

# Significant Usage of RFID and Barcode in Logistic Management

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## Abstract:

In this research, the researcher suggested the significant use of barcodes and radio-frequency identification (RFID) wireless non-contact systems, which use radio-frequency electromagnetic fields to transfer data from an attached tag to an object for automatic identification purposes. The objectives of this research study are to facilitate businesses to reduce costs, especially when they use barcodes for inventory products, raw materials, office supplies and everything in between. With a single scan, barcodes help employees identify, identify items, and retrieve other information such as price, pricing or supplier. RFID technology enables many shipping and logistics companies to achieve precise shipping, receiving and order accuracy rates - as well as greater inventory accuracy, almost 30% faster order processing speed and a 30% reduction in labor costs. Barcodes are very important for any business that sells physical goods (Smart, Au et al., 2010). They are used as part of the purchase and refund process in brick-and-mortar stores, to track inventory and packages in warehouses, and to transport carriers to trace and track shipments in real time mode. The detailed survey research design was used to conduct a self-designed questionnaire consisting of open and closed-end items for 120 respondents using a non-probability feature random sample. Closed-end items are measured on a five-point liqueur scale. Data are compiled using IBM- SPSS at 0.05 significant level and presented results in descriptive and inferential statistical form. Based on statistical analysis and currently available data the researcher recommended that Barcode and RFID technology are enabled and having a significant impact on logistics management.

**Keywords:** Barcode, RFID, Logistics Management, Real time

## INTRODUCTION

Radio-Frequency Identification (RFID) is a wireless system that uses radio magnetic fields to transfer data from an attached tag to an object for automated identification and tracking purposes. This technology is especially suitable for moving and tracking objects. RFID technology allows most shipping and shipping companies to achieve accurate shipping, receiving and ordering rates - as well as greater inventory accuracy, approximately 30% faster ordering speed and 30% reduction in staff costs. Barcodes are very important in any business that sells physical goods (Smart, Au et al., 2010). It is used as part of the purchase and refund process in brick and mortar stores, to track inventory and packages in warehouses, to track and track shipping by shipping companies, and sometimes to assist in invoice calculations. Is done for.

Barcodes provide better data. Because barcodes can be used in inventory and price information, it is possible to quickly retrieve data from both. Additionally, barcodes can

be customized to hold other important information. They provide fast, reliable data for a variety of applications. By using barcodes, the process of collecting and recording data becomes faster and more accurate (J rmehrzardi, Y., 2010). Allows simplification.

For a better understanding it is necessary to know what is going on in business today. As part of doing this top thesis, I aimed to improve my knowledge and explain to others what is going on right now. This effect is often overlooked or unknown, but remains the case for most companies today. The methodology of this paper provides the basis for themes and concluding results (Nash, Trina A, 2010). Raza, SA (2021) states that RFID applications in the supply chain can benefit from the Internet of Things and blockchain technology as well as other learning and viewing tools. Although many researchers have researched the RFID literature on supply chains, this review is usually done in a standardized way, with authors choosing papers based on their expertise, interests and knowledge. The choice of subject authors to include in the scope of such reviews is biased and should not limit or use sophisticated BA tools for analysis.

The RFID technology introduced in food identification affects the following performance: identification, monitoring, labeling, product management, product reporting, diagnostic casting and revenue conversion from product sales. Conceptual models are used to analyze the results. This paper contributes to transportation research by studying the implementation of RFID technology and information levels in line with food identification requirements. The supply of research fish is limited to this chain; Other sectors and supply chains should be considered to maximize results. Discussions on food consumption and food tracking revolve around the use of RFID technology and standard information management practices to maintain food quality and safety. This paper presents a potential impact on asset performance when using RFID technology to implement EPCIS compliance and tracking in the food supply chain (Anders Ringsburg, H. & Mirzabeki, V., 2014).

## **LITERATURE REVIEW**

Malte Schmidt et.al., (2013) state that the barcode and RFID which stands for radio frequency identification is having usage in the production of goods and other logistics materials. The researcher explored the RFID to find a logical way to maintain a symbolic way of barcode technology and RFID technology in supply chain management. To specify the data collection process the researcher used the non-probability convenience sampling method and for the data analysis and interpretation the researched used the Chi-square test to find the probability of statistics and it significant approach. Xiaoqiang Zhang (2012) focused on the RFID radio frequency identification and significant usage of barcode technology to speed the transportation problem in significant manners. The researcher emphasized that RFID radio frequency identification and barcode technology are the important components to speed the logistics process in transportations.

As Nash, Trina A (2010) emphasized on supply chain management and usage of barcode technology and RFID technology how to streamline to the company and customer services. The advantages of these two technology are more efficient in all areas of supply chain management for the faster and efficient manner in the areas of productions and manufacturing industries. Holiday, SA (2021) stated that RFID radio frequency identification and barcode technology gives the broad spectrum in supply chain management to trac the data and information services related to goods and other materials. These two technology filling the gap in supply chain management industries in

a efficient manners. The end the research the researcher found that RFID radio frequency identification and barcode technology are the significant approach towards manage the transportations problem in business industries.

Rand, B. (2008) stated that RFID radio frequency identification and barcode technology is managing the services in production and manufacturing industries and greatly assist in adapting new technology in a very efficient manners. The researcher collected data from the different business industries and after data analysis and interpretation the researcher concluded that RFID radio frequency identification and barcode technology reduces the cost of transportation after adapting the new technologies. Moatari-Kazerouni, A. & Bendavid, Y. (2017) emphasized that RFID radio frequency identification and barcode technology can be used to improve the performance of the business and transportations process. The researcher implement a case study on a business process redesign in Canada and its sub province in health care industries. With the usage of RFID radio frequency identification and barcode technology the hospitals can be benefits from improvement in their business process and workflows by using of these two technologies.

Anders Ringsberg, H. and Mirzabeki, V. (2014) emphasized the process of transport operations and its services using RFID radio frequency identification and barcode technology for food display industries. During the research study the researcher developed the conceptual framework for analysis of the supply chain according to organizational standards and its parameters. The implementation of RFID radio frequency identification and barcode technology which are specified the identification, monitoring, labelling, product management, product reporting pricing and sales in business industries. The researcher found that RFID radio frequency identification and barcode technology playing a significant role to control the supply chain management process in business industries.

Celito, C., Burgess, S. and Hawking, P. (2007) focused on the quality factors of RFID radio frequency identification and barcode technology services in business industries, demonstrating the new concept of controlling and monitoring the business process. During the researcher study the researcher identifies the key process of RFID radio frequency identification and barcode technology in very efficient manner in business industries. Chen, Q et al., (2020) emphasized that the RFID radio frequency identification and barcode technology have been extensively reviewed and specially to improve the visibility of supply chain management services and workflows process in business industries. The researcher incorporated the usage of RFID radio frequency identification and barcode technology in forensic system into BIM and RFID technologies which are perfectly address the current research issues.

Boeck, H. and Fosso Wamba, S. (2008) identifies the key functions of RFID radio frequency identification and barcode technology in supply chain management and other dimension of logistics management in business industries. AU et.al., (2010) defines the different process of acquisition costs and understand the potential use of RFID radio frequency identification and barcode technology. The researcher found the RFID radio frequency identification and barcode technology playing a significant role for cost reduction of transportations and complexity of business process. The researcher did the theoretical research study of cost of improving the process of supply chain management in efficient manners to control the logistics management and business process.

Fantoni, G. et al., (2021) state that the RFID radio frequency identification and barcode technology can save the time measurement for automatically with respect to reporting, production and integration of business process. The researcher specify the internet of things (IoT) defines the smart transportation with the help of the RFID radio frequency identification and barcode technology to operate the business. The researcher investigated the effects of the RFID radio frequency identification and barcode technology in all possible of business dimension. Hingley, M et al., (2007) emphasized the RFID radio frequency identification and barcode technology and its usage in supply chain management (SCM) in grocery of UK markets. The researcher used the previous data of transportation to shows the impact of the RFID radio frequency identification and barcode technology to control and monitoring the transport activities in very efficient manners.

TagboniDutt et al., (2009) focus on the development of RFID (Radio Frequency Identification) technology through analysis of patents submitted and issued by the US Patent and Trademark Office. An in-depth analysis of this team reveals the patent development strategies of two competing teams of RFID technology engineers. This document provides information on patent analysis and the content of patents owned by both parties. This analysis is based on two key players in the field: Intermech Technologies and the RFID patent pool. Calephoris, T. et al. (2007) explored how radio frequency identification (RFID) methods could meet these requirements. It bypasses both data models and system structures, making them easier to discover and use across the entire supply chain. The proposed system follows a design study approach that meets the requirements of subsequent designs. The ability to identify the technology used and its convenience has a significant impact on the cost involved. Validation of the proposed data model and system architecture, and the promotion of specific technologies using the new opportunities that RFID technology offers.

Thies, F. et al., (2011) The first condition is that decision makers should use RFID in the set of recipients. Although the technical aspects and expected benefits of RFID are extensively discussed in the literature, little is known about the driving forces and limitations of using RFID in practice. Baldini, G. et al, (2012) Humanitarian planning is an essential component of disaster risk management and presents several challenges due to the unique nature of disaster relief. This white paper outlines the key features and challenges of human organizations and the potential role of technology. Radio Frequency Identification (RFID) technology is increasingly recognized as a means of improving the efficiency of supply chain management. Safety is an important requirement in disaster risk management. The purpose of this document is to promote and describe the use of secure RFID technology to improve the management and security of service chains.

Zare Mehrjerdi, Y. (2010) Overview of RF awareness and performance enhancement of SCM using RF awareness. Key elements for identification and updated radio frequency understanding. It briefly reviews other applications of RFID sensing in the supply chain and discusses five issues related to implementing RFID in the supply chain. We offer a variety of sophisticated RF sensing devices and equipment, as well as integrated RF sensing systems to develop new systems that are cost-effective, efficient and productive. Operating costs can be reduced by reducing RFID inventory and reducing returned item inventory, ultimately reducing item sales. A set of strategies that can bring the highest levels of profit and productivity to the supply chain.

## PROBLEM STATEMENT AND RESEARCH OBJECTIVES

In this research paper, the researcher focuses on "critical uses of RFID and barcodes in logistics management" and key research issues on RFID technology, which can significantly reduce costs, improve patient safety and improve supply chains. Has a significant impact on the current scenario. Improving management performance, improving the ability to track and trace devices, as well as monitor theft, delivery management and patient billing. Problem with metals and fluids: RFID has long been associated with difficult working relationships between liquids and metals, making it difficult to obtain accurate readings on both properties. The problem with metal arises because radio waves bounce everywhere. Liquids cause havoc with RFID, which derails signals sent from the tag. This high level of RFID-enabled visibility in secondary data supply chain operations indicates a number of concerns. Concerns include consumer privacy intrusion, business system security issues, and industry intelligence (e.g., Jules, 2006; Shih et al., 2005). The main challenges were identified as cost, followed by operational complexity, lack of technical expertise, knowledge in RFID data usage and many other factors. Ethical issues are a major issue in tracking and tracking individuals and devices when implementing RFID technology. Based on the current available data the researcher formulated some of the significant research issues on usage of RFID and barcode in logistic management which are stated as:

1. To study the significant factors of RFID and barcode in logistic management.
2. To identify the significant impact of RFID and barcode logistic management.

## FORMULATION FOR HYPOTHESIS

The researcher stated the major hypothesis on "significant usage of RFID and barcode in logistic management" and some of the minor hypothesis which are stated as

**H01:** There is no significant relationship between RFID/Barcode and logistics management automation services

**HA1:** RFID/Barcode have a significant logistic management to improve its services to track in real time mode.

## RESEARCH DESIGN AND METHODOLOGY

This research study is based on basic and secondary data collected through structured questionnaires and various research articles on the "significant use of RFID and barcodes in logistics management". The researcher used 120 data sets, which were collected through structured questionnaires using non-probability feature sampling methods by various employees working in logistics management using online Google forms. For data compilation and variability accuracy, the researcher used IBM-SPSS software to generate detailed statistics and Cronbach's Alpha for reliability analysis. The researcher used a 0.05 significance level to validate the hypothesis at 95% confidence interval to generate conclusions and data analysis report.

## RESULTS AND DATA ANALYHSIS REPORT

	Statistic	Std. Error
Mean	4.0167	.06587

Barcode and RFID reduce manual tasks by automatically storing product information	95% Confidence Interval for Mean	Lower Bound	3.8862	
		Upper Bound	4.1471	
	5% Trimmed Mean		4.0556	
	Median		4.0000	
	Variance		.521	
	Std. Deviation		.72162	
	Minimum		2.00	
	Maximum		5.00	
	Range		3.00	
	Interquartile Range		.00	
	Skewness		-.571	.221
	Kurtosis		.559	.438
	Barcode improves inventory control and track in real time mode	Mean		3.5667
95% Confidence Interval for Mean		Lower Bound	3.4065	
		Upper Bound	3.7269	
5% Trimmed Mean		3.5556		
Median		3.0000		
Variance		.785		
Std. Deviation		.88625		
Minimum		2.00		
Maximum		5.00		
Range		3.00		
Interquartile Range		1.00		
Skewness		.679	.221	
Kurtosis		-.924	.438	
Barcodes provide better data	Mean		3.9167	.06327
	95% Confidence Interval for Mean	Lower Bound	3.7914	
		Upper Bound	4.0420	
	5% Trimmed Mean		3.9444	
	Median		4.0000	
	Variance		.480	
	Std. Deviation		.69310	
	Minimum		2.00	
	Maximum		5.00	
	Range		3.00	
	Interquartile Range		.00	
	Skewness		-.504	.221
	Kurtosis		.640	.438
RFID - enable for automatic	Mean		4.0167	.06587
	95% Confidence Interval for Mean	Lower Bound	3.8862	

identification and tracking	Upper Bound	4.1471		
	5% Trimmed Mean		4.0556	
	Median		4.0000	
	Variance		.521	
	Std. Deviation		.72162	
	Minimum		2.00	
	Maximum		5.00	
	Range		3.00	
	Interquartile Range		.00	
	Skewness		-.571	.221
	Kurtosis		.559	.438

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.938	.945	4

### RELIABILITY ANALYSIS OF VARIABLES

"Important use of RFIDs and barcodes in logistics management", such as barcodes and RFIDs, which reduce manual tasks by automatically storing product information, barcodes in real time mode improve list control and track. , Barcodes provide better data, RFID - enables automatic detection and tracking of how close objects belong to a group. Statistical analysis reported that Cronebach's alpha value of 0.938 was the highest internal consistency in the variables set in this research study.

		Sum of Squares	df	Mean Square	Friedman's Chi-Square	Sig	
Between People		231.492	119	1.945			
Within People	Between Items	16.425	3	5.475	99.378	.000	
	Residual	Nonadditivity	.695 <sup>a</sup>	1	.695	5.839	.016
		Balance	42.380	356	.119		
		Total	43.075	357	.121		
	Total	59.500	360	.165			
Total		290.992	479	.607			
Grand Mean = 3.8792							

a. Tukey's estimate of power to which observations must be raised to achieve additivity = 2.149.

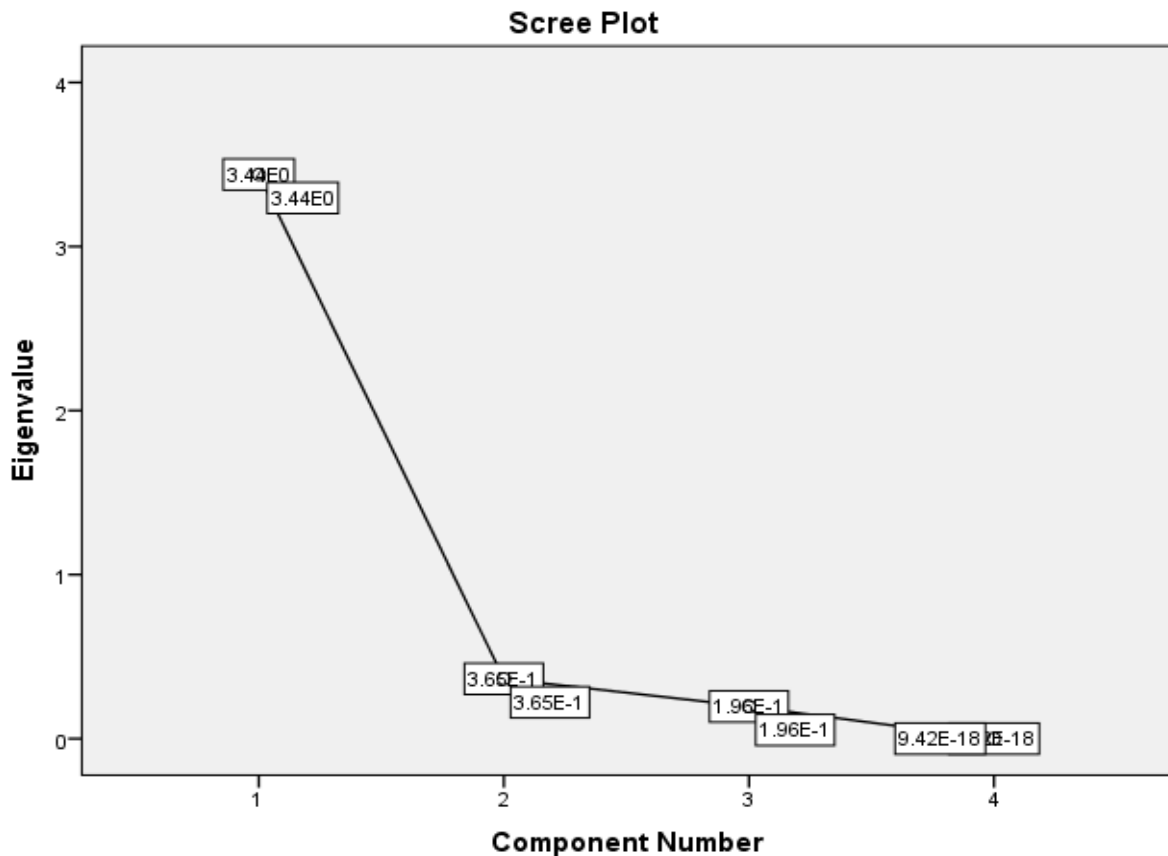
**Table 1.4: Correlation Matrix<sup>a,b</sup>**

		Barcode and RFID reduce manual tasks by automatically storing product information	Barcode improves inventory control and track in real time mode	Barcodes provide better data	RFID - enable for automatic identification and tracking
Correlation	Barcode and RFID reduce manual tasks by automatically storing product information	1.000	.721	.843	1.000
	Barcode improves inventory control and track in real time mode	.721	1.000	.734	.721
	Barcodes provide better data	.843	.734	1.000	.843
	RFID - enable for automatic identification and tracking	1.000	.721	.843	1.000
a. Determinant = .000					
b. This matrix is not positive definite.					

**Table 1.5: Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.439	85.977	85.977	3.439	85.977	85.977
2	.365	9.117	95.094			
3	.196	4.906	100.000			
4	9.417E-018	2.354E-016	100.000			
Extraction Method: Principal Component Analysis.						





**Fig.1.1:** Statistical Analysis of Barcode and RFID in Logistics Management

## INFERENCE

The above data analysis report is based on the "critical use of RFID and barcode in logistics management" by IBM - SPSS software, as elements such as barcode and RFID reduce manual tasks by automatically storing product information, while barcodes improve inventory control and track. Mode, barcodes provide better data, RFID - 0.05 Automatic detection and tracking at critical levels. The data probability P-value is 0.000, which is less than the significant level of 0.05, so the null hypothesis is rejected and the result is significant. The researcher concludes that at this stage the employee reduces manual tasks by automatically storing barcodes and RFID product information, improves barcode inventory control and tracks in real-time mode, while barcode provides significant data, enabling significant logistics for RFID - automatic detection and tracking. Management.

## SUMMARY AND CONCLUSION

Eventually the researchers reduced the manual tasks of "critical use of RFID and barcodes in logistics management", such as barcodes and RFID by automatically storing product information, improving inventory control, and tracking barcodes in real-time mode. As barcodes provide better data, automatic identification and tracking capability are important for this research study in RFID - Logistics Management. The researcher used Cronbach's alpha value of 0.938 for reliability analysis, which is a measure of internal consistency, i.e. how close a set of relevant factors is as a group. It is a measure of the

reliability of a scale. The sixth general rule is the Cronbach alpha. 70 and above. Even better if it is 80 and above. Very good if 90 and above. The reliability value based on the statistical analysis report is 0.938, indicating excellent internal consistency in the variables considered in this research study. The statistical probability of a p-value of 0.000 is less than the significance level of 0.05, so the null hypothesis is rejected and the result is significant. At this stage the researchers validated the hypothesis that factors such as RFID and barcodes would reduce manual tasks by automatically storing product information, barcodes would improve inventory control, and track in real-time mode. Barcodes provide better data, RFID - automatic identification and tracking, tracking data and packets have a significant impact on logistics management in real time mode, including the current operating mode of business logistics management services. Including capacity increase.

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