM= Computer Aided Manufacture, AR= Autoregressive, CPFR= Collaborative planning, Forecasting and Replenishment, VANS= Value Added Networks, JIT= Just-in-time, VMI= Vendor Management Inventory, FMCG= Fast Moving Consumer Goods, ECR= Efficient Consumer Response, RFID= Radio Frequency Information Data, Benchmarking= Follow, JAN= Japanese Article Numbering, ASN= Advanced Shipping Notification, Cross-docking= direct delivery to customer from supplier, Stock out= inventory is finished, Markdown= Price reduction, win-win relationship, Lean & Agile, CIE= International Commission on Illumination, DC= Demand Chain, Lead-time, Modular system= is opposite to classical batch production, Metamorphosis= Transformation.

I. INTRODUCTION

Trouble with traditional supply chain-volatile demands: different firms have various supply chain. Traditionally the whole supply chain took 18 months to deliver the products for a new season. But it is risky in different aspects like- Designer shows as a rule still take place one year ahead of its related season. But months before these designer shows, decisions have already to be taken on colours and fabrics. Of course, the concrete supply chain of the garments is much shorter. Moreover, there are huge differences in this respect within individual companies. The big company like ZARA, H&M can deliver their products to the customer within the 6 to 7 weeks. This is the reason why they can meet the customer various demand which is impossible for many companies in the world. But many companies in the fashion business claim that these are parasites of the fashion system, who take profit of the preparatory work of others, for example by copying their designs. To some extent this may be the case, but the major accomplishment of these fast moving firms is, of course ,to be found in their supply [or demand?] chains .In the eighties, the average lead-time in the apparel industry from raw materials to consumers was about 66 weeks. Of these, only 11 weeks were related to manufacturing, and 40 to warehousing and transit. It consisted of the various bureaucratic in the process. The final 15 weeks the garments were just waiting the store. Nowadays, 12-month lead-times still appear to be quite common. It is estimated that this lead to sale forecast errors of about 40 per cent. Shortening lead-time to nine months already reduces this error margin to 23 per cent. Through implementation of quick response, we can reduce the lead time to a great extent. Each additional shortening of the lead-time with three months leads to an additional reduction of this error margin only about 4 per cent. So, even at the beginning of the season it still is about 10 percent.

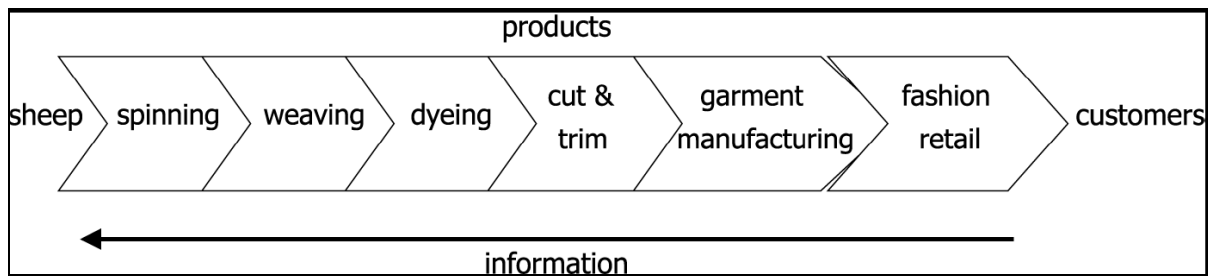


Figure 1: A traditional supply chain.

1.1. Quick response within the organizations: Backdrop, origin, status and outlook:

It was ten years since QR was thought as an improved path for trading in US textile. Since then it is a topic of great interest

in trade, articles have been written, seminars conducted, and talks given but very little have been achieved. But it was not accepted totally. The projected benefits of the QR in the industries are:

- Reduction in pipeline inventories.
- The greater possibility of garments designs and colours being acceptable to the consumer by moving styling closer to the sales date.
- The ability to re-calculate SKU demand at retail and make frequent reorder during the season, thus reducing stock outs and markdowns.
- Greater competitiveness for domestic producers facing increased level of imports.

Quick Response originated in the Textile and Clothing Industry of North America in the 1980's. With the growing complexity and volatility of demand many industries adapted this new strategic proposition to counter their challenges. The historical development of QR was articulated textile industry sponsored research programs by concentrating on the entire apparel pipeline. It was evident that the research revealed many intricacies related to the apparel supply chain due to revenue losses which catered successful development and implementation of QR into SCM.

QR manufacturing techniques further extended into a strategy and culture and as a whole fissured out from the pitfalls of the traditional economics of the apparel value chain smudged by forced markdowns, stock-outs or more precisely lost sales and inventory maintenance costs. Retail shrinkage, could also be considered as a major channel for revenue loss in the recent years. All these, set-up an analogy between lead time and its effects on sales forecasting errors. QR development and adoption was quite inevitable in this environment to achieve lead time and inventory reduction with better flow of information, precise qualities and flexible technologies – in accordance to the consumer's demand.

II. DEFINITION AND CONCEPT

2.1. Lawson defines QR:

A state of responsiveness and flexibility in which an organization seeks to provide a highly diverse range of products and services to a customer or consumer in the exact quantity, variety and quality, and at the right time, place and price as dictated by real-time customer or consumer demand.

The description of the figure 2, QR in total the application that deals with the internet communication of sales data from the retailers to the vendor. Then the vendors within a short time supplying retailers the products needed to return the inventory in stores to level previously determined orders, may be point of sales data combined by the retailer and vendor. It is a diagram of the typical flow of merchandise data in a QR partnership between a retailer and a vendor. Consumers initiate the QR process as they communicate their needs and wants to the store through their purchases. Merchandise information, such as size, style, colour and brand are collected through scanning bar-codes. This information is sent to the vendor via electronic data interchange [EDI] rather than the typical process of remitting a purchase order. These sales data are compared with the inventory model for the store.

Production is ordered for the specific items needed to restore the inventory to the model's requirements. Notification of the expected shipping data is transmitted to the shipper and the retailer. Production orders are transmitted to the plant where the goods are produced. The merchandise is packed and shipped to the retailer. The cycle is complete when floor ready merchandise arrives at the store. The linkages of buyer and producer are must to implement the full process as well as they have a good relationship and unity. Otherwise the QR will not be successful.

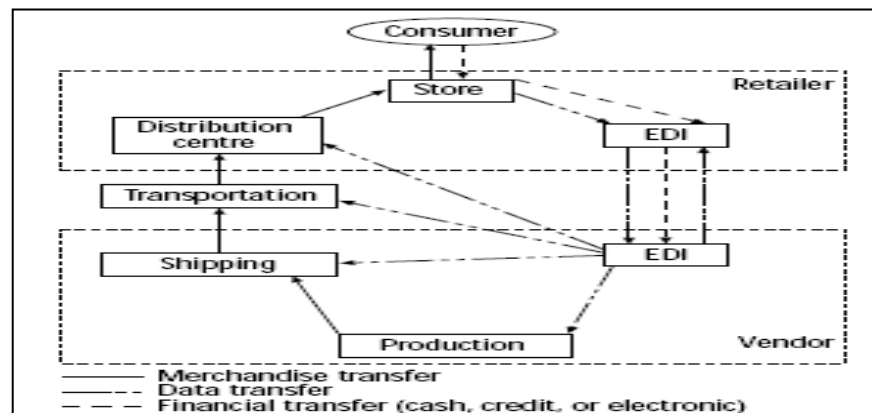


Figure 2: Merchandise and financial transfer with quick response.

III. LEVERAGING QR

Principal elements:

- Up-to-date technology- IT
- EDI
- VANS

- Partnership
- JIT [Just. in-time] Production and logistics.

QR Implementation elements:

- POS tracking,
- FMS.

Now they are shortly described below:

3.1. Up-to-date technology [IT]:

Numerous technological developments are transforming systems in apparel manufacturing and retailing. As a result, relationships between suppliers and buyers are changing dramatically to the benefit of both. QR is only possible through the development of IT. Supply chain members may have implemented some IT systems, but virtual firms with high levels of QR will have implemented most of the following:

- EPoS equipment with UPC bar code scanning at the SKU level;
- EDI or the equivalent Internet system to exchange business documents such as purchase orders and other documentation;
- AR methods;
- Distribution centres to make merchandise floor-ready;
- Cross docking in central and regional distribution centres;
- Shipping container marking [SCM] labels;
- Smaller initial orders;
- CAD;
- CAM and CPFR.

3.2. EDI:

Electronic data interchange is the transmission of business data in structured format between firms who normally do business with each other. The data formats are based primarily on industry standards; these standards permit the sending firm and receiving firm to tailor the data transmission to their own needs. These predetermined formats enable the receiving firm to input the data directly into its own computer applications. Thus EDI supports inter-organisational systems, which transfer data automatically from a firm's computer system to the computer system of its supplier. Within a QR program EDI support sales forecasting system and automatic replenishment programme. Hammond [1993] has described this process. At the point of sale, the barcode on the garment is scanned and SKU is identified. EDI may be used to transmit this SKU information electronically to the appropriate apparel manufacturer, who makes sales forecast by SKU and determines the replenishment quantity required. If the retailers prefer to use its sales forecasting system, the point-of-sale are transferred to this system. The completed sales forecast are used as a basis for developing purchase orders, and then EDI is used to transmit the purchase orders to the manufacturer. In either case, electronic transmissions of the demand data or purchase order reduce both order cycle time and transaction costs.

3.3. VANS:

Different standards and ill-considered systems development has led to expense and incompatibility of QR along the entire supply chain pipeline. The existing sluggish corporate culture, adversarial partnerships and cost burdens, improper handling and transmission of information technology techniques and non-unification of the entire system under a common electronic platform as Value Added Networks [VANS] has in many ways hindered the full-fledged implementation of QR. The role of the value added networks has changed exponentially since the inception of quick response in 1985. At that time they were

looked as being only the telecommunication gateway for the trafficking if the EDI documents were not among several trading partners. These third party networks provided added value by offering retailers and manufacturers alike the ability to translate documents among various versions and computing platforms and transfer them rapidly than the traditional physical form of delivery. Rapidity of delivery collapsed order fulfillment cycle time and this was observed by many as the sector of QR.

3.4. Partnership:

Partnership and alliances are very important in the evolution of QR for creating supply chain synergy by elimination of all process duplications and infrastructures and achieve increased profitability, efficiency and market share. Special QM programs ensure active participation of all the agents in the pipeline with controlled QR element implementation. Bar-coding of merchandise is also quite essential. Proper transaction and inventory management is possible with strict compliance to standards like UPC [Universal Product Code] and NRF [National Retail Federation]. This helps in PoS scanning at the tear-off sections of the retails ensuring rapid communication.

If supply chain members and retailers develop partnerships and are able to participate through collaboration, planning, forecasting and replenishment [CPFR] then suppliers may reduce costs and build their brands, and retailers benefit from having lower stock holdings and fewer stock-outs. If the partnership is successful, the retailer may purchase and stock more of the manufacturer's goods.

3.5. JIT [Just-in-time] production and logistics:

In retailing, it is virtually impossible to plan or to schedule "production" – that is, the demand by consumers for specific merchandise, especially for individual stock-keeping units [SKUs]. JIT, one form of re-engineering, was used at the Nippon Wireless and Telegraph Company in Japan in the early 1960s. Since that time JIT concepts have been adopted by many other firms. Most applications of JIT have been in manufacturing in which production usually can be planned and scheduled, rather than in retailing, where it is impossible to determine the timing of individual sales transactions. In manufacturing, however, if JIT is used, materials used in production are not inventoried; rather, materials are scheduled for receipt only as needed. The underlying principle of JIT is to keep raw or semi-finished goods' inventories as low as possible, maintaining no stock except what is needed for immediate production. Raw materials or semi-finished goods are supplied to the JIT finished goods' manufacturer frequently and at short notice. Thus, the inventory investment necessary when using JIT is close to zero.

3.6. PoS Tracking:

The current position stands out with little changes in most of the areas. Improvements stand out in the form of reduction in inventories, improvement in pipeline management and manufacturing methods with a transition from the classic batch production method to flexible modular system. Significant changes have taken place with benefits in terms of higher customer responsiveness driven via PoS information. QR technologies and its elements like EDI, bar coding etc. are being increasingly adopted by the retailers and the manufacturers

however disappointing statistics are visible in the fields of automatic replenishment, use of re-ordering procedure and PoS data sharing. Dramatic expansion in PoS tracking in the recent years would also attribute to the development of QR with better inventory control, processing of re-orders, SKU management and cost reduction.

3.7. Flexible manufacturing system [FMS]:

QR must also be linked with the production system making it more flexible. FMS in the form of either modular production system or Vendor Managed Inventory [VMI] is essential to respond to the needs of QR ensuring minimum order lead-times, more productivity and effective utilization of resources. Though initial switching costs from traditional production to modular system is high, still this can be accounted as the benefits far outweighs the costs. Even the concept of VMI of maintaining finished goods inventory at a satisfactory level by the manufacturer ensures smaller inventory of goods for the retailers and shorter re-order times. Computer aided design [CAD] and Computer aided manufacturing [CAM], to enable the supply chain to become more efficient. In cutting and marker making, designing both of these machines has a great establishment. Along with rapid designing and product development process [using CAD system], process simulators and Line Balancing Decision Trainers – 3-Dimensional Concurrent Engineering could be followed to have complete system redesigning. It is exceedingly important to understand the product seasonality in considering the implementation of QR philosophies. Products could be 'Basic', 'Seasonal' or 'Fashion' depending upon their shelf life. Depending upon this these merchandise have different characteristics and hence QR requirements. 'Basic' products have marginal demand fluctuation throughout the year with steady requirement. This hardly caters the need to have QR responses for such products though the development of PoS tracking, inventory management and information transaction are quite essential to be implemented. For 'Seasonal' products, QR management becomes essential for organization with multi season assortments, especially during the re-order process. For single season goods, QR implementation is a bit difficult requiring spreading out of manufacturing schedule and inventory operations. However, for multi product lines, this is concurrently easier due to properly spaced product sales and inventory management requirements. For 'Fast Fashion' goods much of research and speculation is inevitable to correctly determine the strategies. QR is an essential requirement to streamline the design-, manufacturing- and logistics- processes to meet the rapid changing customer demand. Benchmarking is also a key requisite for full QR implementation required to change corporate mindset and gauge as according to standards.

IV. BUILDING THE INFRASTRUCTURE TO SUPPORT THE GROWTH

With the basic fashion category, the US-born QR concepts places much focus on the relationship between retailers and the manufacturers of the product. The building infrastructure to support the growth has been summarized by the under mentioned 3 points. [Giunipero ET al.2001]:

Stage1: Introduction of the basic QR technologies: -SKU level scanning, -JAN [Japanese Article Numbering] Barcode, - Use of EDI and use of standard EDI.

Stage2: Internal process reengineering via technological and institutional advancement.-Electronic communication for replenishment,-use of the cross-docking,-small amount of inventory in the system,-small order processing,-ARP [automatic replenishment program],

-JIT [Just-in-time] delivery,-SCM [shipping container marking].-and ASN [Advanced Shopping Notification].

Stage3: Information of a collective supply chain and win-win relationship:-real time sales data sharing,-stock out data sharing,-QR team meets with partnership,-MRP [Material resource Planning].

The model most appropriate for the garments sector has become a role model for QR Programme.

V. CURRENT POSITION OF QUICK RESPONSE IN DIFFERENT INDUSTRIES

The current position stands out with little changes in most of the areas. Improvements stand out in the form of reduction in inventories, improvement in pipeline management and manufacturing methods with a transition from the classic batch production method to flexible modular system. Significant changes have taken place with benefits in terms of higher customer responsiveness driven via PoS information. QR technologies and its elements like EDI, bar coding etc. are being increasingly adopted by the retailers and the manufacturers however disappointing statistics are visible in the fields of automatic replenishment, use of re-ordering procedure and PoS data sharing. Future of QR encompasses the need to develop both short- and long-term goals for future. Over the next 2-3 years it is essential to develop the role of VANS in resolving the QR supply chain problems through wider use of EDI, educational courses in the supply chain pipeline business issues, additional data processing and system integration etc. However the maturation and progression of QR paradigm over the successive years require change in mind set - metamorphosis from forecast driven to demand driven Pipeline. This caters sufficient extension of the strategy into a culture or philosophy through PoS systems to understand underlying trends, have flexible and rapid production techniques and demand-activated manufacturing. RFID [Radio frequency information data] is the new challenge in the field of quick response. As well as lean production is also important.

VI. FUTURE OF QUICK RESPONSE AND CHANGING THE FUTURE OF SUPPLY CHAIN

6.1. Short term:

Short terms means we have to estimate the effect of the quick response in the supply chain for the 1-2 years that means for a short time. Over the next one to two years, the most pressing task for the industry will be to extend the use of EDI to all manufacturers as well as the smaller retail outlets and to forge better links with the textile producers and other suppliers to the garment industry. The role of the VANS may be the most pivotal

in resolving the QR supply chain's problems as they have the technical expertise to effect change among suppliers. The retail community has, in many respects, already relegated to the VANS the task of implementing EDI solutions among their trading partners. Also the competitive environment among the VANS has intensified as the trafficking of electronic documents has become a price-commodity business. The technologies among the VANS, although slightly different, offer similar speed of delivery in real time terms. Since the documents are non-proprietary in nature, no one VAN provides a particular benefit. Product differentiation among the VANS in the near future will be the delivery of "quality information products", as contrasted with speed of delivery: the VAN that can provide the most accurate information to its trading partners will have the strategic advantage. To accomplish this objective, which the VANS will need to maintain or gain share of market, will require more "ownership" of the supply chain. They will have to provide computer software solutions that add value to their information products by increasing the accuracy of the data as they are sequentially or concurrently processed, as well as permitting additional data processing and systems integration. In order for the VANS to implement these value added applications and satisfy their retail customers' needs for quality information products, they will need to change their present training approach to software and solutions to an educational approach. The former stresses how something, be it a product or a process, works, while an educational approach is more concerned with why the product or process exists and how it facilitates or enables improvement or innovation.

In all respects, the VANS, through their value added applications will need to champion ownership in the supply chain if the new coordinating technologies are not to open the door to a different kind of competitor who will use computers and telecommunications. Further, their job will not be complete until they streamline the interconnections, one to another. By this we mean that a manufacturer deals with retailers using different VANS and it should not be his job to sort out to whom he should send what. Already, some progress is being made in this area. Alongside the wider use of EDI must come improvements in the quality of the information being transmitted? UPC errors can be reduced or eliminated through use of such software packages as the bar-code director, now being offered by the major VANS. The reductions just beginning in retail inventories lead to a host of problems for both the short and the long term. We mention only one; that of balancing low retail inventories against desired customer service levels [the complement of stock outs] and supplier and DC lead times. This aspect of QR is not well retail profits. Textile producers and the better dye houses routinely measure the color of their fabrics and could supply CIE coordinates.

6.2. Long term:

The QR paradigm has become clearer, however, a number of initiatives have already been taken. The retailer, once he has worked out how to balance lead times, stock outs, and vendor lead times will start to examine the end-of-season markdown mix of seasonal goods, with its attendant margin loss, and install procedures for re-estimation of demand and the appropriate reorders. The problems associated with fashion merchandise,

while similar, are more complex and call for sophisticated analyses of fashion and color trends. These techniques have yet to be developed. While fashion is, almost by definition, impossible to forecast, we believe that certain underlying trends can be projected, but these projections will require extensive historical databases, and these are not yet being accumulated.

Successful manufacturers will be those making use of PoS data, which can anticipate seasonal demands, estimate shifts from buyer projections, and keep inventories to a minimum, while keeping their textile and other suppliers informed of their own requirements. This kind of juggling act will require very sophisticated software and innovative management. It will also call for flexible and rapid production techniques. It is in these areas that the manufacturer can add real value to his merchandise and tie himself more closely to his customer. This is the surest way to increase competitiveness than increasing the switching cost for the retailer. It is certain that computing costs and speeds will continue to improve and we will soon be at the point where a new aspect of the apparel business becomes possible on a broad scale. This will be a wider use of CAD, extended to include interactive designing of garments with the customer and the retail buyer. A second step will be inclusion of the garment design. In the price and sales catalogue, thus allowing sales preference data series to be established, and the possibility of true color and style forecasting to open up. So far, we have made little mention of the textile and fiber producers. This not an oversight, but reflects our belief that the prime imperative of the pipeline is to broaden and focus the UPC or EDI aspects of the pipeline. Given reliable PoS data and the manufacturer or retailer systems to make use of them, the industry will be in a position to tie into the very sophisticated up-stream systems capable of supporting demand-activated manufacturing. Until this happens, we believe the most important role these large and disciplined enterprises can play is partnering the VANS in their attempts to broaden acceptance of and compliance with EDI standards. However, there is another aspect to such teamwork: developing a financial infrastructure that will allow the small manufacturer invests in the software and services needed to participate fully in the EDI process. The EDI poses problems for many small companies.

VII. QUICK RESPONSE AND VALUE CHAIN MANAGEMENT

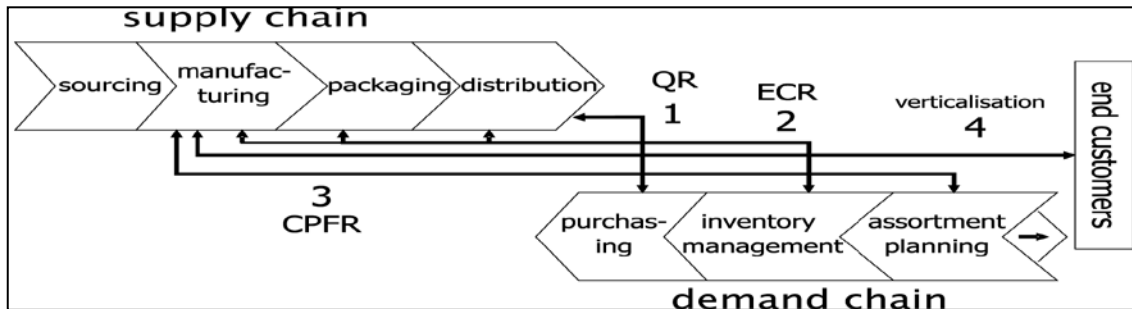
1. The first one is the connection between distributions and purchasing resembles the buyer and seller relationship.
2. Manufacturing, packaging or distribution with inventory management [e.g. based on the customer's POS sales data]. The manufacturer may offer to monitor carefully the customer's inventory levels in order to be able to fulfill future demand more efficiently. This may help these customers to reduce their inventory costs. Ideally, this has to be linked with knowledge about possible seasonal patterns in demand – even for basis apparel like jeans; there appear to be quite seasonal differences in sales patterns. This resembles more efficient consumer response.
3. Manufacturing with assortment planning. "By collaborating on the assortment determination in retailing, for example, the supplier and retailer look together at consumer demand categories that the supplier's products serve. Suppliers are also expected to use this collaboration to improve their

delivery performance”. This resembles CPFR: Collaborative Planning, Forecasting and Replenishment.

4. The supplier may go one step further and try to supply to the end consumer directly, as for example Dell has done in the field of computers. This is the path of verticalization, followed

by some manufacturers-retailers [like Zara], or designer-retailers with outsourced manufacturing. These different possibilities thus shift the “value offering point” of the suppliers ever more downstream in the demand chain. If supplier’s play this game intelligently, this may lead to win-win for both sides.

Figure 3: Shifting the (value offering point) downstream in the demand chain.



VIII. DISCUSSION

Quick response is the communication or data transferring between the different factors of the business, from the retailers or the end customer to the vendors or the manufacturer through the QR implementing elements [for instance: Up-to-date Technology-IT, EDI, VANS, POS tracking, and RFID etc.]. Quick response has a great achievement in reducing the forecast error due to the shorter lead time, FMS, CAD/CAM, partnership and JIT production.

IX. CONCLUSION

The big companies like- Zara and H&M are implementing the quick response and gaining the advantages. Quick response is an automatic choice for any trading company in the world. Because now a day’s people are very fashion concern and their style is changing rapidly because of modernization. So one need to change one’s production plan in different times of year. One can do this by assistance from the QR in different times of a selling season. But the total infrastructure should be active and dependable. In results, one can shine in this competitive business world.

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