

₹ 200

ISSN - 2249-555X

Volume : 1

Issue : 9

June 2012



Journal for All Subjects

[www.ijar.in](http://www.ijar.in)

Listed in International ISSN Directory, Paris.



ISSN - 2249-555X

# Indian Journal of Applied Research

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## Warehouse Management Information System: A New Perspective in Supply Chain Management

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### ABSTRACT

*Warehousing management information system contributes to abundant benefits such as improved customer service, reduction in inventories, effective space utilization etc. The present study explores the benefits of warehouse management information system acquired by 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 WMIS results in increase in production, inventories reduction, effective space utilization, competitive advantage, shortening of lead times etc.*

**Keywords : Warehousing, Supply Chain, Small Scale Industries (SSIs)**

### INTRODUCTION

Supply chain in simple words means sequence of partners/members/intermediaries engaged or involved to supply & manage the flow of manufactured products to the ultimate customers. These partners/members/intermediaries are known as channel functionaries encompassing suppliers, manufacturers, wholesalers, retailers and the ultimate customers. These members collaborate and work together by forming a chain (to ensure the goods to the markets (customers)) known as supply chain.

Warehouse management information system is a planet which creates information hub regarding different activities performed by warehouses such as, increase in overall production, reduction in inventories, effective space utilization, fosters competitive advantage, shortening of lead times and reduction in errors. "The efficiency and effectiveness in any distribution network in turn is largely determined by the operation of the nodes in such a network i.e. the warehouses". Reduction in material handling, increase accuracy levels, improvement in service consistency & availability, increase speed of service are the main decision criteria in warehousing management (Drury & Falconer, 2003). Customer service failings at the warehouse level can have significant impacts on companies in terms of sales & profits, market share, brand switching, competitive capabilities (Stalk et al., 1992) and picking efficiency (Gibson & Sharp, 1992).

### LITERATURE REVIEW

Warehousing management is defined as "the direct control of handling equipment producing movement and storage of loads without the need for operators or drivers" (Rowley, 2000). Proper warehousing management in Supply Chain 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 (Tarn et al., 2003). A survey of large warehouses in the United Kingdom indicated that over 50 per cent of the floor area is generally taken up by storage, with most of the remaining area being used for the associated goods-in, order picking, packing and despatch activities (Baker, 2004). 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.

### RESEARCH METHODOLOGY

#### 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 which comprised of general information ranking questions and 19 statements of warehousing management. 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 was based on ranking and ordinal scale (5<---->1) ranging from 'strongly disagree' (1) to 'strongly agree' (5). The primary data were collected by making three to four visits for getting response from managers. The secondary information was collected from various sources namely books, empirical papers from online & hard copies of journals.

#### Reliability and validity of the instrument

Reliability: As evident from the Table 1.1, 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) thereby obtaining satisfactory internal consistency.

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 INTERPRATATION

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 Sphericity (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  $\geq 1$ ) 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.

Table 1.1 divulges the warehousing costs incurred by organisations and their respective mean ranks. The different costs incurred in warehousing includes "Warehousing rent", "Rates & taxes", "Communication, postage & stationary", "Salaries/wages" and "Loss due to pilferage/leakage". The main warehouse costs incurred by firms is salaries & wages to employees as revealed by its mean and rank (1.5 & I). The other cost incurred is related to communication, postage & stationary which scored second rank. Rates and taxes are accorded rank third, followed by loss due to pilferage/leakage with rank fourth. Warehousing rent is given rank fifth by almost all the

firms which connotes that maximum of firms operating are having their own warehouses.

Table 1.2 heralds the benefits derived from warehouse management information system. The factors specified are "Increased productivity", "Inventories reduction", "Better space utilisation", "Competitive advantage", "Shorter lead times" and "reduced errors". Increased productivity appeared with rank I, inventories reduction revealed rank II, shorter lead times scored rank III, better space utilisation rank IV, competitive advantage rank V and reduced errors rank VI. So, managers perceives that warehouse management information system helps in increasing productivity, reducing inventories and paves way for competitive advantage.

### CONCLUSION

The research provides immense contribution of warehousing in supply chain management and its effectiveness. 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 Warehousing Costs Incurred by SSIs**

Units/Costs	Warehousing rent	Rates & taxes	Communication, postage & stationary	Salaries/wages	Loss due to Pilferage/leakage
Cement	3.6 (IV)	2.5 (II)	2.8 (III)	1.7 (I)	4 (V)
Battery/Lead/Alloy	1 (I)	3.2 (III)	4.4 (V)	2.4 (II)	4 (IV)
Pesticides/Insecticides	2.5 (III)	2.4 (II)	4 (V)	1.6 (I)	3 (IV)
Conduit pipes	4 (IV)	2.5 (III)	2.4 (II)	1 (I)	5 (V)
Menthol	5 (V)	4 (IV)	3 (III)	2 (II)	1 (I)
Guns	2 (II)	3.5 (IV)	3.5 (III)	1 (I)	--
Steel	4.3 (V)	3.3 (III)	1.6 (II)	1.3 (I)	4.3 (IV)
Gates/Grills/Varnish/Paint	4.4 (V)	2.4 (II)	3 (III)	1.4 (I)	3.5 (IV)
Atta/Maize/Dal mills	4.5 (V)	4 (IV)	3 (III)	1.3 (I)	1.5 (II)
Others (Miscellaneous)	4 (V)	3.4 (IV)	3 (III)	1.5 (I)	2.7 (II)
Mean & Rank	3.5 (V)	3.1 (III)	3 (II)	1.5 (I)	3.2 (IV)

Note: Where 1 denotes "highest rank" and 5 denotes "lowest rank"

**Table 1.2: Unit-wise Ranking of Benefits Derived From Warehouse Management Information System**

Units/Benefits	Increased productivity	Inventories reduction	Better space utilisation	Competitive advantage	Shorter lead times	Reduced errors
Cement	1.6 (I)	1.8 (II)	4 (IV)	4.7 (V)	3 (III)	5.6 (VI)
Battery/Lead/Alloy	1.6 (I)	2.2 (II)	3.6 (IV)	5.2 (V)	3 (III)	5.4 (VI)
Pesticides/Insecticides	2.6 (II)	1 (I)	5.3 (V)	3.6 (IV)	2.6 (III)	5.6 (VI)
Conduit pipes	1 (I)	3 (II)	4 (V)	3.5 (IV)	3.5 (III)	6 (VI)
Menthol	1 (I)	4 (IV)	2 (II)	5 (V)	3 (III)	6 (VI)
Guns	1.5 (I)	2 (II)	4.5 (IV)	4.5 (V)	2.5 (III)	6 (VI)
Steel	1.3 (I)	3 (III)	3.3 (IV)	4.6 (V)	2.6 (II)	6 (VI)
Gates/Grills/Varnish/Paint	2 (II)	1.8 (I)	3.8 (IV)	4.8 (V)	2.6 (III)	6 (VI)
Atta/Maize/Dal mills	2.3 (III)	1.6 (I)	4 (IV)	5 (V)	2 (II)	6 (VI)
Others (Miscellaneous)	1.4 (I)	1.7 (II)	4 (IV)	4.4 (V)	3.6 (III)	5.7 (VI)
Mean & Rank	1.6 (I)	2.2 (II)	3.8 (IV)	4.5 (V)	2.9 (III)	5.8 (VI)

Note: Where 1 denotes "highest rank" and 6 denotes "lowest rank"

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