IMPACT OF INVENTORY MANAGEMENT IN DOWNSTREAM CHAINS ON CUSTOMER SATISFACTION AT MANUFACTURING FIRMS

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Abstract:

The intention was to explore the relationship between inventory management and customer satisfaction in the downstream of manufacturing firms in Pakistan. A quantitative research design was used to found the said relationship. The study consisted of total sample size of 160 respondents with 100 respondents from retailers and 60 were from distributors. The findings of this research specified a significant positive relationship between customer satisfaction and inventory management.

The Pearson correlation coefficient values for retailers and distributors were .889** with $p < 0.01$ and .801** with $p < 0.01$ after using the variables named customer satisfaction and inventory management respectively. Inventory management had significant influence on customer satisfaction and this was also shore up by the value of adjusted R square. The adjusted R square value indicated that independent factors anticipated the dependent factors by 71 %. In conclusion, this research discovered that chain members required using enhanced and superior information systems for better inventory management and well coordinated customer collaboration consequently leading to higher levels of customer satisfaction.

Keywords: Inventory management; customer satisfaction; customer collaboration

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1. Introduction and Background

The research on inventory is to be indeed necessarily done as the inventory is becoming more sophisticated part of business. It involves major costs in the form of raw materials, work in progress holding and caring costs. The collaboration which helps in the sense of feedback is very necessary for higher inventory turns, repeat purchases, customer loyalty and delivery of quality products on time with minimum lead times after maintaining the inventory levels for higher levels of customer satisfaction. Distributors and retailers are the major stake holders in the chain of manufacturing firms which are differentiated as extended and unmitigated chains of middlemen, which mean extended chains among consumers and members of chains (Bibangambah, 2002). These chains are called downstream chains (Krausse. et al., 1998). Clients are interested in the provisioning of the items and the capacity which a firm has for fulfillment the needs of the customers on time (Gunaskaran .A. et al., 2001). Customers formulate their decisions to purchase again and again depending on the offered services from associated partners of the chain. Non-availability of inventory has terrible impact on customer satisfaction with in the downstream chain for this reason it leads to profit loss (Vander .Y. et al., 1996).

1.1 Statement of the Problem

For downstream chains inventory management and customer satisfaction are critical features. By means of inventory management and customer satisfaction the firms endeavor to match demand with supply. However, Manufacturers face problems of inventory management which is consequently affecting its capability to satisfy loyal consumers.

1.2 Purpose of the Study

This research required to explore the relationship in downstream of Manufacturers between customer satisfaction and inventory management.

1.3 Research Objectives

The objectives of this research are:

1. To know the impact of inventory management over customer satisfaction in downstream of Manufacturers.

1.4 Research Questions

The research questions are:

What is the relationship between inventory management and customer satisfaction in downstream of Manufacturers?

1.5 Study Scope

1.5.1 Geographically scope. This research focused the downstream of Manufacturers located at Karachi. The study was carried out from distributors and retailers within the region of Karachi.

1.6 Gaps and Significance / Contribution of the Study

Researcher found scarcity of work on inventory management and customer satisfaction in Pakistan and found so many gapes in inventory management for customer satisfaction. This research would find importance of effective inventory management and customer satisfaction.

The study would helpful for following:

1. The research findings would help in designing mechanisms which ensure that better inventory management lead to get better satisfaction of customers.
2. This research would add to the presented research on management of inventories and satisfaction of customer in down streams of firms.
3. Provide knowledge and opportunity to future researchers.
4. The conclusion of this research will enlighten the students who are under academic career in the same area.
5. The findings will provide guide to manufacturing firms in designing policies.

1.7 Limitations of the Research

i. The research bothered some issues in terms of time, editing the work each and every time after having corrections, disobliging and uneducated respondents.

ii. The researcher was self financed and endured too many expenses for accomplishment of this research work.

iii. Hence less work done on inventory management and customer satisfaction Due to this reason researcher found scarcity of text.

Literature Review

2.0 Introduction

The literature relating to this research is the central theme of this chapter. This chapter was segregated and this segregation resulted three parts. The chapter includes literature, hypothesis and the conceptual framework. Here the conceptual framework was the foundation of literature review.

2.1 Customer Satisfaction and Inventory Management

Improved customer satisfaction can be achieved by better inventory management (Eckert, 2007). On time orders fulfillment by suppliers satisfies customers (Wilding, 2003). This crafts chain members to keep safety stocks for execution of purchaser's orders or go into long term relations who need loyalty and trust (Wang and Lee, 2000). Loyalty is a wish for to maintain a relationship and can be distinct in three dimensions; inputs to it, its robustness and its constant uniformity. Just in time, vendor management inventory and consignment inventory allow members of the chain to please customer's needs by providing on time deliverance which insist the customer for repetition of purchases (Wang, 2002, Arnold. et al., 2008). It points out with the intention of purchaser fulfillment is achieved by decreasing cycle time of order and it guides that through decreasing production lead time of the manufacturer the deliveries to the purchaser should be on time. Buyers get pleased while merchandisers are quick to respond as well as they have flexibility in responses (Vander. et al., 1996). Customers want to get defect free products (Davidson, 2001).

2.1.1 Flexibility and inventory management. When the seller is ready to alter his/her plan to settle the purchaser's unanticipated needs and ensuring availability of products/services in line with specific requirement of purchasers is said to be flexibility (Gunaskaran. et al., 2001). This is principally hurt when unanticipated problems arise for the needs of purchaser. Sellers having elasticity for adjustment will have immediate reaction according to requirements of firm which is buying (Ginemez and Tachizawa, 2005). It requires motivation to alter procedures/policies for inventory (Lee .H. and Cheung, 2002). The thing which permits a seller for being willing for quick reaction with client needs is flexibility (Romano, 2003). The downstream chain's flexibility is difficult for gratifying purchasers' altering desires in rivalry and vague situations

(Ndubisi .N., 2005). For being flexible members of the stream need to keep surplus stock for meeting the client orders instantly and reducing the lead times can also help (Ayad, 2008). On the other hand most probably clients will never come back if he/she practicing a bad experience, it results a lot of sales lost for members of the stream (Corsten.D. and Gruen.T.W, 2002).

2.1.2 Customer loyalty and inventory management. Customers furnish information regarding all goods and services offered by members of the chain (Blatherwick, 1996). Customers are able to switch their business somewhere else and this decision is very easy for them if a manufacturer distributor or retailer is not able to offer good service by ensuring accessibility of goods (Blatherwick, 1996). If stream members are not able for price competition then, about these types of failures buyers will show their conscious very soon which results in the form of loyalty shift. Client expectations regarding range, new products, promotions and service needs members of the chain to be flexible (Howgego, 2002).

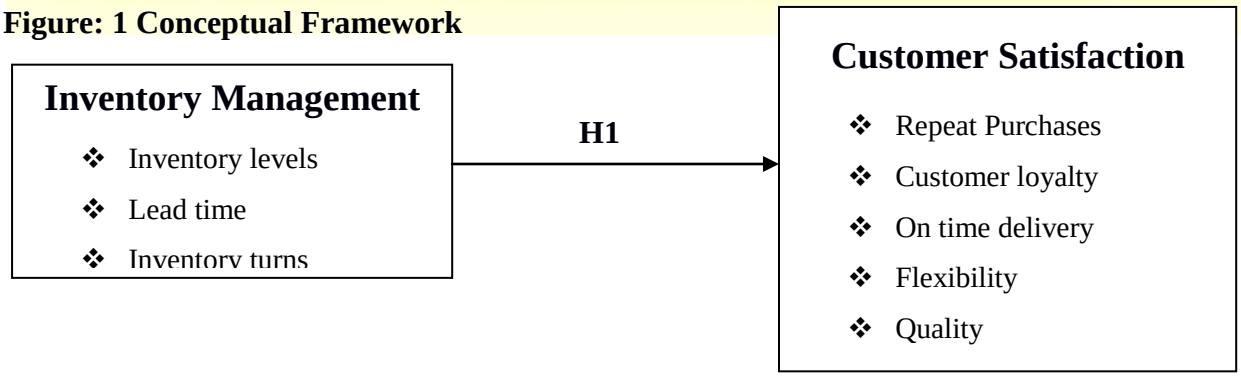
For checking the brand loyalty of the customers, seller has to offer and should do evaluation of customer satisfaction before purchase and after purchase (Agarwal, 2007). Members of the chain have to build up end to end integrated collaboration which minimizes overheads, enhanced delivery as well as management of inventory and ultimately loyalty of customer (Howgego, 2002).

2.1.3 Quality and inventory management. Customers want to get defect free products (Davidson, 2001). It requires commitment, incorporation amongst retailers, distributors as well as manufacturer for fulfillment the expectations of customer which changes frequently (Chelsom, 1998). When it comes to quality in inventory management, it is very important for long-term constancy. It can directly affect the profits, both in the short-term and long-term. Also surplus or deficient inventory can decrease revenue (Vicki A. Benge, 1999). For satisfaction of clients, the job of fulfilling their instant requirements is very difficult, it demands offering the exact product in the right place and at the time when they need it. Chain members ensure in time delivery of goods that the buyer actually desires with the help of JIT like systems.

2.1.4 On time delivery and inventory management. Buyers called satisfy when manufacturers, distributors and retailers delivers services or products as and when required. Members of the chain keep high levels of inventories in their stocks (Koumanakos, 2008). The customers require the products at their required times and these stocks minimize the wait time of that product to deliver it (David, 2001). However keeping high levels of inventories just work for standardized goods (David, 2001). Members of the chain have to be elastic to satisfy buyers' requirements on priority (Gunasekaran, 2001). To be elastic, members of the chain may required to keep high stocks or by customer collaboration which guides members of the chain to be elastic by giving timely information which directs to improved inventory management and customer service (Elram,1999).

2.1.5 Repeat purchases and inventory management. Stream members are facing a problem of maintaining those customers who are loyal to them (Agarwal, 2007). For repeat buyers it is essential to offer evaluation of satisfaction before purchase and after purchase. Evaluation of satisfaction regarding pre purchase considers condition of transport, quality, flexibility and reasonable charges, when it comes to post purchase, it considers activities like management of service which heavily depend on reverse logistics process (Amini, 2005). Firms are keeping buffer stocks and minimizing the uncertainty due to which members of the chain are saving their customers which were not due to non-provisioning of goods (Anonymous, 1998). Catering market trends as well as customer behaviors can facilitate members of the chain to fulfill buyer requirements and to handle inventory information efficiently (Lee and Kleiner, 2001). If product does not fulfill requirements of consumer then they will not return back for product (Stuart, 2005).

Figure: 1 Conceptual Framework



Source: Kwon and Suh, 2004; Lee .H. and Cheung, 2002; Ratinasingam .P, Pavlou .p and Hau Tan .y., 2002.

2.2 Hypothesis

Ho1: Active consideration of effective inventory management at downstream members has no effect on customer satisfaction.

2.3 Model Description / Discussion on Hypothesis

As the effective and efficient inventory management at downstream chains of manufacturers satisfies the customers in a better way. Improved inventory management decreases surplus inventory, improved product projections, enough capacities, assurance in planning of production and due to superior service accessibility of goods, (Lee .H. and Cheung, 2002). Improved management of inventories brings satisfaction for clients in better way with better flexibility which lead to customer satisfaction (Suh and Kwon, 2004; Ratinasingam .P. et al., 2002).

2.4 Key Findings

As the review indicates, inventory management is a vital downstream problem which affects customers' satisfaction. Inventory management challenges can interfere with a company's profits as well as customer service. They can cost a business more money and can lead to an excess of inventory overstock that is difficult to move. Most of these problems are usually due to poor inventory processes and out-of-date systems. Inventory management has a considerable influence on customer satisfaction.

3. Methodology

3.0 Introduction

This chapter was divided as design of research, design of sample, measurement of variables, population for targeting, size of sample, research instruments as well as sources of data collection, analysis of data as well as confronted limitations while conducting this research.

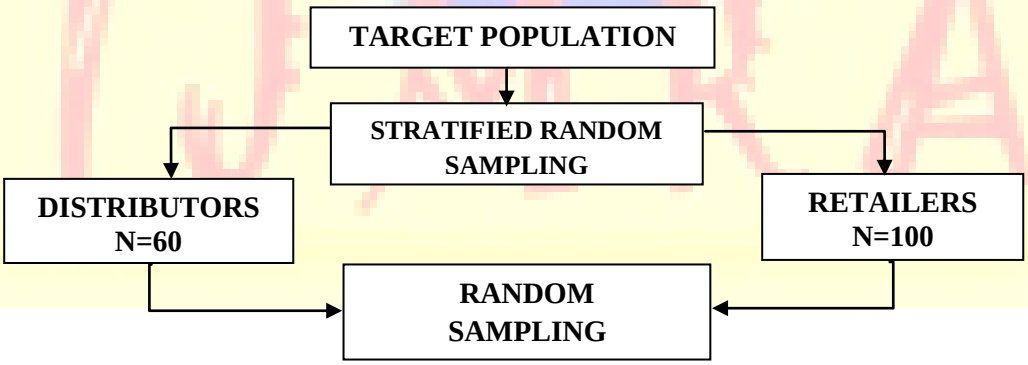
3.1 Research Design

The method was based on the research questions that how the questions can be answered for this purpose researcher implemented stratified random sampling designs. For gathering of primary data, structured questionnaires on 5 point Likert scale were used. Secondary data was taken while using case studies, internet browsing and reports to support the findings obtained in primary data. Data obtained from respondents was sorted according to its nature. This was done to change the available information into a more acceptable form then data analysis done with the aim of finding the nature of relationships among variables by using Microsoft Excel and SPSS software.

3.2 Target Population and Study Area

Distributors and retailers located at Karachi were chosen which are downstream members and major players in supply chain of Manufacturers. Questionnaires were distributed and filled by managers of the retail stores and distribution centers not considering whether they were proprietor or just managers of those businesses. The researcher restricted himself to Karachi because it has edge of being a strategic business hub where corporations are located as well as enriched with cultural diversity as compared to other cities of Pakistan.

Figure: 2 Target population and sampling techniques



3.3 Sample Size

Morgan and Krejecie (1970) were used to draw sample size. The sample was taken from population of distributors and retailers located at Karachi city. The sample of 60 was drawn from distributors and 100 were from retailers with total sample size of 160. Total distributed

questionnaires were 191 but out of these numbers 160 respondents successfully filled and returned back to researcher for analysis. The successful response rate was 83.76 %.

Table: 1

Type of Business	Respondents	Sample size
Retailers	100	120
Distributors	60	71
Total	160	191

Table: 1 Total population, respondents' count and sample size

3.4 Sampling Techniques

Researcher implemented stratified sampling design. Stratification is segregation of population into subgroups, which are retailers and distributors. Among every stratum then random sampling was used which represents the whole population with equal probability of selection (Daren S.; Moore; Daniel S.; David S., Yates, 2008).

3.5 Methodology / Instruments and Data Collection

Structured questionnaires were used. The questionnaires were distributed in respondents after that researcher collected filled questionnaires from respondents. A five point Likert scale was used with 1 for strongly disagrees to 5 for strongly agree.

3.5.1 Sources of Data Collection

3.5.1.1 Primary Data Sources. Primary data acquired from respondents by utilizing structured questionnaires to acquire data on study variables.

3.5.1.2 Sources for Secondary Data. For this research variables secondary data was taken, while using case studies, internet browsing and reports to support the findings obtained in primary data.

3.6 Measurement of Study Variables

The researcher measured inventory management by applying Patel and Gunasekaran (2001), customer satisfaction by applying Vazquez (2004) and Mentzer .J.T. (2002).Inventory management measures consisted of inventory levels, order lead time and inventory turns. Customer satisfaction measures consisted of repeat purchases, customer loyalty, on time delivery, flexibility and quality.

Table 2

Retailers' Cronbach's Alpha	Distributors' Cronbach's Alpha
.940	.888
Table 2 Test of Reliability / Validity	

The tool used for this pretest consisted of variables which have already been used by the researchers and for this reason have recognized validities and reliabilities. On the other hand the reliabilities of the variables, which have been used, were again reestablished. Retailer's constructs have reliability of .94 and distributor's constructs have reliability of .88. Reliabilities of variables which were used by researcher were greater than 0.7 and demonstrating that the relevant items have realistic internal consistency and reliability. More than a few research journals acknowledge if one or two variables have the alpha in the range of 0.70 to 0.95 (Mohsen .T., 2011).

3.7 Research Techniques

3.7.1 Data processing. Data was sorted according to its nature, tabulated, summarized, edited and coded. This was done to make the available information into a more acceptable form.

3.7.2 Data Analysis. After collecting back the questionnaires from respondents, editing as well as coding of data was done then analysis of that data was carried out. Data analysis carried out by using the Microsoft Excel and SPSS software for finding the variables' correlation which they have among each other. The relation among satisfaction of customer and inventory management examined by Pearson correlation coefficient (originating relations among each construct, its trend as well as its significance), statistical technique of multiple regression (concludes; that how

much dependent factor influenced by the analytical power of independent factors), test of finding reliability (conducts assessment and produces constant and reliable results) were also adopted, T-tests (finds variations in observations regarding constructs with contrast to characteristics of sample) and analysis of variance ANOVA tests (which concludes dissimilarities among group means and their associated procedures).

Presentation and Analysis Findings

4.0 Introduction

Chapter four is important portion of the research. It is presenting the observations and results' were also analyzed in this chapter. This chapter incorporates response frequencies trough tables and figures, correlation analysis, descriptive statistics, regression analysis, T tests and analysis of variance test (ANOVA). The study tested the objectives.

4.1 Descriptive Statistics

4.1.1 Response frequencies. In figures 3 and 4 the mode of retailers' and distributors' (respectively) responses on 5 point likert scale against variables were taken to test whether the responses are significantly supporting the hypothesis to reject or accept. Here the percentage values are significantly supporting to reject the null hypothesis.

Figure: 3

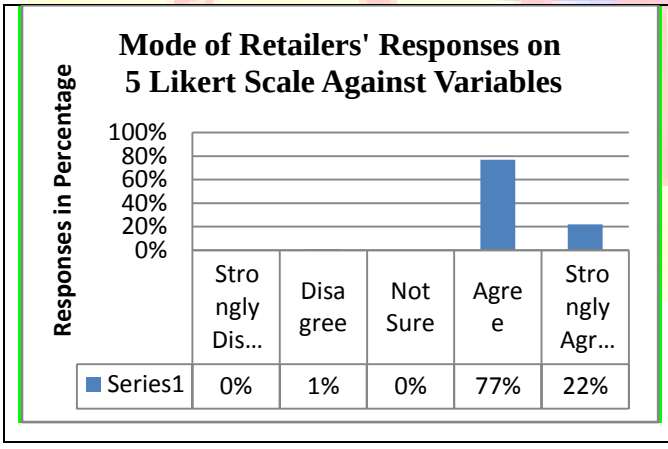


Figure: 4

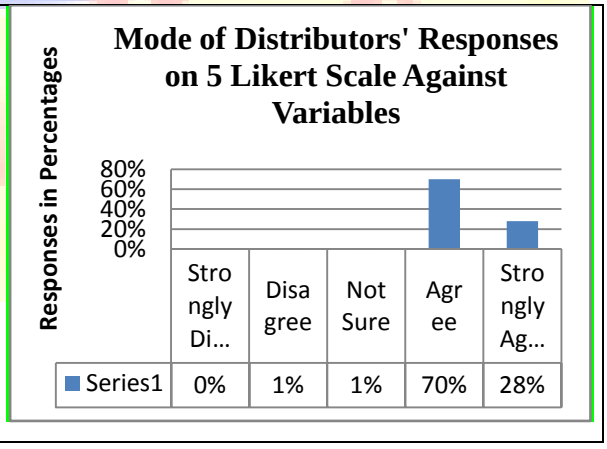


Table: 3

Retailer (N=100)		
Variables	Inventory Management	Customer Satisfaction

	M	SD		
Inventory Management	4.19	.430	1	.889**
Customer Satisfaction	4.23	.458	.889**	1
Distributor (N= 60)				
Variables			Inventory Management	Customer Satisfaction
	M	SD		
Inventory Management	4.29	.517	1	.801**
Customer Satisfaction	4.23	.481	.801**	1
**Correlation Significant at 0.01 level 2-tailed test				

Table 5: Correlation Matrix

4.1.2 Pearson correlation. Uniqueness of the variables was tested through Bivariate Correlation by taking the correlations of all the constructs on one to one basis. The inter item correlation results suggests that the data fulfill Correlation validity requirement, which are presented in Table 3. The hypothesis were tested in light of stated correlation which state the under mentioned trends.

4.1.2.1 Hypothesis testing (null hypothesis). Ho1: Active consideration of effective inventory management at downstream members has no effect on customer satisfaction.

In table 3 for retailers, we found significant positive correlation among customer satisfaction and inventory management with Pearson value of .889** (M=4.19, SD=.430, N=100 p=0.0<0.01) while Pearson coefficient of .801** (M=4.2933, SD=.51745, N=60 p=0.0<0.01) for distributors. These values are suggesting that decreases or increases in one variable relate to decreases or increases in other variables directly. It rejects the null hypothesis and proves that active consideration of inventory management improves customer satisfaction.

4.1.3 Significance of constructs. Table 3 showed the relationships were significant at the level of 0.01 (2-Tailed). In the research all variables are significant enough with the value of 0.000. This value is less than .01. Because of this, we can conclude that there is a statistically significant correlation among all stated constructs and have significant impact.

4.2 Regression Analysis

The researcher used the regression analysis. By using Multiple Regression in SPSS the predictor variables were entered simultaneously.

Table: 4

Variables		N	Mean	Standard Deviation	Model Summary		ANOVA	Coefficients			
					R	Adjusted R Square	F	Sig. (1 tail) *p*	x St. Beta Coefficient	t	Sig. (1 tail) *p*
Inventory Management	Retailers	100	4.19	.430	.889	.788	368.567	.000	.889	19.198	.000
	Distributors	60	4.29	.517							
Customer Satisfaction	Retailers	100	4.23	.458	. 801	.635	103.479	.000	.801	10.172	.000
	Distributors	60	4.23	.481							
xStandardized Beta Coefficient (Dependent Variable = Customer Satisfaction)											
Table: 10 Regression Analysis											

In our table 4 the results showed the distributors comprised a higher mean score in inventory management with a mean score of 4.29 (N=60) whereas retailers comprised the lowest mean score of 4.19 (N=100). In customer satisfaction the retailers and distributors comprised the same mean scores with a mean score of 4.23 (Retailer' N=100, Distributor's N=60).

Retailers' and distributors' model summary gave R values (.899), (.801) and Adjusted R square values (.788), (.635) respectively. Thus, these models are predicting 79% and 64% of the variance in customer satisfaction respectively. These are good models as these are meeting our assumptions.

ANOVA values expressed F=368.567, $p<.001$) for retailers and F=103.457, $p<.001$ for distributors and these values are significant enough and predictors significantly predict customer satisfaction.

The retailers' and distributors' Coefficients expressed that Standardized Beta give a measure of the contribution of each variable to the model. Large values of inventory management which are .889, .801 respectively indicated that a unit change in these predictor variables have large impact on the customer satisfaction. The t=19.198, 10.172 and Sig (p) < .001 values for retailers and

distributors respectively, give a rough indication of the impact of each predictor variable – a big absolute *t* value and small *p* value suggests that inventory management is having a large impact on the customer satisfaction. Hence inventory management is the variable which is significantly adding anything to the prediction.

Summary of Findings, Conclusion and Recommendations

5.0 Introduction

This research emphasized and draws affiliation among customer satisfaction and inventory management. Research was conducted for discovering whether in downstream satisfaction of customers could be recognized by inventory management. This section of study got segregation of five segments; summary of findings, reporting the results, conclusions, recommendations and further research areas.

5.1 Discussion of Finding

These discussions are basing on the findings which are in relation with the study questions.

5.1.1 Relationship between inventory management and customer satisfaction. The correlation values expressed a positive significant association among inventories management and customer satisfaction. Our results were supported by Eckert (2007) which states active considerations of inventory management by fulfilling customer's needs lead to better satisfaction of customers.

Satisfaction of customers was achieved when orders were fulfilled on time by their suppliers. This is the reason due to which chain partners were compelled to maintain safety stocks for fulfilling the orders of customers or go into extensive strong relations which involve trust as well as commitment (Wang, 2002). A good managed inventory improved inventory turns, repeat purchasing, minimized returns of inventory, increased flexibility and customer loyalty due to superior quality (Wang, 2002). Without active considerations of improved inventory management customer needs cannot be fulfilled on time.

The findings found out that the significance importance of inventory management in the T-test which mean that the inventory management still need intentions so the conventional and simple methods of managing the inventories by lacking in best systems, which is also lagging them in sharing of information and management of their inventories well in downstream members. Lastly the regression values expressed that inventory management had the highest beta coefficient for both retailers and distributors which meant that more emphasis should be for inventory management.

5.2 Conclusion

The results of this research discovered a strong positive significant relation among inventory management and customer satisfaction which expresses that effective and efficient inventory management is necessary to get superior customer satisfaction among chain members.

5.3 Recommendations

This research mainly focused on inventory management and customer satisfaction in the downstream; the subsequent recommendations were furnished.

This research suggesting that for effective and efficient inventory management chain members should apply information systems, like POS, ERP, EDI and many other systems which should be used to make available the desired information. These systems will also be used to manage inventories efficiently among chain members; consequently will lead to customer satisfaction. The stated systems will be used to handle the levels of inventories, increase inventory turns and its lead time efficiently; ultimately these factors will endorse on time delivery, repeat purchase, customer loyalty, quality and flexibility therefore will lead toward customer satisfaction.

5.4 Further Research Areas

This research mainly focused on inventory management and customer satisfaction. For further research: impact of information technology on customer satisfaction, supply chain practices and its implementations, automated systems and its impact on inventory management, impact of back log inventories on performance, impact of inventory returns on performance and impact of

customer collaboration and inventory management on performance. These areas still require more work to be done specially in Pakistan.

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