

**A LEVEL OF SERVICE METHOD FOR EVALUATING A.S.R.S.
BASED ON USERS EXPERIENCE**

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A LEVEL OF SERVICE METHOD FOR EVALUATING A.S.R.S. BASED
ON USERS EXPERIENCE

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To my beloved family

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ABSTRACT

The Automated Storage and Retrieval System or known as ASRS is an automated system where it was invented over the century with considerations of high ability to overcome various problems exists within the warehouse operations. However, to interpret the effectiveness of the ASRS quality system, it is difficult since a detail of study for evaluating the ASRS toward the entire operation of the system was not found. As the main objective of this research is to identify factors that may affect the ASRS quality of service, this study has aim for evaluating the ASRS based on two basic criteria according to the global view into current adoption warehouse. The criteria identified then subsequently incorporated into each statement of questionnaire for distribution to current warehouse's workers. Data obtained from the results of a survey distributions to respondents who has experiences to operates this system is useful for evaluation the ASRS based on their expectations and perceptions toward ASRS service quality. The data collected then will be analysed and calculated through proposed model. Next, the results received from each factor will be suited based on rating system to representing the existing services of ASRS quality which consisted by six stages of point system. This grading is consisted by highest ranking of LOS A which shown "the highest quality system" until to the lowest ranking of LOS F that was representing "this system does not acceptable ". The average of the results toward the usage of ASRS on current adopted warehouse has found and it was placed on the highest quality level. Nevertheless, there are several factors that must be emphasized by warehouse management or any research to improve the quality of services through the extensive findings on the lowest dimension stated on this study for giving fully satisfaction and enhance user requirements and needs. Hopefully, the findings and recommendations given through this method could be used as a measuring tool for comparing the performance of various storage systems that exist around the world.

ABSTRAK

Automated Storage and Retrieval System atau ASRS adalah satu sistem automasi yang dicipta sejak beberapa dekad lalu dan ianya dianggap satu sistem yang boleh menangani beberapa masalah yang wujud didalam operasi gudang. Namun demikian, tahap keberkesanan terhadap kualiti ASRS adalah sukar untuk ditafsirkan berikutan ketiadaan kajian yang terperinci yang dijalankan untuk menilai tahap operasi sistem ASRS ini secara keseluruhannya. Oleh itu, objektif utama kajian yang dijalankan ini adalah untuk mengenalpasti faktor yang boleh menjejaskan kualiti perkhidmatan terhadap ASRS di dalam gudang yang sedia ada berdasarkan dua asas kriteria mengikut pandangan rangkaian logistik dunia. Faktor yang dikenalpasti ini juga seterusnya akan dimasukkan ke dalam pembinaan penyata soal selidik. Data yang diambil daripada proses kaji selidik hasil edaran kepada responden yang mempunyai pengalaman untuk mengendalikan sistem ini dinilai berasaskan daripada pecahan untuk setiap jangkaan dan tanggapan mereka terhadap kualiti perkhidmatan ASRS. Seterusnya, setiap data yang terkumpul akan dianalisa melalui satu model baru yang dibangunkan. Keputusan bagi setiap faktor kemudiannya juga akan disepadankan berdasarkan satu lagi sistem penilaian iaitu sistem mata dimana ianya terdiri daripada enam tahap kualiti sistem dari yang tertinggi iaitu LOS A yang menunjukkan "kualiti tertinggi sistem" sehingga yang terendah iaitu tahap LOS F yang mewakili "system ini tidak boleh diterima" untuk menilai kedudukan kualiti perkhidmatan ASRS sedia ada. Hasil daripada kajian ini mendapati bahawa penggunaan sistem yang telah digunapakai di dalam gudang sedia ada ini adalah berada di dalam kualiti tertinggi secara puratanya. Namun, terdapat beberapa faktor yang perlu dititik berat oleh pihak pengurusan gudang atau mana-mana penyelidik untuk meningkatkan kualiti perkhidmatan yang menyeluruh menerusi hasil penemuan dimensi yang terendah bagi meningkatkan lagi kepuasan dan kehendak pengguna. Hasil penemuan dan cadangan menerusi kaedah kajian ini juga diharap dapat dijadikan sebagai satu alat pengukur untuk membandingkan prestasi pelbagai sistem gudang yang wujud di seluruh dunia.

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LIST OF ABBREVIATIONS

ASRS	-	Automated Storage and Retrieval System
ASRS LOS	-	Automated Storage and Retrieval System Level of Service
BRS	-	Best Rating Scale
EM	-	Expectation Mean
EP & NQ	-	Evaluated Performance and Normed Quality Model
IBM SPSS	-	International Business Machine – Statistical Package For the Social Science
KPI	-	Key Performance Indicators
LISREL	-	Linear Structural Relations Model
LOS	-	Level of Service
LSQ	-	Logistics Service Quality
NQ	-	Normed Quality Model
P	-	Perception
PM	-	Perception Mean
Q	-	Quality
S/R Machine	-	Storage/Retrieval Machine
SERVQUAL	-	Service Quality Model
SERVPERF	-	Service Performance Model
SQ	-	Service Quality

CHAPTER 1

INTRODUCTION

1.1 Background of study

Inventory is the heart of the warehouse, where the industries or enterprises to store their products and raw materials before delivering them to the user for production and consumption purpose. As the process to store the products in the warehouses for certain time, the role of warehouse is important as the place to keep products in a safe condition to make sure the environmental element will not affect the product (Baker, 2010).

Thus, a better function of warehousing would create a better component of logistics that bring the key aspect of modern supply chains and plays a critical role in the success of businesses today (Frazelle, 2002a). If one takes a closer look at the detailed operating cost of a particular company in Malaysia, about 94% agreed that expenses of company relates with logistics are spent on warehouse (Sahidah Zakariah & Jaafar Pyeman, 2013). This is a great issue which should be considered that is related to logistic courses.

Furthermore, due to globalization, the increase in complexity of the supply chain has also increased the complexity of the roles played by a warehouse. This is the factor that influences the problems occurring in production flows and distribution environments. Coupled by the traditional distribution warehouse methods and system with obsolete usage for storage and buffering of products in the warehouses by conventional warehouse system, the quality of service performance becomes plenty of problem that frequently being told by warehouse manager from their side such as less accuracy, time consuming, labor cost, wasted of storage space etc. (Dhamdhere, Gadakar and Jaisingpure, 2012). Generally, one of the factors to solve this problem is by the selection of the warehouse system itself. This is the argumentation that is perusal to be considered for adoption such warehouse system to be selected effectively. Where in a competition, the quality of the service experience becomes an important factor in buyer decision making (Seth and Deshmukh, 2004)

Around 1994 and 2004, one of amongst invention for automated warehouse system to overcome such problems occur in the warehouse has exists where it was called as Automated storage and retrieval systems (ASRS). This system has been a significant increasing in distribution environments in the United States (Automated Storage Retrieval Systems Production Section of the Material Handling Industry of America, 2005) and nowadays ASRS are being widely used in logistic industry (Ya-Hong et al., 2003) where this system has been deemed as sustainable facilities since some user realized to store inventory more effective than traditional system (Megeghetti & Monti, 2011).

So, in conclusion, on this research, a study towards ASRS will identify the factors that affect service quality of this system where it was adopted in current warehouse based on service quality instruments. The instrument used has been proven valid and reliable across a large range of service contexts (Prasad and Shekhar, 2010). In order to measure and evaluate level of service based on current ASRS workers, this researcher as well as had modified some statements on

SERVQUAL instrument evaluation criteria and created ASRS's Level of Service (ASRS's LOS) model for the measurement of level of service on the current warehouse that adopted this system.

1.2 Problem Statement

Many of the warehouse systems that are implemented or adopted are faced with some problems for managing their stocks or inventories in their warehouses. The systems adopted also have low efficiency to manage various factors throughout the warehouse. The problematic elements of the warehouse systems include warehouse late of delivery, floor space problem, security and so on, to store the inventory (stock) in the warehouse and indirectly to support their warehouse management system.

Understandably, the evolving utilizations of ASRS which are broadly publicized help to improve various problems in the warehouse. Thus, to overcome the problems above, it is imperative to overview the ASRS system's criteria especially to quality service provided. To study the effectiveness of this new-founded system, this study will examine the specific companies which adopted this system in Malaysia due to ASRS service quality or level of service does not investigated base on the previous study or research. Thus, this study will also indirectly benefit other companies that intend to adopt the system in their warehouse. However, does the ASRS help improve the quality service and increase the efficiency of the entire warehouse that meet user's expectations and perceptions?

1.2.1 Study Area Profile

This research is focusing toward quality service of ASRS adopted in some warehouse in Klang Valley by evaluating user' expectations and perceptions from workers perspective. Two target warehouses were selected due to this system has been used in same region but with different warehouse, unintentionally close place. Nevertheless, both warehouse is owned by private sector which is taken from the company that adopted same system into their warehouse for logistics purposes. The reason regarding the only two companies have been selected on this research is based on some restrain such as time limitations, limited company adopted this system in Malaysia, difficulty to give authorization for study conduction and some related things that has stated in research limitation section.

A selected warehouse that adopt ASRS system within the region are known as Tiong Nam Logistics Holdings based in Shah Alam, a private entity, and another company is MSM Holdings Bhd that located in Sungai Buloh, Selangor which becomes a logistics company to supply sugar for a nation-wide.

1.3 Research Objectives

This research had to measure and evaluate the level of services of ASRS by considering users expectation and perception from workers' perspective of the service provided. To achieve this aim, four objectives have been outlined as below:

1. To identify the effective factors of ASRS's level of service that adopted in warehouse.
2. To evaluate the ASRS level of service based on the current user's experience.
3. To develop a model for ASRS level of service based on the user's expectation and perception .
4. To suggest improvements based on the proposed ASRS's LOS model.

1.4 Research Questions

1. What are the effective factors for ASRS's level of service?
2. How can the ASRS level of service be evaluated based on the current user's experiences?
3. What kind of model can be used for ASRS's level of service?
4. What improvements can be identified based on the proposed ASRS's LOS model?

1.5 Expected Outcomes

Base on the expectation of research at the end of this study, the data analysis through quantitative method and proposed formula could found all criteria for service quality of ASRS and meets the perceptions compared to the expectation outline. If the perceptions given by warehouse workers toward current study did not meets an expectation, this study assumed that there are manipulated towards previous research and the adoptions of ASRS in warehouse no longer assumed as best solution of problematic warehouse adoption in future. Plus, the outcome of this research as well as could will give better options of service quality system preferences to other companies who has intentions to adopt the system and the finding of this study will shed some light on the service quality of the ASRS in the logistics operations. Besides that, the proposition and suggestion of the system, if implemented, will bring some improvement with the highest efficiency and effectiveness, in terms of time and economy, ease in operation and process, and also increase customer satisfaction. All this improvement will boost the growth of the economy condition, as well as in term of safety and security condition.

1.6 Research Significance

Based on the survey that has been done through book, article or internet sources, there is no single research has been done in term for measure ASRS quality service or any detail measurement to calculate warehouse service quality base on the workers expectation and perception towards the satisfaction level. So, the aims of this research study are to give better understanding for reader or any potential researcher to review and consider the new proposition method for evaluating ASRS service in this study with well-acceptance.

The proposed ASRS LOS model on this this study as well as assumed that the outcome of this research can give better options for the potential buyers to considers the quality system provided by ASRS for those who has intentions to adopt this system in their warehouse. In the line of this study, the readers can found the significance factors will be achieved through this research regarding ASRS's quality service by selections of thoroughly warehouse quality dimensions such as the system reliability and the safety and security dimension of the system itself. Thus, this research then will help in pinpointing the areas that have assumed important in managerial attention and needs to generate the improvements service quality for the warehouse system itself.

1.7 Research Limitations

There are few limitations factors have been identified on this study since the initiations to the end of the study completions. First, a time constraint to conduct this research with short period given to undertake a research is only within four months. This is the most significant problems to ensure the research appropriately to answer the research problem and objectives. Thus, within this period it was probably difficult or unable to cover comprehensive details. Second, the late response and lack of organisation's cooperation to get a permission for data distribution to workers has great influence as the company need a get through from higher level of organisation for verification This factor has created some delays in term to accelerate the research process throughout the study period.

Thirdly, a next constraint is regarded to the limitations number of ASRS adoption in Malaysia. Base on the initiative to find the companies that use this system to be involved in a study found that only small numbers of companies have

been used this system in their current warehouse. This numbers of company that adopt the system in their warehouse can be estimated within not exceeded than ten companies throughout Malaysia included the west part of Malaysia (Sabah and Sarawak). So, a difficulty regarding cooperation from companies to undertake study on their workplace plus with small number of ASRS in Malaysia has added inconvenience factors to implement the study with broadly point of view. The last but not least, the small limitations on this research have been found such as limits numbers towards ASRS study area base on the previous study and the point system to evaluate grade or scores that related to logistics or warehouse are inaccessible.

1.8 Chapter Summary

This chapter has discussed the introduction to the issues which the research is concerned, the problem statement of issue being studied, the aims and objectives of the study and the rationale and significance of the study. As a conclusion, this chapter has briefly explained the ideas and current issues related to the study. The objectives of the research were clearly defined to ensure the research was routed in a right way and finish in time frame. The following chapter provides the literature review.

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