

Internal Customers Satisfaction on Material Handling Management of Al Imam Factory, Kingdom of Saudi Arabia

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Abstract - The importance of materials handling stems from the intrinsic relationship that it has in the production flow. Any imbalance or disruption that occurs, it ruptures the supply chain. These disruptions in the system creates logistics problems which will ultimately cause customer dissatisfaction. Managing the flow of materials from their original sources of materials to the ultimate customers is important to the success of the organization. This study assessed the internal customer satisfaction levels on material handling management of Al Imam Contracting and Trading Co., provider of intralogistics in Kingdom of Saudi Arabia. It intended to explain the relationship of the material handling principles on the material handling management of the said company. The study used descriptive and inferential analysis to explain the significance of the material handling principles on the internal customer's satisfaction. System integration, automation, and environmental principles were statistically significant on the internal customer's satisfaction. Internal customers were satisfied with the material handling management, and they agree on all material handling principles. The study suggests that the company must review its operational efficiency of the material handling system.

Keywords

Keywords: Material handling, material flow, material handling management, service level, internal customer, internal customer satisfaction.

INTRODUCTION

Materials Handling Industry (MHI) defines material handling as “the movement, protection, storage and control of materials and products throughout manufacturing, warehousing, distribution, consumption and disposal”. It includes processes related to the movement of either an individual product, packed, or bulk either in solid or semi-solid form by gravity, manually, or equipment operated by and within the limits of production or service creation (Kumar & Saresh, 2007). Material handling is part of the product costs but is considered non-value adding activities. Cost and efficiency of handling system are important factors to consider in selecting the materials handling equipment.

Automation of material handling operation improves consistency, reduce costs, and reduces or eliminates occupational hazard. The integration of material flow and information management through computerized material handling system increases operational efficiency, predictability, and responsiveness (Hegaru, 2015).

Many studies indicate that materials handling management improvement have positive effects on production. However, employees play major roles in both area's production and materials handling. The case study of Vieira, et al. (2011) on automobile industry in Brazil, effective improvement in the material handling increases the internal customers' overall satisfaction. Agility, reliability in service, and lower costs are the factors that explained the improvement in the overall satisfaction.

Studies on organizational quality revealed that the closer the organizations meet customers' expectation, the more effective the organizations. Similarly, the effectiveness of internal organization units can be measured by the degree of internal customers' satisfaction (Gilbert, R., 2015). When internal customers of work units are satisfied, the network of

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iKSP Journal of Innovative Writings (2021) 2(2): 38-44

organization units are more likely to work effectively together to accomplish the overall objectives of the organization. Internal customer satisfaction identified as the network of any company which built on a series of processes and deliveries that generate a product or service. Each link in this network is a different section that serves the next link to support each other to achieve the target. If there is a weak link, the internal customer satisfaction will suffer, so the entire company including the external customer will suffer.

For employees, distributors, vendors or departments because internal customers add a whole new perspective to business management. Improved internal customer satisfaction will ultimately lead to a more efficient production process, better service and ultimately to more satisfied external customers. This study established the following objectives.

1. To analyze the internal customers' satisfaction levels relative to materials handling management.
2. To determine the materials handling principles that affect the materials handling management of Al Imam Contracting and Trading Co.
3. To examine the significant relationship between the level of satisfaction of the internal customers and materials handling principles.

HYPOTHESES DEVELOPMENT

The materials handling system design process is a complex problem and should be divided into smaller subsystems. Hassan (2010) designs a framework outlining steps to take while designing materials handling system (MHS). MHS consists of hardware, software, and human and sub-managerial devices that work together to carry out all material handling activities. The device is the largest subsystem and includes many physical items such as transport and storage equipment, identification, and other factors. The MHS program ensures the communication between the hardware components, as well as the material handling system with its environment. Finally, the human management subsystem deals with MHS operations, and aims to operate it efficiently in relation to the company's manufacturing strategies.

The College Committee for Material Handling in Pittsburgh, USA in 1990 prescribes twenty basic guidelines and principles that can be used for effective planning and control of material handling. The fundamental MHS design principles are as follows: the planning, system, materials flow, simplification, gravity, space utilization, unit size, mechanization, automation, equipment selection, standardization, adaptability, deadweight, utilization, maintenance, obsolescence, control, capacity, performance, and safety. These principles were used and modified by many authors such as Tompkins et al. (1996), Neiman (1992), and Cowell et al. (2008).

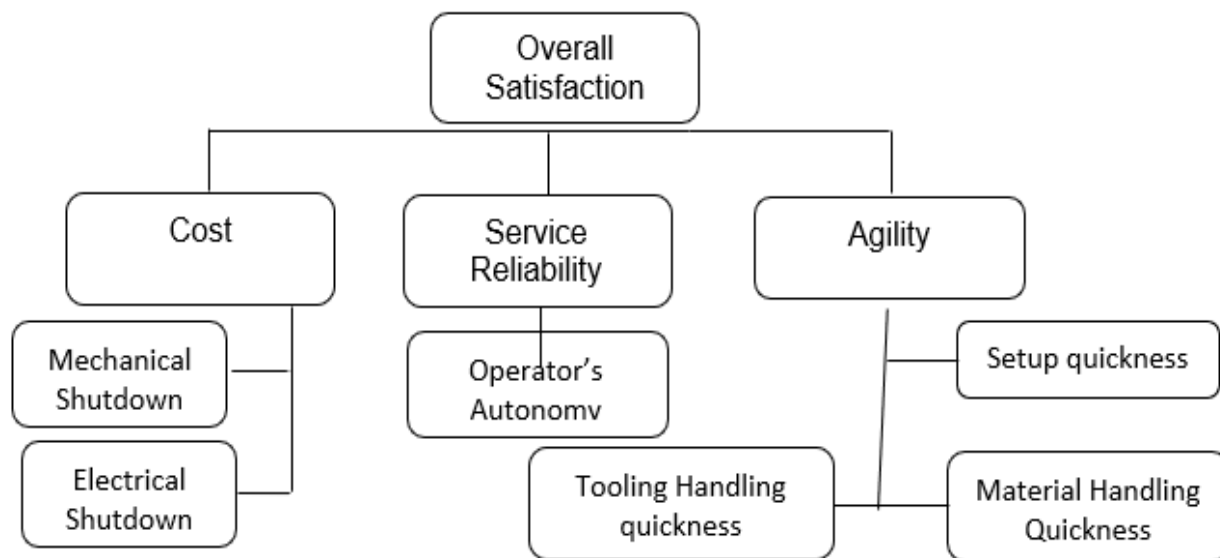


Figure 1. Model of Satisfaction of Material Handling Management (Vieira, 2011)

The relevance of materials handling emanates from the intrinsic relationship that it has with the production flow. The material flow principle provides the operation sequence and planning of the equipment, which improves the material flow. Based on the study conducted by Vieira, G.B, et.al., it was noted that internal customers understood that effective materials handling management system increased reliability and service agility, reduced costs which can attribute to the overall satisfaction of internal customers.

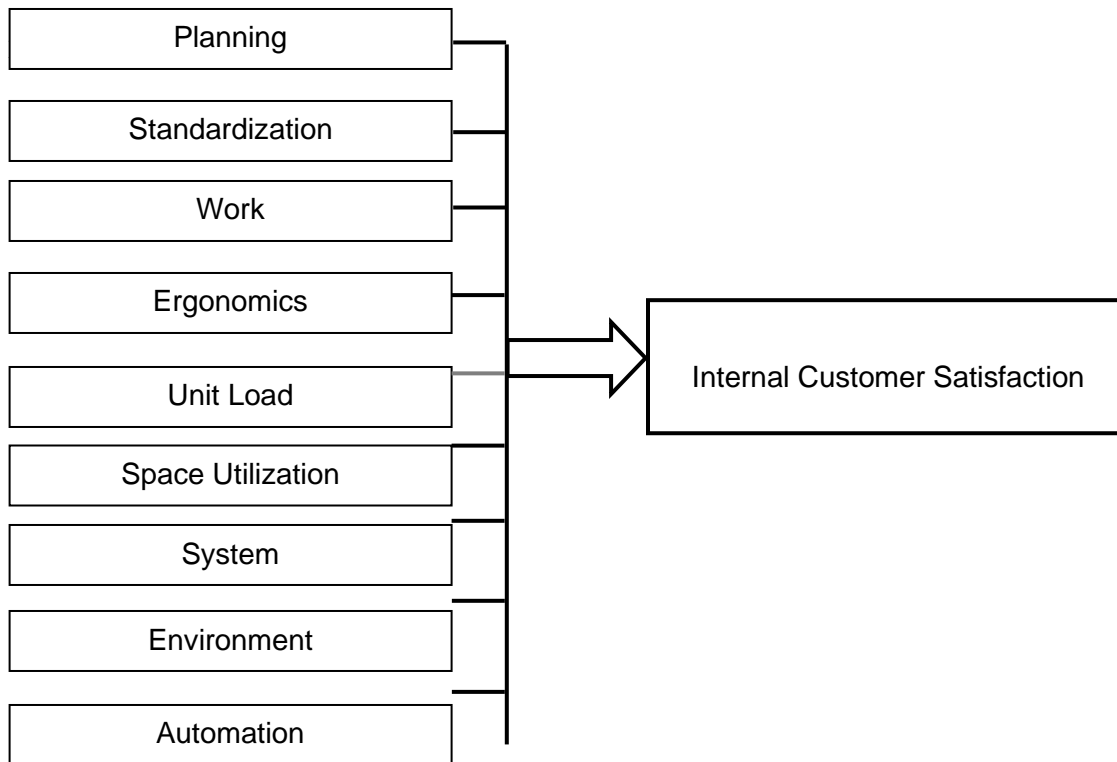


Figure 2: Conceptual Framework

In designing the material handling system, it is essential to refer to the industry's best practices to ascertain that the processes and equipment are attuned with the objective, requirement of the company, as well as the principles of material handling. By analyzing the objective of the material handling process and aligning it with guidelines, intelligently designed system improves customer service, reduces inventory, shortens delivery time, and reduces total handling costs in manufacturing, distribution, and transport (MHI).

Material Handling Industry (MHI) specifies 10 material handling principles to ensure that all equipment and processes located where the facility is and works together as a standard system. These are the planning, standardization, work, ergonomics, unit load, space utilization, system, environment, automation, and life cycle cost. The following null hypotheses was be drawn and tested at a 0.05 level of significance.

Ho1: There is no significant relationship between the internal customers' satisfaction levels and the following materials handling principles

1. Planning
2. Standardization
3. Work
4. Ergonomic
5. UnitLoad
6. Space Utilization
7. SystemIntegration
8. Automation
9. Environment

METHODOLOGY

The research design showed the overall flow on how the study was carried out to answer the issues identified in the research problems and objectives. This study utilized the descriptive method and correlational research designs. The goal of a descriptive research is to study a phenomenon that is happening at a particular time and place. On the other hand, Correlational research involved the collection of data in verifying if there exists a relationship between two or more quantifiable variables and to what degree is the relationship. If a relationship is established between variables, it means that values on one variable vary with the values on another variable. By examining the relationship between variables,

insights on the nature of the variables as well as the relationships among them are obtained such as the nature, degree, and direction of the relationship. The respondents of the study were the internal customers of Al Imam Contracting and Trading, Co. a provider of full range of intralogistics and a trusted partner for forklift trucks, warehouse equipment and racking solutions in Saudi Arabia.

Internal customers as defined in this study, were the employees of the company who were directly involved in the material handling operation. Respondents were categorized into procurement, operation, and distribution.

The data obtained were analyzed and descriptive statistics were used in the summary and interpretation. Frequency count was used to determine the number of respondents' responses involving their demographic profile. Weighted mean was used to obtain the interpretation of the respondents' responses from the 5-point Likert scale. Regression analysis was used to determine the relationship effect between the independent variables (planning, standardization, ergonomic, unit load, space utilization, automation, environment, and system integration) and the dependent variable (internal customer satisfaction). The responses gathered were organized, summarized, and tabulated for statistical treatment of data. Statistical Platform for the Social Sciences (SPSS) was used in the analysis and production of statistics. The statistics generated helped the researcher in the presentation and interpretation of the findings of this study.

RESULTS

The results of the study show that majority or 61% of the respondents has bachelor's degree; 26% have masters' degree; and (13%) were under bachelor. In terms of working with the organization, 15.6% respondents worked below 2 years; while 40.3%, between 3 to 5 year; 18.2%, between 6 to 10 years; and the remaining 18.2%, above 10 years. In terms of working experience, 2.6% of the respondents have less than 2 years; 23.4% with 5 years; 32.5%, with 10 years, (22.1%) have 15 years; 7.8% with 20 years; and 11.7% with more than 20 years working experience.

Table 1 Respondents' demography

Demographic Characteristic		Frequency	Percentage
Academic Qualification	Under Bachelor	10	13.0
	Bachelor	47	61.0
	Master	20	26.0
	Total	77	100.0
Employment with the organization	Below 2 years	12	15.6
	3-5 years	31	40.3
	6-10 years	20	26.0
	Above 10 years	14	18.2
	Total	77	100.0
Working experience	less than 1 years	2	2.6
	1-5 years	18	23.4
	6-10 years	25	32.5
	11-15 years	17	22.1
	16-20 years	6	7.8
	More than 20 years	9	11.7
	Total	77	100.0

Table 2 Correlation between Internal Customer Satisfaction and Material Handling Principles

	Planning	Standard ization	Work	Ergono metric	Unit Load	Space Utilization	System Integration	Automat ion	Environm ent
Satisfac tion	0.148	0.194	0.176	0.149	0.113	0.197	0.259*	0.245*	0.242*
	0.198	0.092	0.125	0.196	0.328	0.086	0.023	0.032	0.034
	77	77	77	77	77	77	77	77	77

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2 presents the correlation of internal customers satisfaction level and the material handling principles. The results show that material handling principles, planning ($r=0.148$, $p=0.198$); standardization, ($r=0.194$, $p=0.092$); work ($r=0.176$, $p=0.125$); ergonomics, ($r=0.149$, $p=0.196$); unit load, ($r=0.113$, $p=0.328$); and space utilization, ($r=0.197$, $p=0.086$) have no significant effect on the internal customers satisfaction level. The results further show that at 5% level of significance, the following material handling principles, system integration with $r=0.259$, $p=0.023$; automation, with $r=0.245$, $p=0.032$; and environmental with $r=0.242$, $p=0.034$, have significant effect on internal customer satisfaction levels.

The main objective of this study was to determine the material handling principles and internal customers satisfaction levels of Al Imam Contracting and Trading, Co. The study revealed that internal customers were satisfied on the aspect of agility of the company which is the company ensures that the forklifts and other operating equipment are well maintained. The result confirms the study of Vieira, G.B. that agility is one of the factors that increase the overall satisfaction of the internal customers. Further, the result indicates that respondents neither satisfied nor dissatisfied on the sub-factor service reliability, safety in service and costs. Company to specifically identify forklifts' operators for the handling of materials and provides financial budget for the maintenance of the forklift and other operating expenses. The company is reliable in handling materials.

Table 3 Summary of Material Handling Principle that affect Materials Handling management

Factors	Mean score
Planning principle	3.996
Standardization principle	3.956
Work principle	3.928
Ergonomic principle	3.964
The unit load principle	3.853
Space utilization principle	3.961
System principle	3.941
Automation principle	3.955
Environmental principle	3.939

The result of the study shows that internal customers agree that the material handling principles, planning, standardization, material handling flow, ergonomic, unit load, space utilization, system integration, automation and environmental have an effect on material handling management of Al Imam Contracting and Trading, Co.

The study conforms with the Material Handling Industry (MHI) principles that company must adhere with the material handling principles to ensure that all equipment and processes located where the facility is and works together as a standard system.

When evaluating a material handling system, several factors must be considered, including plant facilities, machinery, material handling equipment, and of course the people involved. Simulation techniques can be used effectively throughout all stages of this process to understand the behavior of manufacturing systems, from defining the concept of material handling throughout the final implementation of the system through factors that affect the level of internal customer satisfaction. The study revealed that planning ranked the highest and according to Cowell et al. (2008), the planning principle addresses all material handling and storage activities to increase overall operational efficiency.

The study accepts the null hypothesis that planning, standardization, work, ergonomic, unit load and space utilization principles have no significant relationship with internal customer satisfaction since all p -values are higher than 5% significance level. The study rejects the null hypothesis that there is no significant relationship between the internal customers' satisfaction and the following material handling principles; namely, system integration, automation, and environmental principles since the p -values are lower than the 5% level of significance.

CONCLUSION

The study derived the following conclusions after analysis and interpretation of the data. The study revealed that majority or 61% of the internal customers have bachelor's degree, 55% have total work experience between 5 to 10 years; and 56% were with the company for 2 to 5 years. The internal customers were neither satisfied nor satisfied with the material handling management of the company. On sub-factor, agility, internal customers agree that the company ensures that the forklifts and other operating equipment are well maintained. The result of the study shows that internal customers agree that the material handling principles, planning, standardization, material handling flow, ergonomic, unit load, space utilization, system integration, automation and environmental have an effect on material handling management of Al Imam Contracting and Trading, Co.

On the aspect of standardization principle, flexibility, standardization, and modularity of the material handling operation are compatible with the plan. The manager determines the methods and equipment that perform a variety of tasks under variety of operating conditions; standardization process applies to container sizes and other load forming; and flexibility, standardization, and modularity if it is compatible with the plan. On the aspect of work principle, respondents agree that the company simplifies the operational aspects by adding, reducing, shortening, or eliminating unnecessary movement of equipment. The company uses gravity to transport materials or to aid their movement with due regard to safety and potential product damage. On ergonomic principle, the company's workplace design includes safety measures for the handling of materials, and the plan promote simultaneous product engineering, process design, process planning, and materials handling methods.

On the space utilization principle, the company ensures that the work areas are not crowded, the storage areas are accessible and have enough capacity, and Storage area design considers the mobility of the forklift and other operating equipment. On the system integration, the company has an integrated system that include supply chain and logistics management, Information flow and material flow combined as concurrent activities, on integrated system provides product or materials identification, location, and condition within the facilities. On the environmental principle, company ensures the containers, platforms and other products used are reusable when possible and/or degradable as appropriate, provides appropriate safety measures on oil spillage and combustion materials, and ensures proper handling of hazardous substances. The study accepts the null hypothesis that planning, standardization, work, ergonomic, unit load and space utilization principles have no significant relationship with internal customer satisfaction since all p-values are higher than 5% significance level. The study rejects the null hypothesis that there is no significant relationship between the internal customers' satisfaction and the following material handling principles; namely, system integration, automation, and environmental principles since the p-values are lower than the 5% level of significance.

RECOMMENDATIONS

The following were the recommendations derived from the study.

1. The study suggests that Al Imam Contracting and Trading, Co. evaluates the operational efficiency of the company. Further suggested, to review the maintenance and operating budget for the forklift and other equipment. Forklifts' operators for the handling of materials must be clearly identified and to enhance the
2. The study suggests to continually updates its material handling management plans to support the company's growth strategy.
3. The research recommended that the company need to enhance the plan should clearly identify the methods and problems, physical and economic constraints, requirements, and future goals. Also, flexibility, standardization and modularity should be compatible with the plan. The research also recommends that the company should simplify the operational aspects by adding, reducing, shortening, or eliminating unnecessary movement of equipment.
4. In order to improve flexibility, it is suggested that the company should ensure a clean work areas and not crowded, also should use single load to transfer materials item at one time, with the smaller unit loads, the operation will become flexible, continuous flow and on-time delivery. Further suggested that the company ensures the containers, platforms and other products used are reusable when possible and degradable as appropriate.
5. Al Imam factory should improve the system by the information flow and material flow combined as concurrent activities, and should interfaced with materials loading, equipment's operator and call control.

6. The research concluded that more satisfied employees were more productive in the company that provides quick services with high quality on time, empowerment, and effective interaction with management, which makes them more loyal and committed to providing better services.

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