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# Benefits Derived From Warehouse Management System By Small Manufacturing Firms

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**ABSTRACT**

*Proper warehouse management brings in numerous benefits to small scale firms in the form of increased productivity, high turnover, ready availability of stock, meeting demands of diverse markets etc. The present study explores the benefits derived from warehouse management system in supply chain of 44 small scale units operating in district Udhampur of J&K State. The research framework was examined by empirical analysis of primary data collected. Validity and reliability of the scales in the construct were assessed through BTS and Cronbach-alpha. The results of ranking tables revealed that the main variables taken into consideration were: "High throughput rate", "Reduced order processing costs" and "High productivity". The variable "Reduced order processing costs" scored highest rank among all. High productivity was accorded second rank followed by high throughput rate with third rank by most of the firms.*

**KEYWORDS:Warehousing, Supply Chain, Small Scale Industries (SSIs), Warehousing, Management System (WMS).**

## INTRODUCTION

Warehousing operations in supply chains leads to immense utilities in terms of meeting timely demands and regular supply of goods & services etc. Warehouses are primarily for receiving, storing, picking and shipping goods (Hatton, 1990 & Dawe, 1995) and are synonymous distribution centre, transshipment, cross dock, or platform centre and all types of nodes in a distribution network (Rouwenhorst et al., 2000). De Koster et al. (2007) broaden the ambit of warehouses for storing or buffering products (raw materials, goods-in-process, finished products) at and between points of origin and points of consumption. The main activities identified that are communicated with other management information system are "High throughput rate", "Reduced order processing costs" and "High productivity"

## REVIEW OF LITERATURE

The literature related to warehousing management in the context of supply chain is scarce, though few things quoted by eminent authors had been taken care of. Warehouses are the final point in the supply chain for order assembly, value added services and despatch to the customer, represents approximately 20-24 per cent of total logistics costs (Herbert W. Davis & Co., 2005 and Dadzie & Johnston, 1991). Warehouses are critical to the achievement of customer service levels (Frazelle, 2002). Warehousing management in SC attributes for general sales growth by potential improvements in productivity, order accuracy, reduced space requirements, increased volume capacity, control of inventory and increased customer service (Adams et al., 1996). The present study explores the benefits derived from warehouse management system by small manufacturing firms.

## RESEARCH DESIGN AND METHODOLOGY

Research design and methodology comprises area of research, nature of data/information (Primary or secondary), questionnaire/schedule, research tools applied etc. The research methodology adopted proceeds as follows:

### Sampling and data collection

The primary data for the study were collected from 44 functional manufacturing SSIs registered under District Industries Centre (DIC), Udhampur of J&K State sub-divided into ten lines of operation comprising cement (8), pesticide (3), steel (3), battery/lead/alloy (5), menthol (2), guns (2), conduit pipes (2), gates/grills/varnish (5), maize/atta/dal mills (3) and miscellaneous (11). Census method was used to elicit response from owners/managers of the SSIs. Information was collected by administering self developed questionnaire prepared after consulting experts and review of literature which comprised of general information and various statements (19) of warehousing management. Items in the questionnaire were in descriptive form, ranking, dichotomous, open ended and five-point Likert scale. The data collected was further analysed with the help of SPSS (Version 16.00) for purification, checking validity and reliability. Ranking tables were used to elicit meaningful responses from the data.

### The Survey Instrument

The survey instrument for managers was sub-divided into general information and information about dimensions of warehousing management based on ranking and ordinal scale (5<---->1) ranging from 'strongly disagree' (1) to 'strongly agree' (5). The primary data were collected by making four to seven visits for getting response from managers. The secondary information was collected from various journals namely, International journal of supply chain management, Journal of supply chain management, International journal of production & distribution management, International journal of logistics management and from other sources like books, magazines, empirical papers from online journals & hard copies of journals, annual action plan and other documents published and unpublished.

### Reliability and validity of the instrument

Reliability: The Cronbach's reliability coefficients for all 18 scale items underlying four factors within the domain of warehousing management ranges from 0.631 to 0.853. The alpha reliability coefficients for F1 (0.833), F2 (0.853) and F3 (0.846) is higher than the criteria of 0.77 obtained by Gordon and Narayanan (1984) indicating high internal consistency. F4 (0.631) is also at a minimum acceptable level of 0.50 as recommended by Brown et al. (2001) and Kakati and Dhar (2002) thereby obtaining satisfactory internal consistency. However, the overall alpha reliability score for all factors is also satisfactory at 0.790. Adequacy and reliability of sample size to yield distinct and reliable factors is further demonstrated through Kaiser-Meyer-Olkin Measure of Sampling Adequacy that is 0.671 and all factor loadings between items and their respective constructs being greater than equal to 0.55.

Validity: The four factors obtained alpha reliability higher & equal to 0.50 and KMO value at 0.671 which indicate significant construct validity of the construct (Hair et al., 1995).

## DATA ANALYSIS AND INTERPRETATION

Factor analysis was applied to the collected data and the suitability of data was examined through Anti-image, KMO value (0.671), Bartlett's Test of Sphercity (456.51) (p-value = 0.000), Principal Component Analysis and Varimax Rotation (Dess et al., 1997 & Field, 2000). The process of R-Mode Principal Component Analysis (PSA) with Varimax Rotation brought the construct to the level of 18 statements out of 19 statements. Therefore, factor loadings in the final factorial design, are consistent with conservative criteria, thereby resulting into four-factor solution using Kaiser Criteria (i.e. eigen value ≥1) with 67.01% of the total variance explained, i.e. 18 items got grouped in four factors. The communality for 18 items ranged from 0.58 to 0.90, indicating moderate to high degree of linear association among the variables. The factor

loadings range from 0.621 to 0.892 and the cumulative variance extracted ranges from 20.37 to 67.01 percent. The percentage of variance explained by each factor came out to be F1 (20.37%), F2 (18.94%), F3 (17.93%), and F4 (9.97%).

Table 1.1 promulgates the benefits derived from warehouse management system (WMS) in 44 small manufacturing firms operating in district Udhampur of J&K State. These 44 small manufacturing firms have been divided into ten lines of operations namely cement (8), pesticide (3), steel (3), battery/lead/alloy (5), menthol (2), guns (2), conduit pipes (2), gates/grills/varnish (5), maize/atta/dal mills (3) and miscellaneous (11). The variables taken into account were: "High throughput rate", "Reduced order processing costs" and "High productivity". The variable "Reduced order processing costs" scored highest rank among all. High productivity is accorded second rank followed by high throughput rate with third rank. The ranking categorisation is done as follows:

a) The first variable; "High throughput rate" was accorded rank three by almost all the forms except cements & guns industries. This factor received the last rank among all the variables.
b) The second variable taken into consideration was "Reduce order processing costs". Four group of industries namely: Pesticides/Insecticides, Conduit pipes, Menthol, Guns ranked one to this variable and the rest six group of firms namely: Cements, Battery/Lead/Alloy, Steel, Gates/Grills/Varnish/Paint, Atta/Maize/Dal mills and Others (Miscellaneous) ranked two to this variable. The overall mean score of this factor is one as represented by Table 1.1.
c) High productivity was the third variable and it received rank one by five group of firms namely: Battery/Lead/Alloy, Steel, Gates/Grills/Varnish/Paint, Atta/Maize/Dal mills and Others (Miscellaneous). It was given rank two by two group of firms i.e. Conduit pipes and Menthol and rank three by two group of firms namely: Cements and guns. The overall mean score of this variable is ranked two.

In the nutshell, managers perceives that the major benefit of warehouse management system is reduction in order processing costs which in turn helps in reducing overall costs and enhancing profitability.

## CONCLUSION & MAMAGERIAL IMPLICATIONS

The research provides an insight into the main activities being performed by warehouses of small manufacturing firms operating in District Udhampur of J&K State. The main activities taken into consideration were: "High throughput rate", "Reduced order processing costs" and "High productivity". The variable "Reduced order processing costs" scored highest rank among all. High productivity is accorded second rank followed by high throughput rate with third rank. The findings of the study is limited to small scale industries of district Udhampur of J&K State, so results drawn cannot be generalized for medium or large scale industries functioning in other parts of country having dissimilar business environment.

**Table 1.1: Unit-wise Ranking of Benefits Derived From Warehouse Management System**

| Units/Benefits | High throughput rate | Reduce order processing costs | High productivity |
|---|---|---|---|
| Cement | 1.8 (I) | 2 (II) | 2.1 (III) |
| Battery/Lead/ Alloy | 2.8 (III) | 2 (II) | 1.2 (I) |
| Pesticides/ Insecticides | 2.3 (III) | 1.3 (I) | 2.2 (II) |
| Conduit pipes | 3 (III) | 1 (I) | 2 (II) |
| Menthol | 3 (III) | 1 (I) | 2 (II) |
| Guns | 1.5 (II) | 1.4 (I) | 3 (III) |
| Steel | 2.6 (III) | 2 (II) | 1.3 (I) |
| Gates/Grills/ Varnish/Paint | 2.2 (III) | 2 (II) | 1.6 (I) |
| Atta/Maize/Dal mills | 2.3 (III) | 2 (II) | 1.6 (I) |
| Others (Miscellaneous) | 2.2 (III) | 2.1 (II) | 1.5 (I) |
| **Mean & Rank** | 2.2 (III) | 1.81 (I) | 1.86 (II) |

Note: Where 1 denotes "highest rank" and 3 denotes "lowest rank"

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