

**A STUDY ON USAGE OF RFID TECHNOLOGY IN WAREHOUSE AT
FREIGHTERIX CARGO SOLUTIONS PVT LTD**

REGISTER NO: 40410134

RAHUL.K



**Master of Business Administration
SCHOOL OF MANAGEMENT STUDIES**

**SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

**Accredited with Grade "A" by NAAC | 12B Status by UGC | Approved by
AICTE Jeppiaar Nagar, RAJIV GANDHI SALAI, CHENNAI - 600 119**



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SCHOOL OF MANAGEMENT STUDIES

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the Bonafide work of **RAHUL.K 40410134** who carried out the project entitled "**A STUDY ON USAGE OF RFID TECHNOLOGY IN WAREHOUSE AT FREIGHTERIX CARGO SOLUTIONS PVT LTD**" under my supervision from January 2022 to April 2022.

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DECLARATION

I **RAHUL.K (40410134)** hereby declare that the Project Report entitled “**A STUDY ON USAGE OF RFID TECHNOLOGY IN WAREHOUSE AT FREIGHTERIX CARGO SOLUTIONS PVT LTD**” done by me under the guidance of **DR. S. UMAMAHESWARI** is submitted in partial fulfillment of the requirements for the award of Master of Business Administration degree.

DATE: 03-05-2022

PLACE: CHENNAI

RAHUL.K

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ABSTRACT

The use of RFID systems is becoming more common as RFID technology advances. Some authors claim that RFID systems can provide organizations with advantages and value, such as increasing efficiency and effectiveness. Literature also suggests that RFID systems, particularly RFID systems, can be used by companies within the logistics industry. However, some authors also highlight disadvantages of these solutions, such as a lack of security.

Using RFID systems in warehouses and the factors that influence the efficiency and effectiveness of RFID technology, this report analyses the efficiencies and need for RFID technology in organizations.

This purpose is fulfilled with the aid of a qualitative study at Freigherix Cargo Solutions Pvt Ltd in Chennai, where a number of respondents were interviewed. A literature review covering different aspects of RFID systems and technology was conducted first. Using the literature study, an interview guide was created, as well as a basis for the analysis.

An empirical study shows that the RFID system at Freigherix Cargo Solutions Pvt Ltd provides value to their operations and management. As a result, the daily work becomes more effective and efficient, and the system generates accurate information that facilitates good decision-making. The study also shows that precautions need to be taken when using an RFID system, since today's organizations have become highly dependent on the technology.

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CHAPTER 1

INTRODUCTION

An effective supply chain aims to coordinate the flow of materials and information from suppliers to consumers. As part of the supply chain, operations such as planning, manufacturing, and distribution should be connected and visible across the supply network, allowing for rapid and optimal decision making. Supply chain management is the process of improving the flow of material, information, and money from the supplier to the customer.

The traditional supply chain, once driven by supply, has been replaced by one driven by demand. Globalization, consumer loyalty declines, and product introductions are being sped up, forcing companies to become more efficient in their operations due to the increasing competition. To track the flow of materials through the supply chain, barcodes are used in supply management systems. Unfortunately, barcodes have certain limitations, such as the ability to only be read in direct line of sight, limited information, inability to identify individual products, and inability to be read inside containers. Moreover, RFID tags can facilitate automatic inventory audits and prevent pilferage in warehouses and retail stores, providing accurate inventory data.

A total of 125 employees were selected with an attempt to cover a wide cross section of the Freightrix Cargo Solutions Pvt Ltd. Simple random sampling method is used in this study for data collection. Primary data was collected with the help of a Questionnaire. A detailed questionnaire was prepared for which data is collected from 125 employees of Freightrix Cargo Solutions Pvt Ltd in Chennai. Secondary data was collected by external sources like books, newspapers and journals; new age sources like the internet. Some White papers and articles were also referred to get an insight on the working of RFID Technology. Access to different articles with respect to RFID technology on the internet enabled to gather some useful information and facts about the same.

1.1 PROBLEM IDENTIFIED

Freightrix Cargo Solutions Pvt Ltd needed a look at developing an information management system that enables access to real-time, accurate information,

amendments and development of new business applications for improving the organization. It is for this reason that the company is adopting RFID technology in its warehouse. Employees must be trained, educated, and exposed to this new technology. Thus, research is required within the organization.

1.2 OBJECTIVES OF THE STUDY

Primary Objective

To study the usefulness of RFID technology in tracing materials in warehouses at Freighterix Cargo Solutions Pvt Ltd.

Secondary Objectives

- To understand the present method of materials tracing adopted in Freighterix Cargo Solutions Pvt Ltd' warehouses, Chennai
- To analyze the functions of both manual and automated systems and to study their individual pros and cons
- To provide a complete solution to organizations using RFID technology in tracing and handling cargo

1.3 SCOPE OF THE STUDY

Freighterix Cargo Solutions Pvt Ltd used RFID technology to enhance supply chain operations in the study conducted. By analyzing factors like familiarity and ease of use, RFID technology can be evaluated for effectiveness. By using RFID technology for tracking goods, we are also able to evaluate the importance of workflows, flexibility, tenure reliability, the importance of information, the effectiveness of various modules, performance, utilization rate, satisfaction, and rate of success. This study is limited to Freighterix Cargo Solutions Pvt Ltd, Chennai.

1.4 NEED FOR THE STUDY

The aim of technology is to make human life more secure, safe, and easy and provide entertainment. This thesis focuses on presenting the advantages and disadvantages a warehouse setting can offer for an organization as well as the factors that have an impact on these advantages and disadvantages. Therefore, the recommendations give information on how technology should be utilized along with the precautions that should be taken when implementing these technologies.

CHAPTER 2

2.1 REVIEW OF LITERATURE

Shenk (1996) tells us that Soviet policy governing information transmission had left Estonia's communication infrastructure in disarray. Yet, as **Dyer-Witheford (1999)** shares, only a decade after Soviet occupation finally ended in the Baltic region, the latest communication technologies have allowed Estonia to leapfrog into a new and modern economic paradigm. While the leap has been largely successful, Estonia's emergence from Soviet control has presented challenges previously unknown within their state-run market cooperatives.

Kruse (1999) points out that one of these challenges has been how to maximize an antiquated telecommunication infrastructure using scarce resources spread across disparate industries each in desperate need of modernization. The question Estonia faced was whether to invest in patches to existing communication systems, built upon a decaying legacy system of hard-wired telecommunications - a very expensive proposition - (**Hulten&Mollery, 1997**) or to re-engineer the country's communication infrastructure using state-of the- art RFID technology, a decision which would have far-reaching impact on business, consumers and policy-makers (**Radosevic, 1997**).

In the spirit of shrugging off all that represented Soviet domination, Estonia, as well as many other Central and Eastern European Countries, embraced RFID technology as the de facto choice for paving the way into the next thousand years of communication. While perhaps cloaked in nationalism, **Bruce (1999)** sees the decision to eschew Soviet fixed line telecommunications in favor of RFID connectivity to have placed Estonia in excellent stead both technologically and economically as the region begins its foray into liberalization and market competition.

Given that Estonia wishes to present a compelling case for inclusion in the European Union (EU), advantaging all the good that comes from membership in an organized economic and political collective, **Clemens (2001)** favors the Estonian decision to represent itself as free from any ties to the totalitarian regime which once exerted complete control over an artificially supported market. The decision illustrates the level

of commitment that Estonia has to the future of Europe and their role in it. The choice of a primarily RFID communications base is just one component of Estonia's push toward modernization and economic inclusion, yet it is significant as it represents not only a breaking from the past, but an understanding of the requirements for future economic participation with the European Union (UNDP, 2002).

This paper will address the key issues of research to date surrounding RFID communication with respect to Estonia. It will evaluate the meaning of infrastructure and how that meaning can be applied within the context of Estonia's decision to move toward a RFID communication platform, assess the literature discussing the lead up to Estonia's decision to cut the wires to the Soviet Union, and present a critical overview of industry research addressing RFID offerings deployed in Estonia, specifically addressing various authors' opinions on the implications of RFID technology in Estonia and the infrastructural considerations this new technology will bring to bear as it becomes more prevalent .

This paper will attempt to answer the questions, "What do researchers feel are the infrastructural considerations surrounding Estonia's decision to move to a RFID platform," "How does contemporary literature treat Estonia's decision to focus on RFID technology as a communication platform," and "What do the authorities in the field feel are the challenges of RFID communications infrastructure in Estonia?" The reasons for these questions center around the economic considerations of jettisoning an existing infrastructure in favor of state-of-the art technology and the implications this decision has not only on the communications industry in Estonia, but on the vast number of industries communications touches and impacts.

RFID technology is held out as the new gold standard for communications, differentiating this millennium from the last. This paper will offer a comparison among the literature that speaks to RFID telecommunications technology, as well as provide an overview of the research surrounding telecommunication infrastructural change specific to Estonia. These topics are important as Estonia attempts to balance not only national interests against EU inclusion - their choice for telecommunication representing but one of the numerous factors weighed in the EU committee requirements - but most important as the country attempts to layout a framework for

telecommunications taking into account today's needs, budgetary considerations, and decisions for long term telecommunications infrastructural planning.

We begin with background on telecommunications infrastructure to provide a definition for the basis of discussion. **Star and Bowker (2002)** reference Star and **Ruhleder (1996)** when describing the salient points of infrastructure: that is, that infrastructure is embedded within other structures and technologies; it is transparent in use, not needing to be reinvented at each use and only becoming evident when it breaks down; that infrastructure can be specific or general in scope; it is a natural component of usage to its initiators but must be learned by outsiders; it links with the past in practices of convention and is modified for future expansion, building upon the strengths and weaknesses of the installed base such that infrastructural changes are limited or enhanced by systems already in place.

This background of infrastructure is important as we consider the issues with which Estonia wrestled concerning infrastructural change in its telecommunication systems. The decision to select a new technology over a current technology with existing infrastructure already in place has resonance beyond the initial decision. **Star and Bowker** cite numerous authors when describing how choices in infrastructure are usually predicated upon choices made in the past, choices which have been indelibly folded into the application of new technology (**Star & Bowker, 2002**).

With respect to infrastructural application, Hughes referenced reverse salient, or that which slows the development of a new infrastructure not specific to the infrastructure itself, i.e. a technological challenge stemming from a political challenge. He contends that the solution to the initial problem, that being one of politics, for example, need not focus on politics at all but can address itself directly to the technology in question (**Hughes, 1983**). This assertion becomes important to a country like Estonia, which finds itself struggling with old paradigms of controlled telecommunications markets yet wishes to move to a liberalized market with a new communication infrastructure, RFID technology, as its springboard.

Bowker's concept of infrastructural inversion is important to mention here. In his analysis, **Bowker (1996)** shows us that although remarkable societal change may

appear to come from the product of an age, for example in Estonia's case the RFID cell phone, it is really the infrastructural change, or the technology serving as the underpinnings for the product, which lead to the change which society experiences.

The concept of network externalities amplifies this point. Star and Bowker refer to works by David, **Greenstein, and Rothwell (Star & Bowker, 2002)** illustrating how, as technology is adopted by more and more people, the value of that technology for those who already employ it increases even as its value increases for the late adopters. A simple example used by the authors is that of the telephone. With telephone technology, a network developed which was important to those who adopted its use, and, as more individuals came to adopt the technology, the technology became increasingly more powerful for all its users. That power led to even greater adoption of the technology, and so on, with this exponential growth resulting in powerful network externalities.

The concept of network externalities of RFID communication has had significant impact in Estonia, specifically in the form of Short Messaging Service (SMS). If, for example, only one person were to own a cell phone with SMS, its capabilities could not make nearly the societal impact that a network of consumers with the technology has made, nor would entire industries spring from only a single consumer's use of SMS. In Estonia, the network externalities of SMS can be found at levels of the economy as esoteric as the capital city Tallinn's parking authority. When mobile subscribers need to leave automobiles parked for a time, they enter a number into their cell phone, which, as part of a subscription offered, is tied to the city's parking service.

The number, based on the subscriber's cell phone number and auto license number, is entered into Tallinn's parking service database, along with where the car is parked and beginning at what time. The parking rate is tied to the location. When a meter monitor checks on the subscriber's parking status, she or he would see a mobile parking sticker on the subscriber's windshield. An SMS entry to the parking database by the meter monitor confirms that the subscriber does in fact have a mobile parking license and did register to park; a ticket would be issued otherwise. Subscribers must remember to notify the system with another SMS when they have vacated the parking space, or else the database will continue to charge the subscriber for parking for up to

four hours beyond the required time for payment. Tallinn has contracted with Estonia Mobile Telephone, Inc. to manage the parking database and to bill the customers, receiving a portion of the revenues for its services, as a credit-card processor would.

The parking database and SMS service, started in July 2000, in July of 2001 had about 12,000 registered users who either have their RFID provider bill them directly for parking, or who pre-pay for their RFID phone use and apply some of their minutes toward parking **(Dyson, 2001)**.

This example is only one of many highlighting Estonia's leap to embrace RFID technology. Government reports, NGO case studies, industry analysis, and journalistic inquiry have all documented Estonia's rapid acceptance of RFID communications into the infrastructure of society. Still, with the newness of the technology, Estonia grapples with the ever-expanding potential of RFID communications and how to standardize the technology to best meet the needs of Estonia's consumers.

2.2 CONCEPTUAL FRAMEWORK OF THE PROJECT

History

The concept of radio frequency identification (RFID) goes back to the Second World War. Great Britain pioneered the use of radio wave-based navigation and identification of friend or foe aircraft for night operations by the Royal Air Force. The military has continued to use more advanced versions of this technology for many applications. More recently, commercial businesses have begun RFID technology for manufacturing and supply chain applications. In the 1980s Compaq Computer started using RFID tags to trace components through the production process. The railroad industry in US has used RFID to track rail cars while the agricultural industry has used tags to track livestock.

RFID Communicating: The term "RFID" has become a generic and all-encompassing word used to describe communications in which electromagnetic waves or RF (rather than some form of wire) carry a signal over part or the entire communication path. Common examples of RFID equipment in use today include:

Professional LMR (Land Mobile Radio) and SMR (Specialized Mobile Radio) typically used by business, industrial and Public Safety entities

Consumer Two Way Radio including FRS (Family Radio Service), GMRS (General Mobile Radio Service)

Amateur ("Ham") and Citizens Band ("CB") radios

Consumer and professional Marine VHF radios

Cellular telephones and pagers: provide connectivity for portable and mobile applications, both personal and business.

Global Positioning System (GPS): allows drivers of cars and trucks, captains of boats and ships, and pilots of aircraft to ascertain their location anywhere on earth.

Cordless computer peripherals: the cordless mouse is a common example; keyboards and printers can also be linked to a computer via RFID.

Cordless telephone sets: these are limited-range devices, not to be confused with cell phones.

Satellite television: allows viewers in almost any location to select from hundreds of channels.

RFID networking (i.e. the various flavors of unlicensed 2.4 GHz WiFi devices) is used to meet a variety of needs. Perhaps the most common use is to connect laptop users who travel from location to location. Another common use is for mobile networks that connect via satellite. A RFID transmission method is a logical choice to network a LAN segment that must frequently change locations. The following situations justify the use of RFID technology:

- To span a distance beyond the capabilities of typical cabling,
- To avoid obstacles such as physical structures, EMI, or RFI,
- To provide a backup communications link in case of normal network failure,
- To link portable or temporary workstations,
- To overcome situations where normal cabling is difficult or financially impractical, or
- To remotely connect mobile users or networks.

RFID communication may be via:

- radio frequency communication,
- microwave communication, for example long-range line-of-sight via highly directional antennas, or short-range communication, or
- infrared (IR) short-range communication, for example from remote controls or via IRDA,

Applications may involve point-to-point communication, point-to-multipoint communication, broadcasting, cellular networks and other RFID networks.

The term "RFID" should not be confused with the term "cordless", which is generally used to refer to powered electrical or electronic devices that are able to operate from a portable power source (e.g., a battery pack) without any cable or cord to limit the mobility of the cordless device through a connection to the mains power supply. Some cordless devices, such as cordless telephones, are also RFID in the sense that information is transferred from the cordless telephone to the telephone's base unit via some type of RFID communications link. This has caused some disparity in the usage of the term "cordless", for example in Digital Enhanced Cordless Telecommunications. In the last 50 years, RFID communications industry experienced drastic changes driven by many technology innovations.

What is the interest in RFID?

- No more cables...
- Mobility
- Increased productivity
- Competition
- Flexibility
- Many others

Some RFID Data Solutions:

- Field service—dispatch, parts/order, electronic signature, package tracking
- Public safety—parking enforcement, ambulance-hospital links, anti-theft
- Financial—news, brokerage, pricing
- Telemetry—Health care, vending machines, alarm systems, energy
- Identification—inventory in warehouse and stores, anti-theft

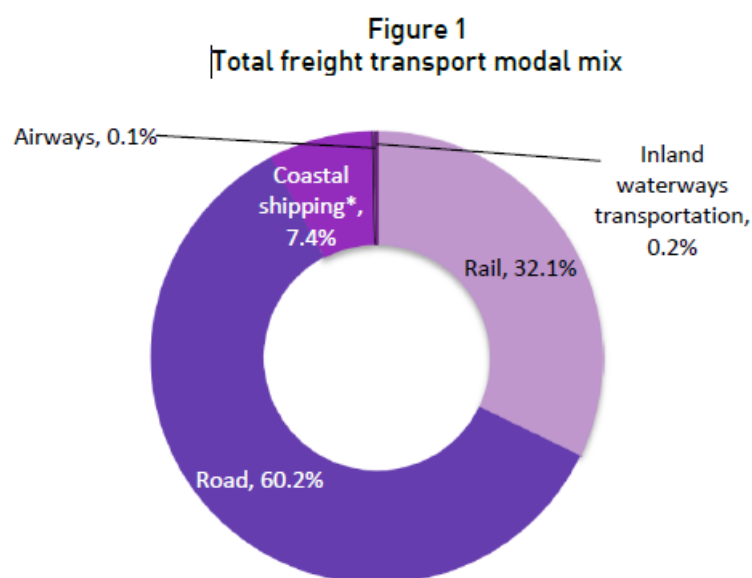
2.3 INDUSTRY PROFILE - OVERVIEW OF INDIAN LOGISTICS INDUSTRY

The Indian logistics industry was valued at an estimated US\$ 385 billion in 2014-15. It has grown at a CAGR of over 16 per cent over the last five years. The industry comprises the following main segments:

- Freight and passenger transportation via road, rail, air and water
- Warehousing and cold-storage

The contribution from the movement of goods including freight transportation and storage is about 90 per cent. Aggregate freight traffic is estimated at about 2-2.3 trillion

tonnekilometres. Road dominates the mode of freight transport mix and constitutes about 60 per cent of the total freight traffic. Rail and coastal shipping account for about 32 per cent and 7 per cent, respectively, while the share of inland waterways transportation and air is less than 1 per cent each.



Source: IMaCS Analysis,
*Major ports

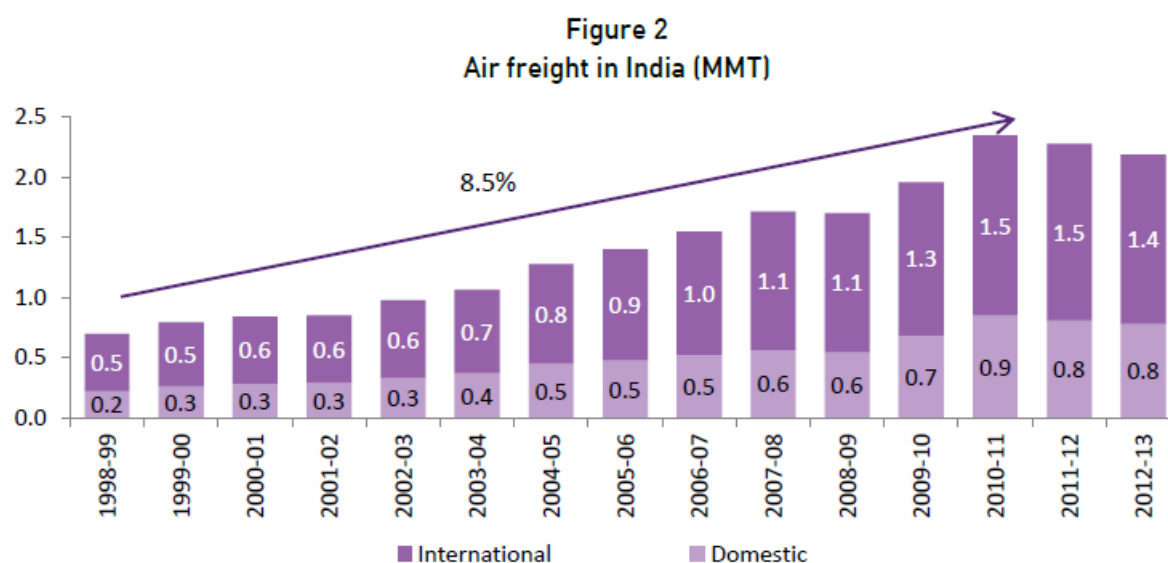
Warehousing comprises industrial and agricultural storage. Of the total warehousing space of about 1,800 million sqft, the industrial and agricultural segments constitute about 86 per cent and 14 per cent, respectively. Government organizations including Food Corporation of India, Central Warehousing Corporation and the state warehousing corporations account for about two-thirds of the agricultural warehousing segment¹. Warehousing also includes cold storage, comprising over 5,300 units; most of which are concentrated in the states of Uttar Pradesh, Punjab and West Bengal. According to the Ministry of Agriculture, at present, the cold chain capacity is about 9 million tons.

FREIGHT MOVEMENT

Air transport

Air cargo volume grew at a compound annual growth rate (CAGR) of about 8.5 per cent from 0.7 MMT in 1998-99 to 2.2 MMT in 2012-13. International traffic accounts for about 64 per cent of the total air cargo traffic and domestic cargo accounts for the remaining 36 per cent. Between 1998-99 and 2012-13, domestic and international cargos have grown at a CAGR of 10.4 per cent and 7.6 per cent, respectively. Expanding cargo-handling infrastructure at airports, demand for speedy delivery,

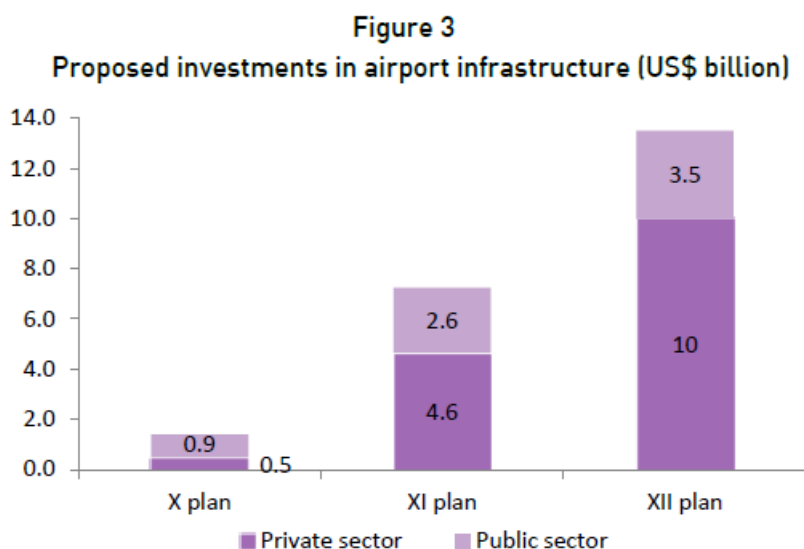
greater trade and commerce and increase in the number of flights operating – are some of the key reasons for this growth.



Source: CMIE; IMAcS Analysis

Future growth in international cargo traffic is expected to be fuelled by trade agreements, especially, with the Asia-Pacific region, and trade in sectors like electronics, garments and pharmaceuticals. Growth in domestic cargo traffic is expected to be led by expansion of industrial activity beyond existing centres. Investments in airport and logistics infrastructure are also expected to drive demand of air cargo.

Proposed investments and private sector participation: For developing airport infrastructure, the government has proposed an investment of US\$ 13.5 billion² in the Twelfth Five-Year Plan period, which is almost double of that proposed in the Eleventh Five-Year Plan. This would include building and expanding cargo terminals. The private sector's contribution is expected to be 74.1 per cent.



Source: Planning Commission of India

Some of the projects included in the investment plan are as follows:

- Ongoing modernization of the metro-airports - Kolkata and Chennai.
- Modernization of 35 non-metro airports, of which, 20 are complete and 15 are ongoing.
- Development of air-freight stations (AFS)

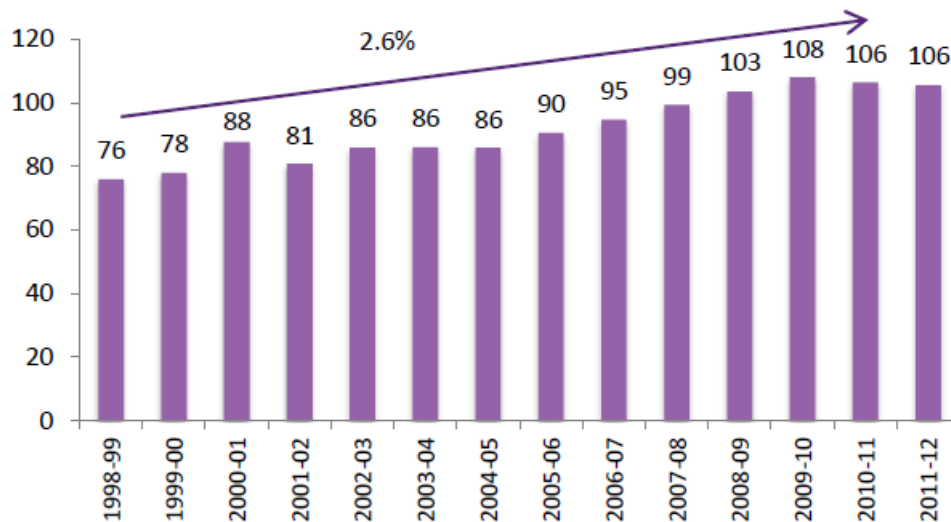
For example, Container Corporation of India and Cargo Service Centre India Private Limited have announced plans to set up an AFS at Mulund in Mumbai. Container Corporation of India also plans to develop AFSs in Ahmedabad, Pune and other major locations.

Water transport

Shipping routes through coasts and inland waterways are primarily used for transportation of bulk freight. India possesses about 14,400 km of inland waterways. Over 3,600 km are navigable by large vessels, of which about 55 per cent is being used. To exploit the potential of this mode of transport, six national waterways have been declared; three of which are operational while three are being developed.

In 2012-13, the estimated cargo movement via inland waterways was at around 89 million tons. The coastal-cargo traffic at major Indian ports has grown at a CAGR of about 2.6 per cent from 76 MMT in 1998-99 to 106 MMT in 2011-12. The freight via water is expected to grow further in the light of the Maritime Agenda 2010-2020, increasing contribution from non-major ports and growing focus on ports on the east coast.

Figure 4
Coastal cargo at major Indian ports (MMT)



Source: CMIE; IMAcS Analysis

Overall cargo traffic has increased at non-major ports at a CAGR of about 19 per cent in the 14 years since 1998, indicating strong growth potential for these ports in the coming years; especially as the infrastructure improves.

Proposed investments and private sector participation: In January 2011, the Government of India launched the Maritime Agenda, 2010-2020, to increase the total port capacity. The salient features of the agenda are as follows:

- It envisages an investment of US\$ 57.4 billion in a phased manner to create a total port capacity of around 3,200 MMT. The non-major and major ports are expected to contribute 61 per cent and 29 per cent of the proposed investment, respectively.
- Capacity expansion by way of construction of new berths and jetties is likely to account for 65 per cent of the total outlay. Other support works such as connectivity works, channel deepening and equipment are likely to account for 35 per cent of the total outlay.
- In particular, the government aims to create an additional cargo handling capacity of around 900 MMT at ports along the East coast through an investment of about US\$ 22.5 billion.
- The funding of the projects under Maritime Agenda is to come, largely, from the private sector. The private sector is expected to contribute 66 per cent and 98 per cent of the total investments in major and non-major ports, respectively.

- The number of scheduled public-private partnership projects (PPP) in the maritime sector has significantly gone up from around 12 in the year 2008-09 to 29 in 2012-13.
- The projects in the construction phase include container terminal expansion and development of thermal coal and copper concentrate handling facility at V.O. Chidambaram Port.
- Some projects in pipeline include container terminal expansion, modernization of iron ore handling complex and installation of mechanized handling facilities at Vishakhapatnam port.

Rail transport

Rail freight segment contributes over 60 per cent to the total rail revenue. Freight movement via railways has grown at a CAGR of around 5.1 per cent from 794 million tons in 2007-08 to 969 million tons in 2011-12. As per the Railway Budget 2013-14, the government targeted freight volume of 1,047 million tons in 2013-14.

Table 1
Rail freight traffic

Year	Tonnes (million)	Tonne kilometres* (million)	Lead (km)
2007-08	794	521,371	657
2008-09	833	551,448	662
2009-10	888	600,548	676
2010-11	922	625,723	679
2011-12	969	667,607	689

Source: Ministry of Railways; IMaCS Analysis

*Tonne-kilometre represents transport of one tonne of goods over a kilometre.

*Lead refers to the average distance to which freight was transported.

2.4 COMPANY PROFILE

A comprehensive range of services and smart solutions

From mining and manufacturing to clothes, cars and food, Freightrix Cargo Solutions Pvt Ltd is all about delivering the right product, to the right place, at the right time, at the right price. Our combined services equip us to design, implement, operate and manage smart supply chain solutions. By understanding our clients' businesses inside and out, we deliver integrated and customized solutions to create a competitive advantage.

Operational excellence provides us with a smart process that drives continuous improvement, which makes us better at what we do.

Innovation sits at the heart of smart. Thinking *outside the box* and making better use of resources is the very essence of smart supply chain solutions. At Freightenix Cargo Solutions Pvt Ltd we believe your supply chain is a key enabler of success. It's why we're driven to make your supply chain work harder for your business. In addition to optimising individual logistics functions, Freightenix Cargo Solutions Pvt Ltd has led the way in adopting an integrated approach to supply chain management. By combining strategy, planning and management with excellent operational execution, we analyse, design, implement, manage and operate entire supply chains. As a result, a new breed of optimized supply chains is being developed. Supply chains that are designed around your business goals. Supply chains that are far more efficient, effective, flexible and responsive to ever changing market needs. And the bottom line? We create smart supply chain solutions that level the playing field and give your business a competitive advantage.

Combining ingenuity, expertise and real-life experience.

At Freightenix Cargo Solutions Pvt Ltd there is nothing ordinary about the way we do business. We're committed to creating extraordinary solutions that exceed expectations and deliver exceptional results.

Our strategy is simple. We link your supply chain to your business strategy. In other words, we ensure you have the right operations, resources and capabilities to implement your strategy and realize your vision.

We do this by thinking out of the box, breaking down barriers and pushing boundaries. We identify hidden problems by knowing what to look for and where to find them. We then transform the right possibilities into profitable opportunities.

It's how we've helped multinational organizations around the world cut costs, grow revenue and improve customer service.

CODE OF CONDUCT

Setting standards in global corporate governance.

The world is continually changing, and so is our business. But one thing that will never change is our commitment to maintaining the highest ethical standards. Our reputation is one of our greatest assets. Each of us has a responsibility to protect and live up to it – every day.

Here is what our code of ETHICS means to and for all of us:

- Obey the LAW
- Be FAIR
- Be HONEST
- RESPECT others
- Protect the ENVIRONMENT

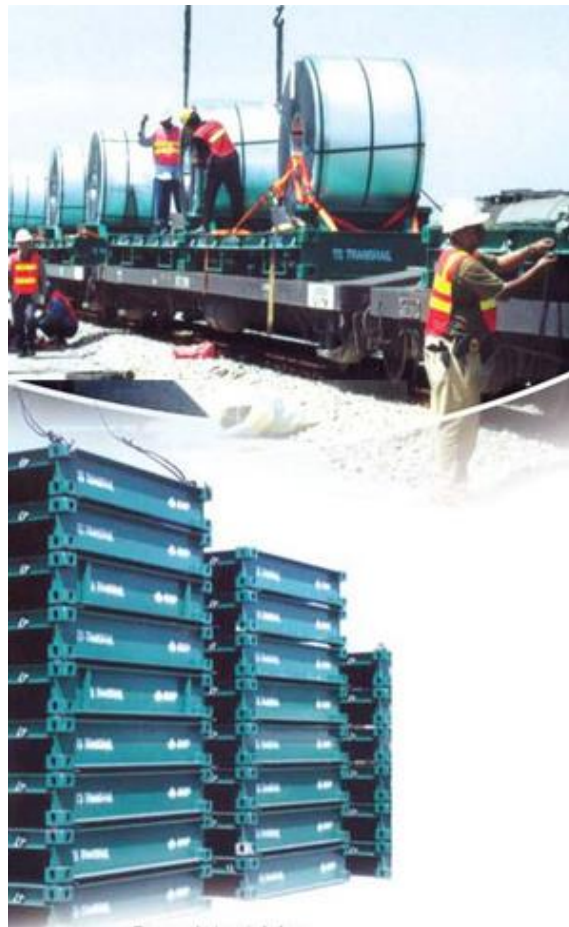
SERVICES

1. Cargo Management
2. Waste Management and Consultancy
3. Warehouse and Distribution
4. Inventory solutions
5. Supply chain consulting
6. Supply chain management
7. Road transportation
8. Transport Management Services
9. Supply chain software planning
10. Freight forwarding

1. Cargo Management

From start to finish, the industrial and project cargo distribution area is well taken care of through our dedicated project management team. Here, Safety is accorded high priority. Evolving from the need of customized cargo transportation, it also provides the logistics for project cargo handling from shipyard or factory to site and vice versa.

From steel coils and beams to heavy-lift cargo, we offer customized solutions that are safe, timely and cost-effective.



2. WASTE MANAGEMENT AND CONSULTANCY

Accredited with ISO14000:2010, our Hi-Tech Waste Management provides waste management and consultancy for a wide range of industrial and commercial customers including clients. Realizing the crucial need for environment-friendly and cost-effective solutions to waste management, the company offers an extensive range of services that include witness disposal of FMCG products, solid waste minimization consultancy and industrial tank cleaning. Other areas of primary expertise include the exploration of the 'wormy culture' in waste management and expanding our services into the transportation of palm oil waste.



3. WAREHOUSE AND DISTRIBUTION

Taking stock of where your business is and moving it into a new direction.

Adopting an integrated strategic approach and looking at your delivery network holistically, our warehousing and distribution solutions are smart, streamlined and efficient. When it comes to warehousing, we look at whether it will serve your interests to rent, buy or build. We evaluate the benefits of location, size and design, factoring in where your sources of supply and delivery destinations lie. Our aim is to design and manage or operate customized warehouse solutions that deliver bottom-line benefits by helping you to be more productive, your organization more efficient, and your business more agile. We implement collaborative techniques, provide tools for measuring success, and advanced analysis, which demonstrates our original thinking.

Designed for today but with the future in mind, our solutions are based on a comprehensive range of bespoke management systems and processes, which include cross-docking, racking, shelving, pick-and-pack, and track and trace capabilities.

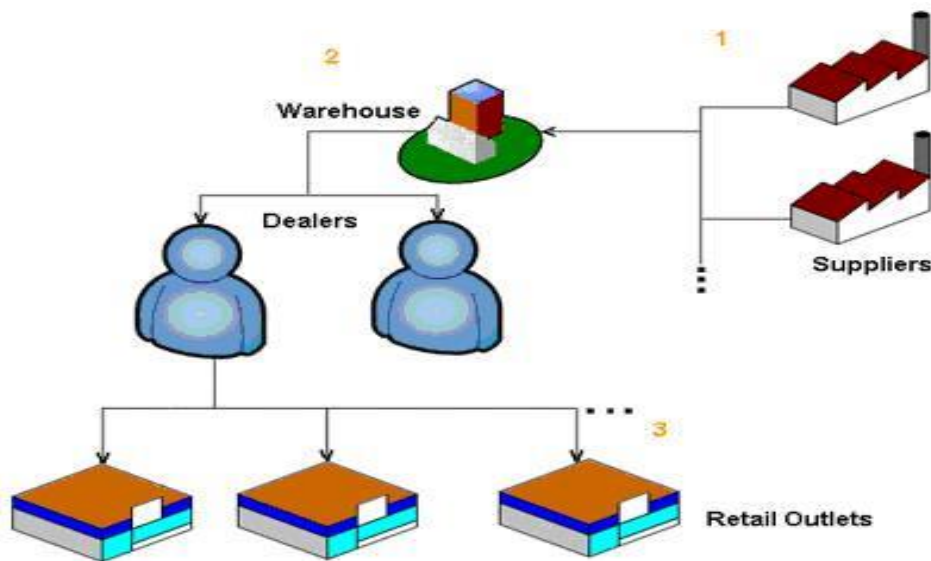
Consistent quality, operational excellence and on-going innovation is how we achieve a reduction in inefficiencies, enhanced consumer value, improved cash flow and profits for your business.



4. INVENTORY SOLUTIONS

Inventory sits at the heart of any supply chain strategy. Too little or too much has far reached implications for your business.

The real opportunity lies in our inventory and supply chain planning solutions that not only optimize inventory, but link it to your business strategy. This in turn allows us to identify where we need to align and redesign key elements of your supply chain so that you deliver more value to your customers at a lower cost.

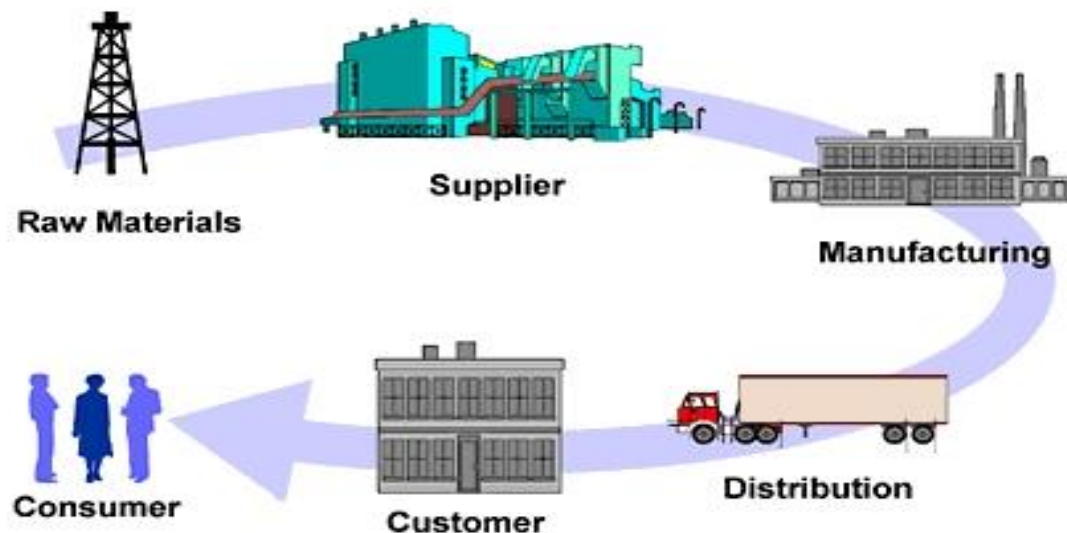


5. SUPPLY CHAIN CONSULTING

Through supply chain consulting, Freightrix Cargo Solutions Pvt Ltd equips you with the big picture, identifying what's working, what isn't and what can be optimized for operational efficiency. Regardless of the industry or sector you operate in, our specialized consultants have the experience, knowledge and insight to provide practical supply chain solutions that are innovative and results orientated.

Working together with you, we determine objectives, budget, time constraints, resources, risks, assumptions, and other variables up front. We then measure, analyses and benchmark your logistics operations or entire supply chain against global best practices. By identifying where you've come from, and where you are, we can help you get to where you want to be.

Using a variety of world-class tried and tested tools and methodologies, including sophisticated modelling and scenario planning, our consultants apply their analytical skills to uncover potential complications and profitable prospects.



6. SUPPLY CHAIN MANAGEMENT

Freightenix Cargo Solutions Pvt Ltd pioneering approach to supply chain management has made us the partner of choice for re-engineering some of the most sophisticated supply chains in the world. Through our holistic approach and original thinking we're able to create supply chains that are dynamic, adaptable, responsive and visible. Performance-based supply chains that drive costs down and profits up.

We understand no business is the same. Which is why our supply chain management solutions are completely customized? Whether you want to know how a change in manufacturing processes will impact on your distribution, or you need a redesigned distribution network, our scenario planning, modelling and analysis tools combined with our expertise and resourcefulness ensures you get a solution that truly supports your business objectives.

Creating an innovative, customized supply chain solution is just the beginning. We then put a disciplined practical plan in place to ensure successful implementation and continuous improvement.

Our account management teams and consultants see themselves as an extension of your business from design to the on-going management or operation of your supply chain. Commitment and collaboration form the foundation of every partnership.



7. ROAD TRANSPORT

We have the size, strength and expertise to deliver flexible, optimized and sustainable transport solutions to new and existing clients. We deliver transport solutions across a wide range of industries. Our variety of services include dedicated, linehaul, cross-border, fuel, chemical and gas, timber, project cargo and abnormal loads, as well as other specialized services.

We have a combined track record of service excellence, innovation, advanced fleet management capabilities and international standards of safety, governance and risk management. It's how we deliver sustainable results that not only reduce risk and costs, but increase service levels, reliability and supply chain flexibility. For a smart transport solution geared

8. TRANSPORT MANAGEMENT SERVICES

Our dedicated Transport Management Services (TMS) team provides a service that encompasses far more than transport management. Armed with the experience, expertise, skills and knowledge, the TMS team begins by understanding your holistic business and supply chain needs.

This is followed by designing the optimal network configuration, strategic sourcing, planning, optimizing and managing the nationwide distribution of your goods. In addition, TMS manages everything from daily administration to analyzing trends, providing business intelligence and insight, which in turn enables an environment of

continuous improvement. Ultimately TMS is geared to help you reduce costs and risks but also increase integration, service levels, visibility and supply chain flexibility. The bottom line? TMS is in the business of developing a competitive advantage for the businesses we work with.

9. FREIGHT FORWARDING

Reliable global capacity guaranteeing you peace of mind.

At Freighterix Cargo Solutions Pvt Ltd , we're passionate about delivering your goods in the most cost-effective and efficient way. By understanding your needs and wants through intelligent analysis of the best way to move your goods, we provide a customized solution that fits both your financial and delivery needs.

As the Freight Forwarding partner for many blue-chip companies, Freighterix Cargo Solutions Pvt Ltd safely transports your cargo around the world, on time, on target and on budget.

Air freight

Fast and efficient.

Our comprehensive range of services in airfreight comprises:

- Consolidation services
- Air charters
- Customs brokerage
- Transshipment services
- Cross port services
- Direct shipments
- Events

Information Technology

Customized and cutting edge.

All of our products and solution offerings are underpinned and enabled by the most sophisticated information technology available.

- Fully-fledged ERP systems
- Online booking and shipment tracking for clients and agents
- Shipment status updates for customers via EDI/Fax/Email
- A sophisticated integration tool allows handshakes between client's systems and ours, ensuring faster response times to customers
- Single communication domain with instant messaging between Barloworld Logistics offices

Distribution

Whatever you need to move, wherever, we're equipped to move it.

Our Freight Forwarding and Clearing division offers a full range of rubber on the road options for your cargo, including:

- Heavy-duty fleet
- Tractor units
- Trailers
- Pick-up units
- Reefer and dry containers
- GPS

CHAPTER 3

RESEARCH METHODOLOGY

In order to accomplish the objectives of the study, it is essential to articulate the manner in which it is to be conducted, i.e., the research process is to be carried-out in a certain framework. The Research Methodology, which follows, is the backbone of the study. An Exploratory Research with the secondary data study was conducted. Primary data was collected with the help of a questionnaire. Conclusive research was also conducted, which involved Causal research in the field.

Research Methodology is a way to systematically solve the research problem. The Research Methodology includes the various methods and techniques for conducting a Research.

Research design

Descriptive research tries to explain analytically a situation, crisis, incident, service or programmed, or provides information about, say, living condition of a community, or describes attitudes towards an issue.

Sampling Plan – Sampling can be defined as the selection of some part of an aggregate or totality on the basis of which judgment or an inference about aggregate or totality is made.

Sample size:

A total of 125 employees were selected with an attempt to cover a wide cross section of the Freightrix Cargo Solutions Pvt Ltd.

Sampling Technique

Simple random sampling method is used in this study for data collection.

Primary data:

Primary data was collected with the help of a Questionnaire. A detailed questionnaire was prepared for which data is collected from 125 employees of Freightrix Cargo Solutions Pvt Ltd in Chennai.

Secondary data:

Secondary data was collected by external sources like books, newspapers and journals; new age sources like the internet. Some White papers and articles were also referred to get an insight on the working of RFID Technology. Access to different articles with respect to RFID technology on the internet enabled to gather some useful information and facts about the same.

Mode of data collection:

The questionnaire consisted of questions on the existing method of inventory management, use of supply chain management software and other aspects of supply chain management. The questionnaire also designed to gather information on the need, perception and barriers towards RFID and readiness of these firms to embrace RFID technology in the near future.

Tools data Analysis

Under probability clustered sampling, the statistical tools applied are,

1. Percentage method
2. Chi-square method
3. Karl Pearson's Correlation co-efficient

LIMITATIONS OF THE STUDY

1. The study is restricted to few of the companies in Freightrix Cargo Solutions Pvt Ltd in Chennai
2. Due to time constraint the whole population could not be considered.
3. The study considered only 125 samples.

The employees could not contribute more time. Not all the employees answer the questionnaire

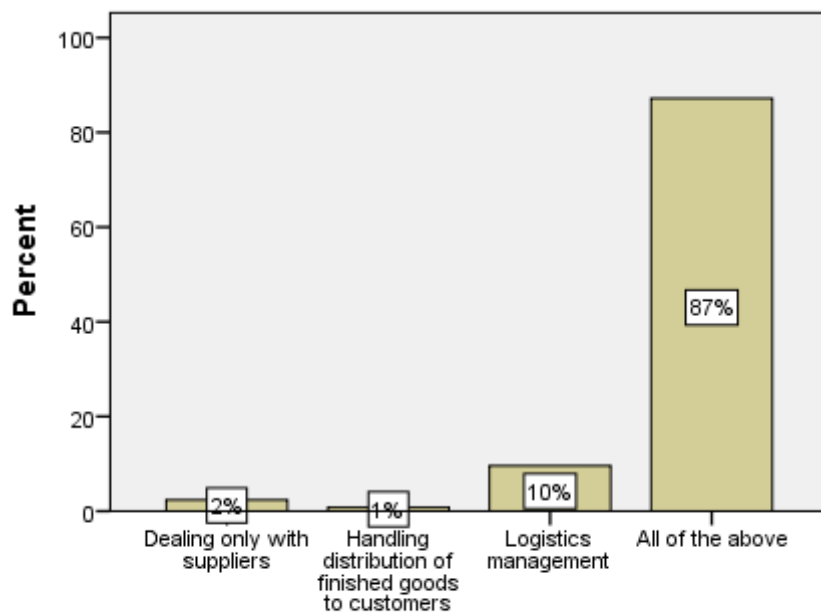
CHAPTER 4

DATA ANALYSIS & INTERPRETATION

TABLE 1
IN-HOUSE SCM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Dealing Suppliers	3	2.4	2.4	2.4
	Handling distribution	1	.8	.8	3.2
	Logistics Management	12	9.6	9.6	12.8
	All the above	109	87.2	87.2	100.0
	Total	125	100.0	100.0	

CHART 1
IN-HOUSE SCM



SOURCE: IBM SPSS STATISTICS DATA

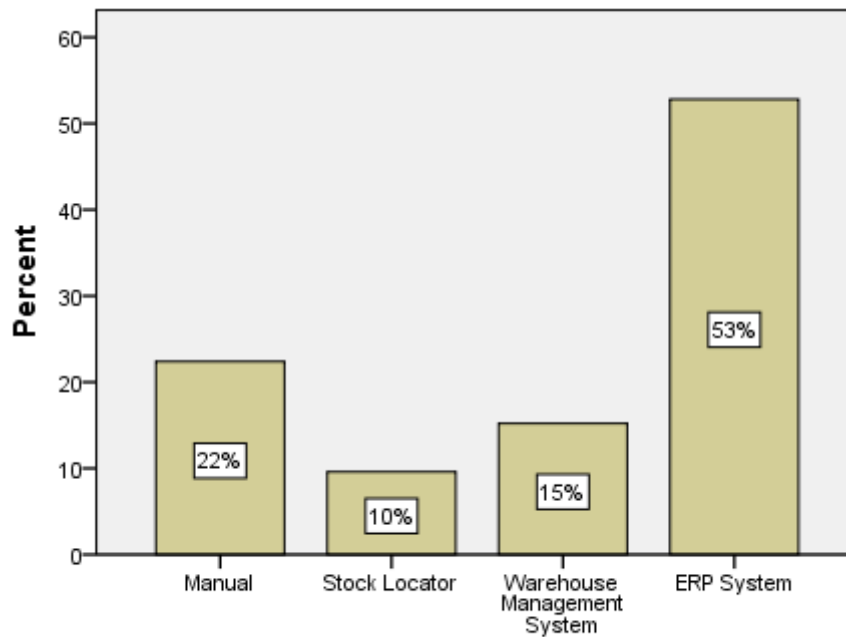
Interpretation:

2% said they are dealing only with suppliers, 1% said they are handling distribution of finished goods to customers, 10% said they are involved in logistics management, and 87% said all the above functions are dealt by in-house SCM.

TABLE 2
INVENTORY MANAGEMENT SYSTEM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Manual	28	22.4	22.4	22.4
	Stock Locator	12	9.6	9.6	32.0
	Warehouse Management System	19	15.2	15.2	47.2
	ERP System	66	52.8	52.8	100.0
	Total	125	100.0	100.0	

CHART 2
INVENTORY MANAGEMENT SYSTEM



SOURCE: IBM SPSS STATISTICS DATA

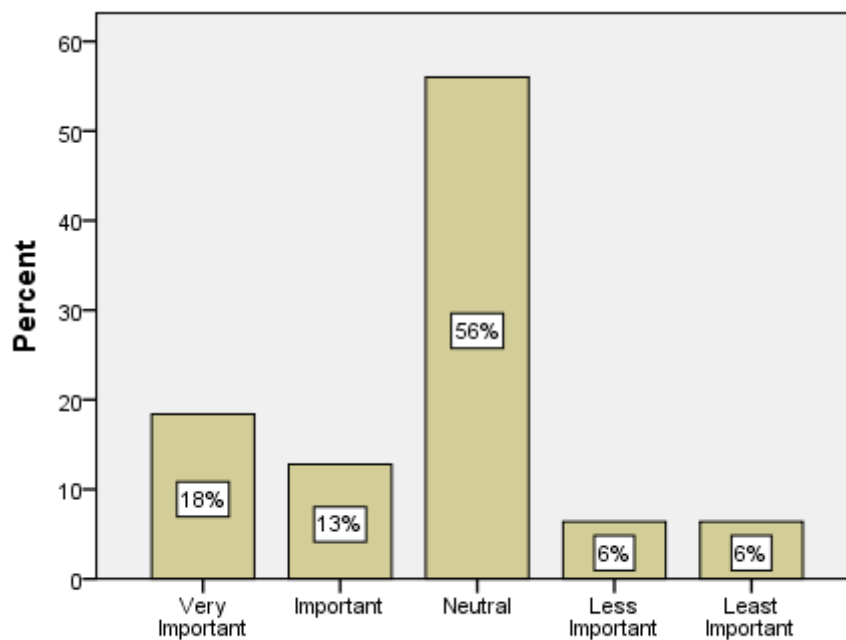
Interpretation:

22% said the company's inventory management system is manual, 10% said they are adopting warehouse management system, 15% of them said they are using ERP systems and the rest 53% said they are using stock locator.

TABLE 3
RFID TECHNOLOGIES TO LOWER INVENTORY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Important	23	18.4	18.4	18.4
	Important	16	12.8	12.8	31.2
	Neutral	70	56.0	56.0	87.2
	Less Important	8	6.4	6.4	93.6
	Least Important	8	6.4	6.4	100.0
	Total	125	100.0	100.0	

CHART 3
RFID TECHNOLOGIES TO LOWER INVENTORY



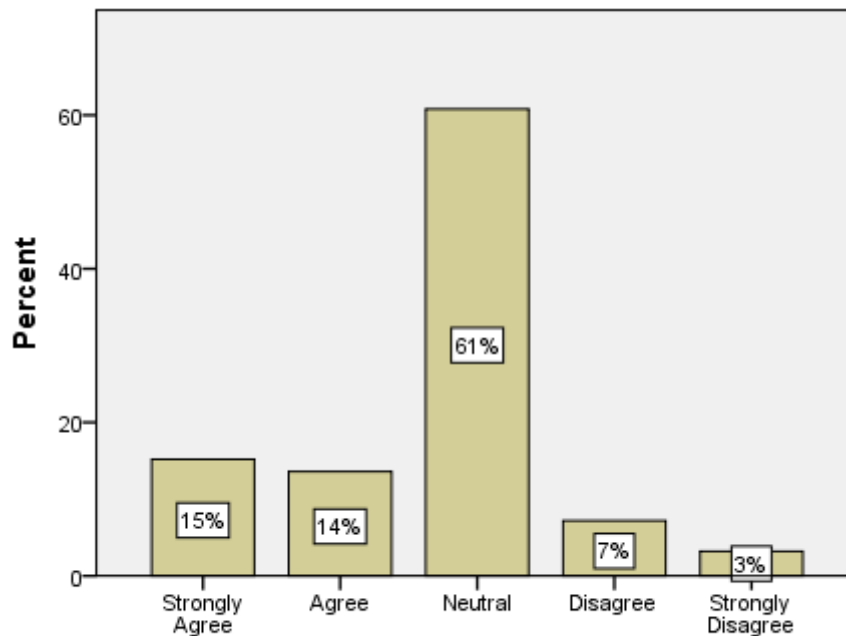
SOURCE: IBM SPSS STATISTICS DATA

Interpretation: 18% respondents said RFID technology is very important to lower inventory, 13% said it is important, 56% of the respondents are neutral towards the RFID Technologies to lower inventory, 6% of them said it is less important, 6% said it is least important.

TABLE 4
RFID TECHNOLOGIES FOR COMPETITIVE ADVANTAGE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	19	15.2	15.2	15.2
	Agree	17	13.6	13.6	28.8
	Neutral	76	60.8	60.8	89.6
	Disagree	9	7.2	7.2	96.8
	Strongly Disagree	4	3.2	3.2	100.0
	Total	125	100.0	100.0	

CHART 4
RFID TECHNOLOGIES FOR COMPETITIVE ADVANTAGE



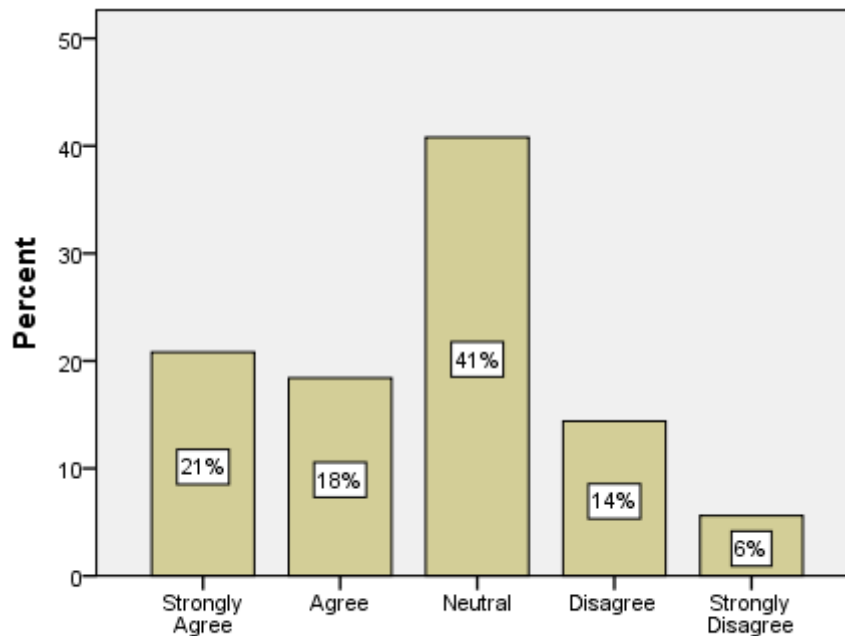
SOURCE: IBM SPSS STATISTICS DATA

Interpretation: 15% strongly agree that RFID Technology is needed to gain competitive advantage, 14% of them agree this, 61% of the respondents are neutral towards the RFID technologies for competitive advantage, 7% disagree, and 3% strongly disagree

TABLE 5
RFID TECHNOLOGY TO INCREASE VISIBILITY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	26	20.8	20.8	20.8
	Agree	23	18.4	18.4	39.2
	Neutral	51	40.8	40.8	80.0
	Disagree	18	14.4	14.4	94.4
	Strongly Disagree	7	5.6	5.6	100.0
	Total	125	100.0	100.0	

CHART 5
RFID TECHNOLOGY TO INCREASE VISIBILITY



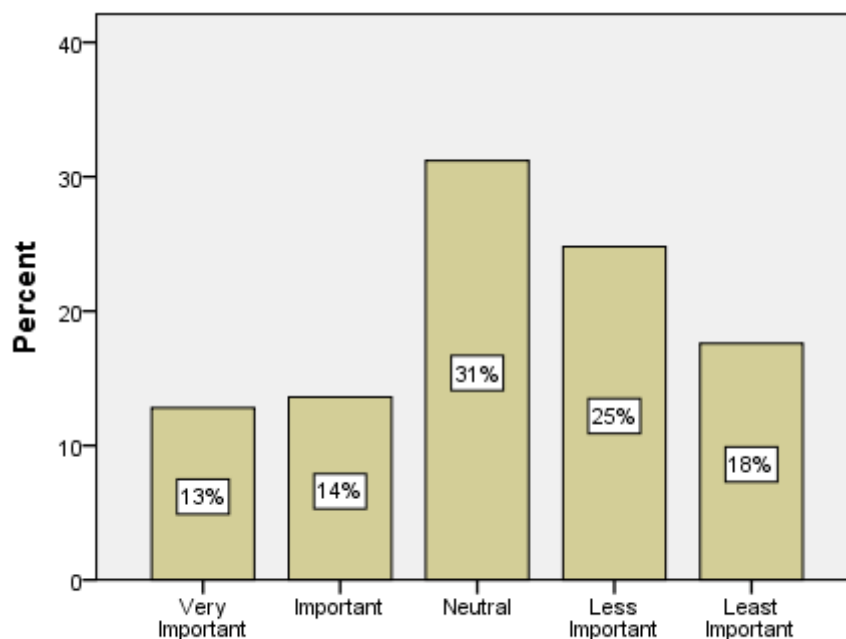
SOURCE: IBM SPSS STATISTICS DATA

Interpretation: 21% strongly agree that RFID Technology increases visibility, 18% of them agree this, and 41% of the respondents are neutral towards the RFID technology to Increase visibility, 14% disagree, and 6% strongly disagree

TABLE 6
RFID TECHNOLOGY REDUCE OPERATION COST

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Important	16	12.8	12.8	12.8
	Important	17	13.6	13.6	26.4
	Neutral	39	31.2	31.2	57.6
	Less Important	31	24.8	24.8	82.4
	Least Important	22	17.6	17.6	100.0
	Total	125	100.0	100.0	

CHART 6
RFID TECHNOLOGY REDUCE OPERATION COST



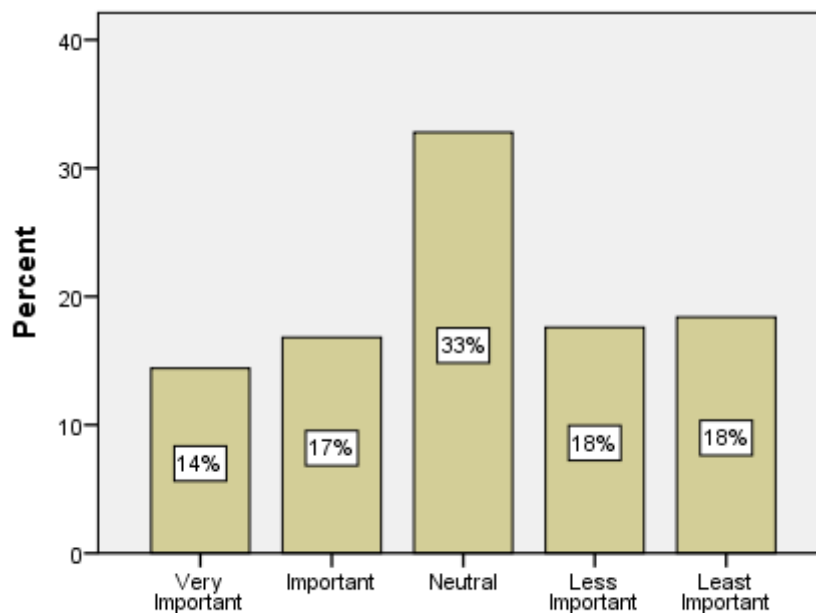
SOURCE: IBM SPSS STATISTICS DATA

Interpretation: 13% said RFID Technologies is needed to increase visibility in supply chain by tracking goods in supply chain, 14% of them said it is important, 31% of the respondents are neutral towards this, 25% said it is less important that RFID technology reduce operating cost, 18% said it is least important.

TABLE 7
RFID TECHNOLOGY REDUCE ORDER CYCLE

RFID Technology to reduce order cycle					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Important	18	14.4	14.4	14.4
	Important	21	16.8	16.8	31.2
	Neutral	41	32.8	32.8	64.0
	Less Important	22	17.6	17.6	81.6
	Least Important	23	18.4	18.4	100.0
	Total	125	100.0	100.0	

CHART 7
RFID TECHNOLOGY REDUCE ORDER CYCLE



SOURCE: IBM SPSS STATISTICS DATA

Interpretation: 14% said RFID Technologies is needed to reduce order cycle, 17% of them said it is important, 33% of the respondents are neutral towards the statement that RFID technology reduce order cycle, 18% said it is less important, 18% said it is least important.

TABLE 8
PREREQUISITE FOR SCM INITIATIVE

Description	No of respondents					Total
	SA	A	N	DA	SDA	
Company outlook	24	48	14	12	27	125
Involvement of management	20	56	21	15	13	125
Budget allocations	25	60	15	10	15	125
Existence of ERP software	15	27	48	19	16	125
Trained manpower	18	11	43	38	15	125
Suppliers involvement	34	48	04	12	27	125

PERCENTAGE OF PREREQUISITE FOR SCM INITIATIVE

Description	No of respondents					Total
	SA	A	N	DA	SDA	
Company outlook	19%	38%	12%	9%	22%	100%
Involvement of management	16%	45%	18%	11%	10%	100%
Budget allocations	20%	48%	12%	8%	12%	100%
Existence of ERP software	12%	22%	38%	15%	13%	100%
Trained manpower	14%	9%	35%	30%	12%	100%
Suppliers involvement	28%	38%	3%	9%	22%	100%

Inference:

- ✓ 19% of the respondents strongly agree that Company outlook is the pre requisite for RFID Technologies initiative, 38% agree this statement, 12% of them are neutral towards this, 9% of them disagree this, and 22% of them strongly disagree this opinion.
- ✓ 16% of the respondents strongly agree that involvement of management is the pre requisite for RFID Technologies initiative, 45% agree this statement, 18% of them are neutral towards this, 11% of them disagree this, and 10% of them strongly disagree this opinion.
- ✓ 20% of the respondents strongly agree that Budget allocations is the pre requisite for RFID Technologies initiative, 48% agree this statement, 12% of them are

neutral towards this, 8% of them disagree this, and 12% of them strongly disagree this opinion.

- ✓ 12% of the respondents strongly agree that existence of ERP software is the pre requisite for RFID Technologies initiative, 22% agree this statement, 38% of them are neutral towards this, 15% of them disagree this, and 13% of them strongly disagree this opinion.
- ✓ 14% of the respondents strongly agree that trained manpower is the pre requisite for RFID Technologies initiative, 9% agree this statement, 35% of them are neutral towards this, 30% of them disagree this, and 12% of them strongly disagree this opinion.
- ✓ 28% of the respondents strongly agree that suppliers involvement is the pre requisite for RFID Technologies initiative, 38% agree this statement, 3% of them are neutral towards this, 9% of them disagree this, and 22% of them strongly disagree this opinion.

CHART 8 PERCENTAGE OF PREREQUISITE FOR SUPPLY CHAIN MANAGEMENT INITIATIVE

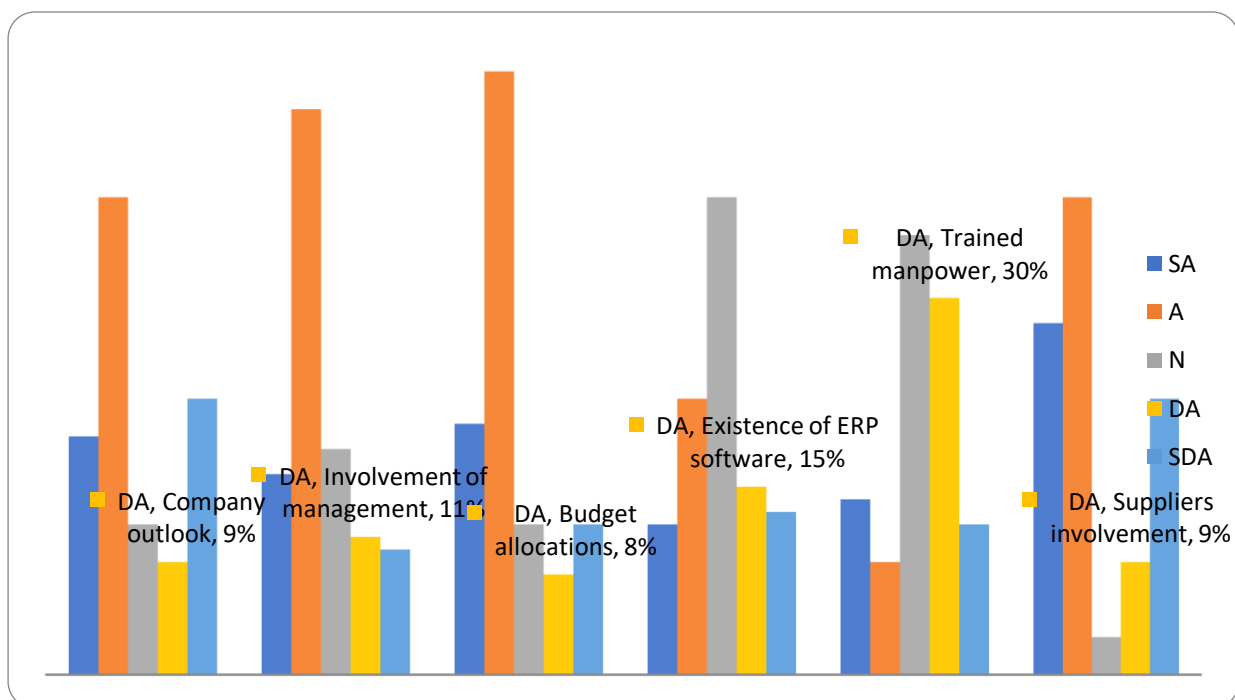
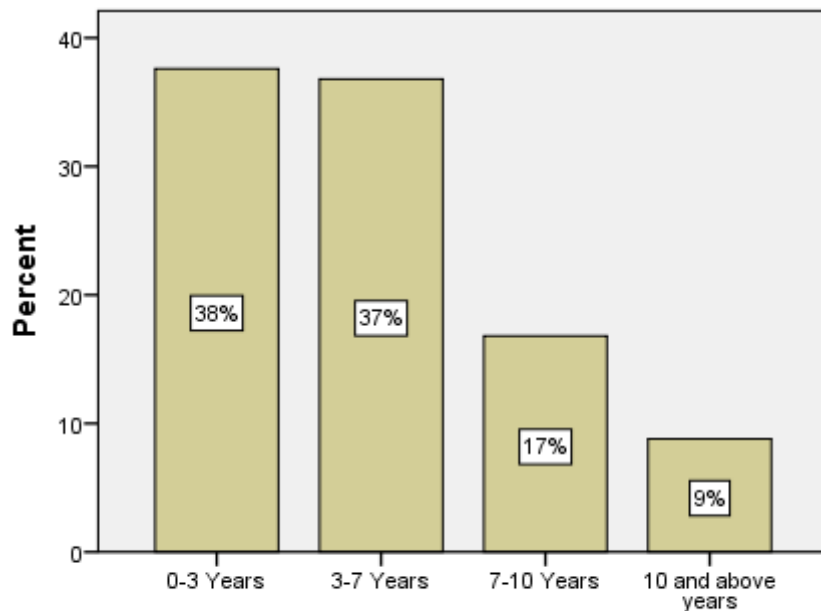


TABLE 9
EXPERIENCE IN SUPPLY CHAIN MANAGEMENT

Experience in SCM					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-3 Years	47	37.6	37.6	37.6
	3-7 Years	46	36.8	36.8	74.4
	7-10 Years	21	16.8	16.8	91.2
	More than 10	11	8.8	8.8	100.0
	Total	125	100.0	100.0	

CHART 9
EXPERIENCE IN SUPPLY CHAIN MANAGEMENT



SOURCE: IBM SPSS STATISTICS DATA

Interpretation: 38% of them are having 0-3 years of experience in supply chain management, 37% of them are having 3-7 years' experience, 17% of them are having 7-10 years of experience and the rest 9% of them are having more than 10 years of experience.

TABLE 10
RFID TECHNOLOGY IMPLEMENTATION IN FREIGHTERIX CARGO SOLUTIONS
PVT LTD

Description	No of respondents					Total
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
Pressure from major players	25	60	15	10	15	125
Compliance to standards	24	48	14	12	27	125
Select process	18	11	43	38	15	125
Competitive advantage	34	48	04	12	27	125

PERCENTAGE OF RFID TECHNOLOGY IMPLEMENTATION IN FREIGHTERIX
CARGO SOLUTIONS PVT LTD

Description	Percentage					Total
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
Pressure from major players	20%	48%	12%	8%	12%	100%
Compliance to standards	19%	38%	12%	9%	22%	100%
Select process	14%	9%	35%	30%	12%	100%
Competitive advantage	28%	38%	3%	9%	22%	100%

Inference:

- ✓ 20% of the respondents strongly agree that implementation of technology in the company creates pressure from major players, 48% agree this statement, 12% of them are neutral towards this, 8% of them disagree this, and 12% of them strongly disagree this opinion.
- ✓ 19% of the respondents strongly agree that implementation of technology in the company creates compliance to standards, 38% agree this statement, 12% of them are neutral towards this, 9% of them disagree this, and 22% of them strongly disagree this opinion.

- ✓ 14% of the respondents strongly agree that implementation of technology in the company creates pressure from major select process, 9% agree this statement, 35% of them are neutral towards this, 30% of them disagree this, and 12% of them strongly disagree this opinion.
- ✓ 28% of the respondents strongly agree that implementation of technology in the company creates competitive advantage, 38% agree this statement, 3% of them are neutral towards this, 9% of them disagree this, and 22% of them strongly disagree this.

CHART 10: RFID TECHNOLOGY IMPLEMENTATION IN FREIGHTERIX CARGO SOLUTIONS PVT LTD

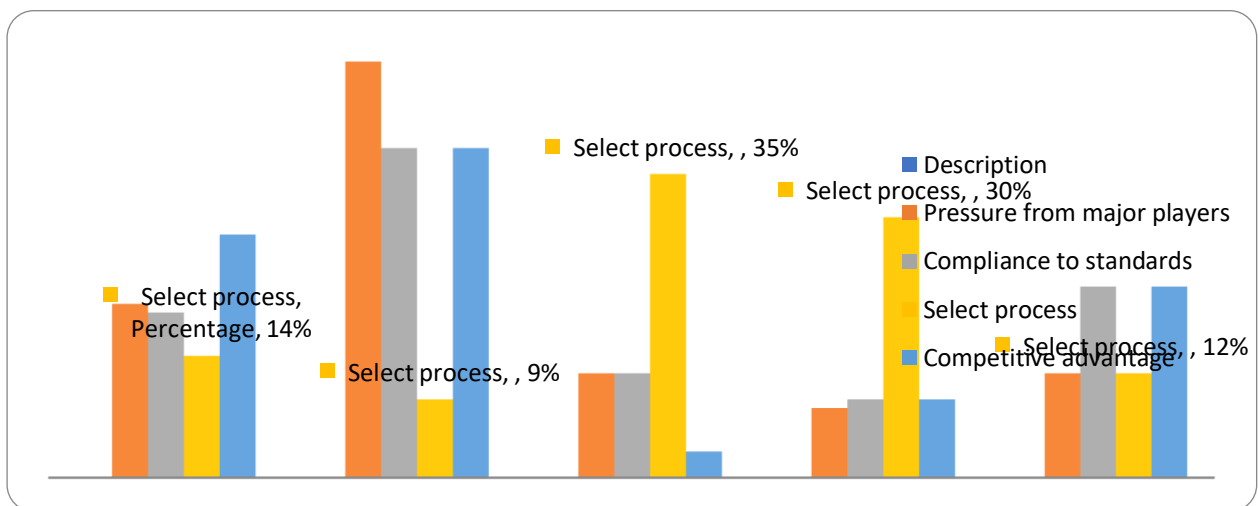
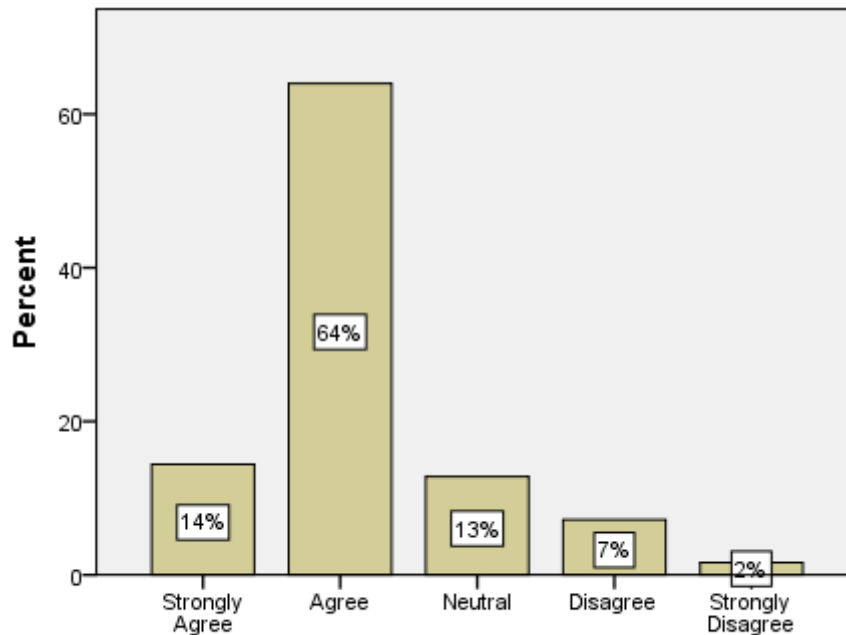


TABLE 11
PREVENTION OF PILFERAGE AND COUNTERFEITING STOCK

RFID prevent pilferage and counterfeiting stock					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	18	14.4	14.4	14.4
	Agree	80	64.0	64.0	78.4
	Neutral	16	12.8	12.8	91.2
	Disagree	9	7.2	7.2	98.4
	Strongly Disagree	2	1.6	1.6	100.0
	Total	125	100.0	100.0	

CHART 11
PREVENTION OF PILFERAGE AND COUNTERFEITING STOCK



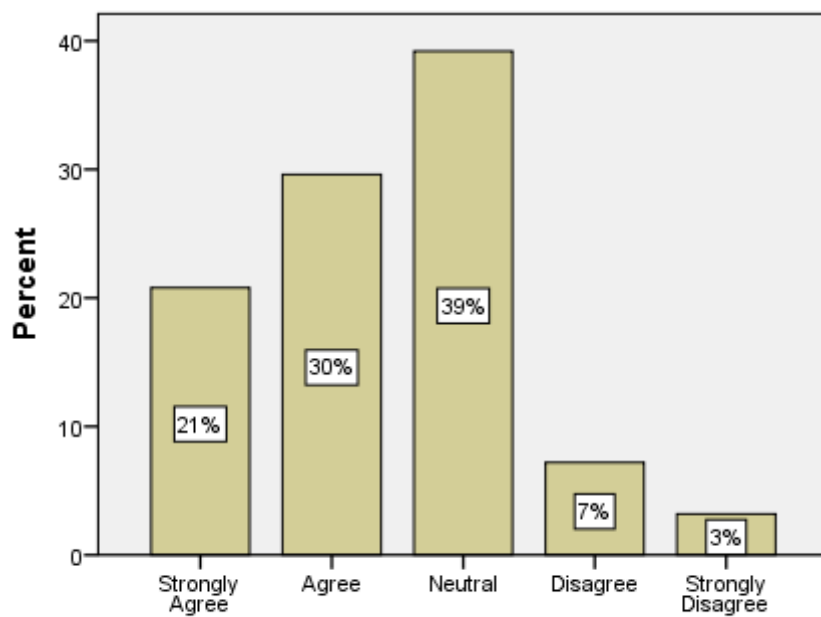
SOURCE: IBM SPSS STATISTICS DATA

Interpretation: 14% of the respondents strongly agree that adoption of new technology is needed to prevent pilferage and counterfeiting, 64% agree this statement, 13% of them are neutral towards this, 7% of them disagree this, and 2% of them strongly disagree this opinion.

TABLE 12
RFID ENHANCE CUSTOMER EXPERIENCE

RFID Technology helps to enhance customer experience					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	26	20.8	20.8	20.8
	Agree	37	29.6	29.6	50.4
	Neutral	49	39.2	39.2	89.6
	Disagree	9	7.2	7.2	96.8
	Strongly Disagree	4	3.2	3.2	100.0
	Total	125	100.0	100.0	

CHART 12
RFID ENHANCE CUSTOMER EXPERIENCE



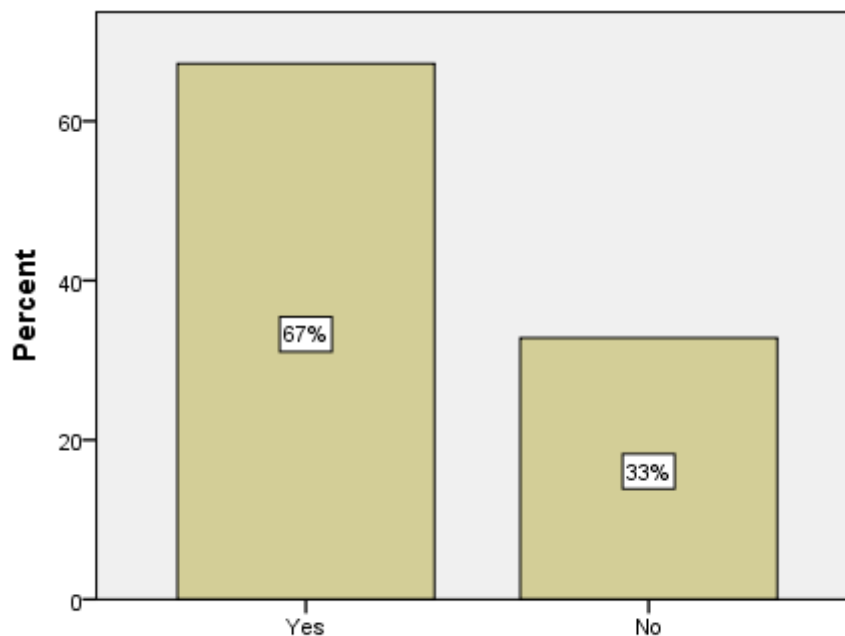
SOURCE: IBM SPSS STATISTICS DATA

Interpretation: 21% of the respondents strongly agree adoption of new technology is needed to enhance customer experience, 30% agree this statement, 39% of them are neutral towards this, 7% of them disagree this, and 3% of them strongly disagree this opinion.

TABLE 13
RFID TECHNOLOGY IS A TREND SETTER IN SCM

RFID technologies is a trend setter in SCM					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	84	67.2	67.2	67.2
	No	41	32.8	32.8	100.0
	Total	125	100.0	100.0	

CHART 13
RFID TECHNOLOGY IS A TREND SETTER IN SCM



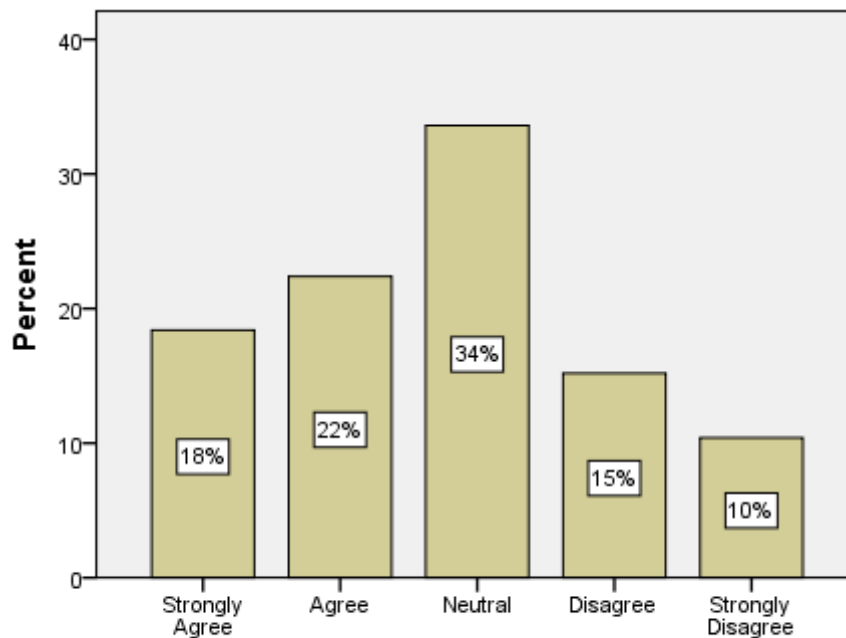
SOURCE: IBM SPSS STATISTICS DATA

Interpretation: 67% of them said RFID technology is a trend setter in supply chain management and the rest 33% of them disagree this.

TABLE 14
RFID HELPFUL IN INCREASING ASSET EFFICIENCY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	23	18.4	18.4	18.4
	Agree	28	22.4	22.4	40.8
	Neutral	42	33.6	33.6	74.4
	Disagree	19	15.2	15.2	89.6
	Strongly Disagree	13	10.4	10.4	100.0
	Total	125	100.0	100.0	

CHART 14
RFID HELPFUL IN INCREASING ASSET EFFICIENCY



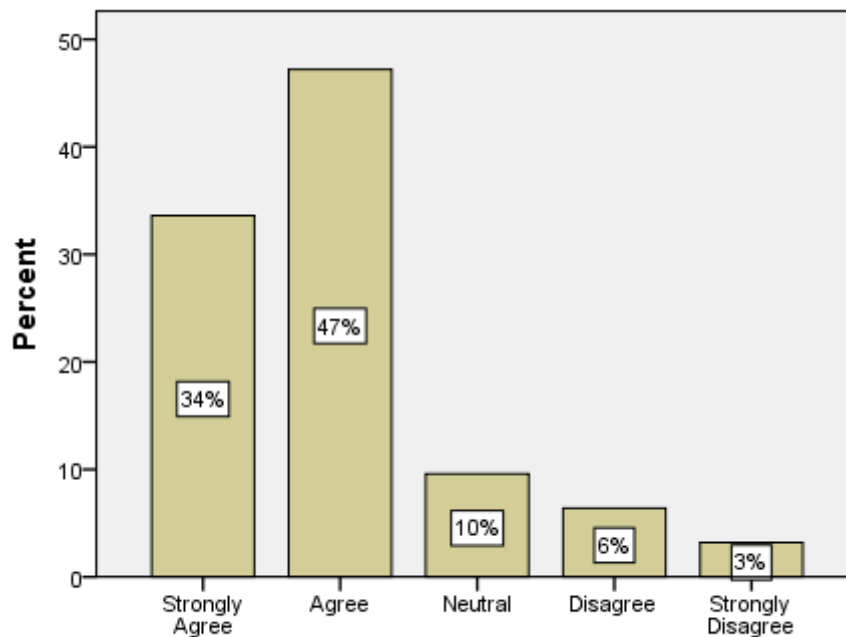
SOURCE: IBM SPSS STATISTICS DATA

Interpretation: 18% of the respondents strongly agree that adoption of new technology is needed to increase asset efficiency, 22% agree this statement, 34% of them are neutral towards this and 15% of them disagree this and the rest 10% of them strongly disagree this.

TABLE 15
RFID INCREASE CORPORATE CONTROL OVER MECHANISMS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	42	33.6	33.6	33.6
	Agree	59	47.2	47.2	80.8
	Neutral	12	9.6	9.6	90.4
	Disagree	8	6.4	6.4	96.8
	Strongly Disagree	4	3.2	3.2	100.0
	Total	125	100.0	100.0	

TABLE 15
RFID INCREASE CORPORATE CONTROL OVER MECHANISMS



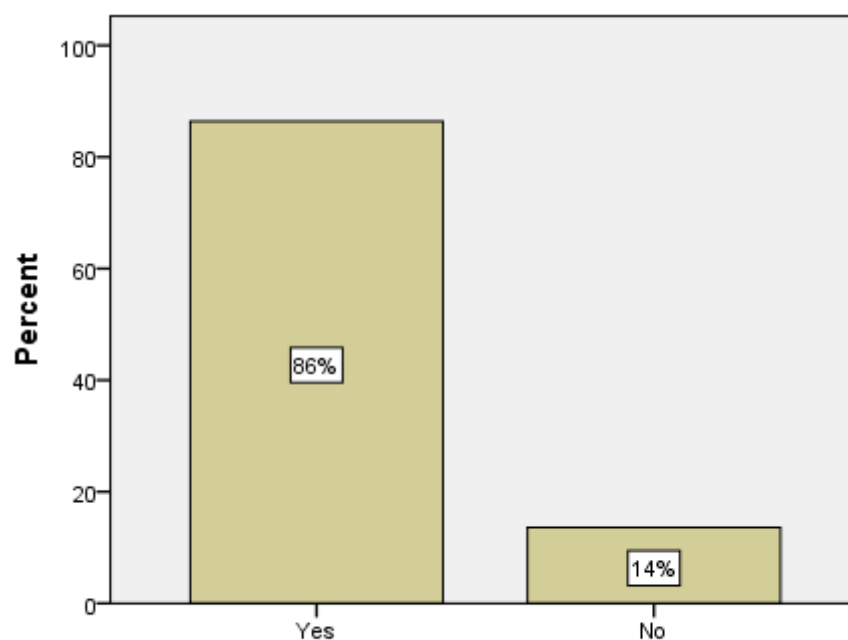
SOURCE: IBM SPSS STATISTICS DATA

Interpretation: 34% of the respondents strongly agree that adoption of new technology is needed to increase corporate control over mechanisms, 47% agree this statement, 10% of them are neutral towards this and 6% of them disagree this and the rest 3% of them strongly disagree this

TABLE 16
INCREASE IN ORGANIZATION REVENUE AFTER IMPLEMENTATION OF RFID

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	108	86.4	86.4	86.4
	No	17	13.6	13.6	100.0
	Total	125	100.0	100.0	

CHART 16
INCREASE IN ORGANIZATION REVENUE AFTER IMPLEMENTATION OF RFID



SOURCE: IBM SPSS STATISTICS DATA

Interpretation: 86% respondents strongly agree that after implementation of RFID there is increase revenue of the organization, 14% of them disagree this opinion.

TABLE 17
BARRIERS TO IMPLEMENT RFID TECHNOLOGIES

Description	No of respondents					Total
	SA	A	N	DA	SDA	
Insufficient knowledge	24	48	14	12	27	125
Lack of vendor participation	18	11	43	38	15	125
Organizational readiness to accept	34	48	04	12	27	125
Cost of implementation	25	60	15	10	15	125
Lack of sufficient business value	24	48	14	12	27	125
Technology maturity	34	48	04	12	27	125

PERCENTAGE OF BARRIERS TO IMPLEMENT RFID

Description	No of respondents					Total
	SA	A	N	DA	SDA	
Insufficient knowledge	19%	38%	12%	9%	22%	100%
Lack of vendor participation	14%	9%	35%	30%	12%	100%
Organizational readiness to accept	28%	38%	3%	9%	22%	100%
Cost of implementation	20%	48%	12%	8%	12%	100%
Lack of sufficient business value	19%	38%	12%	9%	22%	100%
Technology maturity	28%	38%	3%	9%	22%	100%

Inference:

- ✓ 19% of the respondents strongly agree that biggest barrier to implement ERP systems for RFID Technologies is insufficient knowledge, 38% agree this statement, 12% of them are neutral towards this, 9% of them disagree this, and 22% of them strongly disagree this opinion.
- ✓ 14% of the respondents strongly agree that biggest barrier to implement ERP systems for RFID Technologies is lack of vendor participation, 9% agree this statement, 35% of them are neutral towards this 30% of them disagree this and 12% of them strongly disagree this.
- ✓ 28% of the respondents strongly agree that biggest barrier to implement ERP systems for RFID Technologies is organizational readiness to accept, 38% agree

this statement, 3% of them are neutral towards this, 9% of them disagree this, and 22% of them strongly disagree this opinion.

- ✓ 20% of the respondents strongly agree that biggest barrier to implement ERP systems for RFID Technologies is cost of implementation, 48% agree this statement, 12% of them are neutral towards this, 8% of them disagree this and 12% of them strongly disagree this opinion.
- ✓ 19% of the respondents strongly agree that biggest barrier to implement ERP systems for RFID Technologies is lack of sufficient business value, 38% agree this statement, 12% of them are neutral towards this, 9% of them disagree this, and 22% of them strongly disagree this opinion.
- ✓ 28% of the respondents strongly agree that biggest barrier to implement ERP systems for RFID Technologies is technology maturity, 38% agree this statement, 3% of them are neutral towards this, 9% of them disagree this, and 22% of them strongly disagree this opinion.

CHART 17

PERCENTAGE OF BARRIERS TO IMPLEMENT RFID TECHNOLOGIES

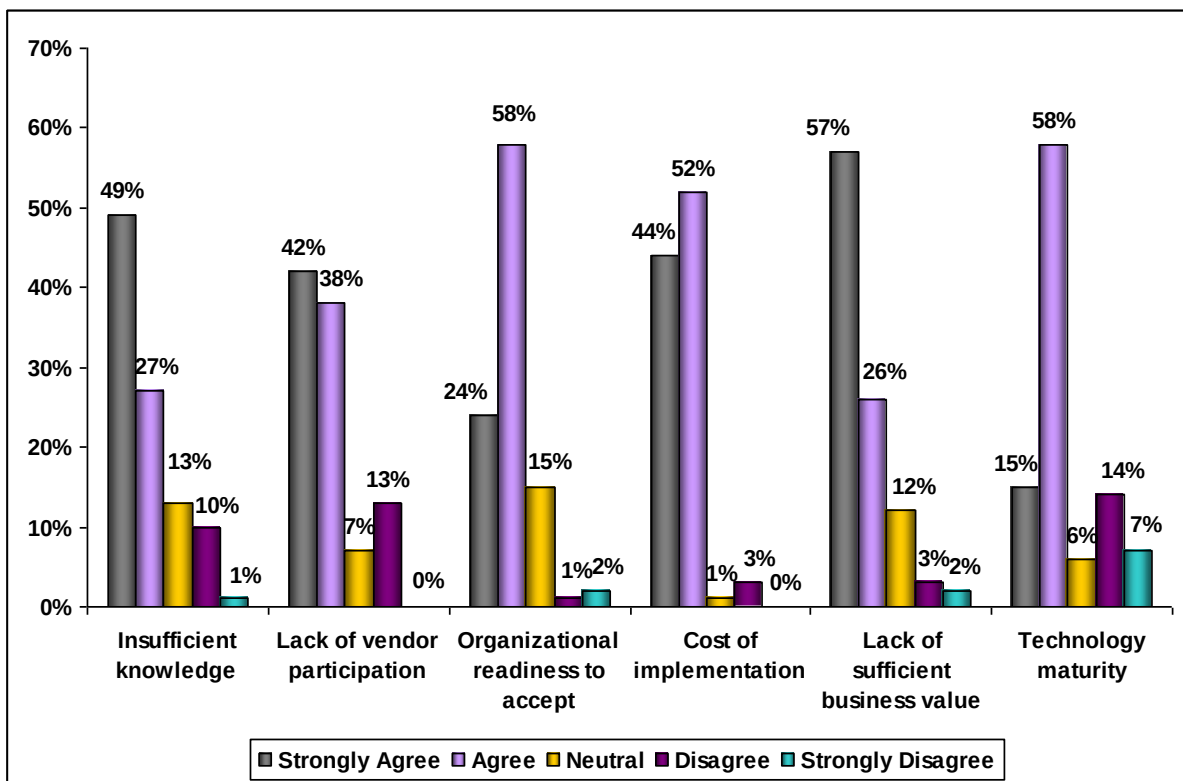
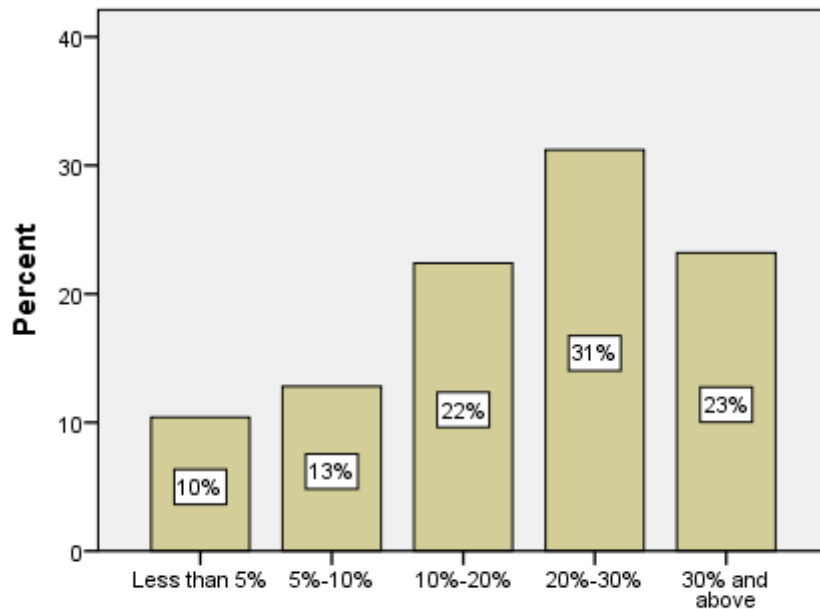


TABLE 18
EXPECTED GROWTH OF RFID TECHNOLOGIES IN NEXT 5 YEARS

Expected growth of RFID technologies in next 5 years					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 5%	13	10.4	10.4	10.4
	5-10%	16	12.8	12.8	23.2
	10-20%	28	22.4	22.4	45.6
	20-30%	39	31.2	31.2	76.8
	Above 30%	29	23.2	23.2	100.0
	Total	125	100.0	100.0	

CHART 18: EXPECTED GROWTH OF RFID TECHNOLOGIES IN NEXT 5 YEARS



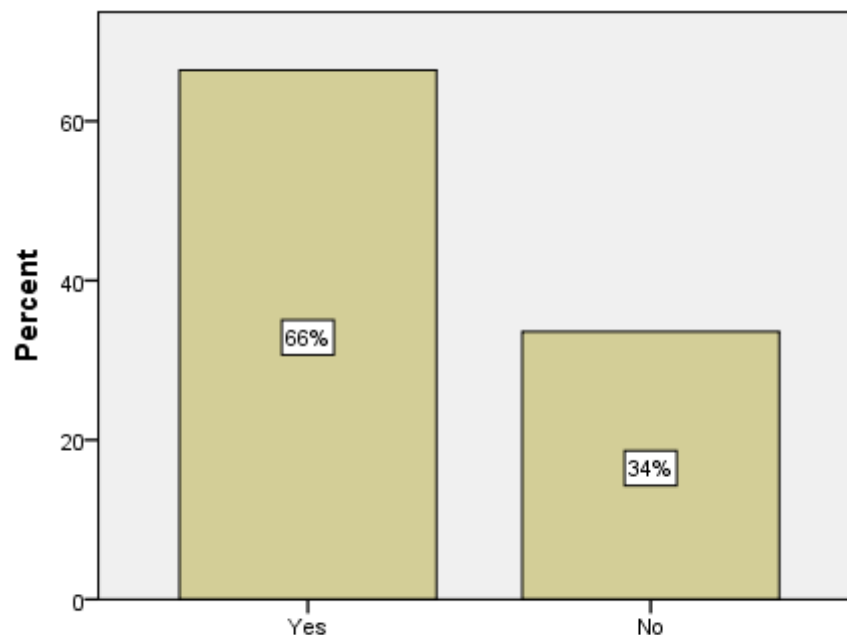
SOURCE: IBM SPSS STATISTICS DATA

Interpretation: 10% of the respondents said less than 5% of expected growth of RFID technologies will be seen in the next 5 years, 13% said the growth rate would be around 5% - 10%, 22% said it is between 10-20%, 31% said it is between 20-30% and the rest 23% said the growth rate would be above 30%.

TABLE 19
IS THE IMPACT OF RFID TECHNOLOGY ON WAREHOUSE MANAGEMENT OF
FREIGHTERIX CARGO SOLUTIONS PVT LTD IS EFFICIENT?

Is impact of RFID technology efficient					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	83	66.4	66.4	66.4
	No	42	33.6	33.6	100.0
	Total	125	100.0	100.0	

CHART 19
IS THE IMPACT OF RFID TECHNOLOGY ON WAREHOUSE MANAGEMENT OF
FREIGHTERIX CARGO SOLUTIONS PVT LTD IS EFFICIENT?



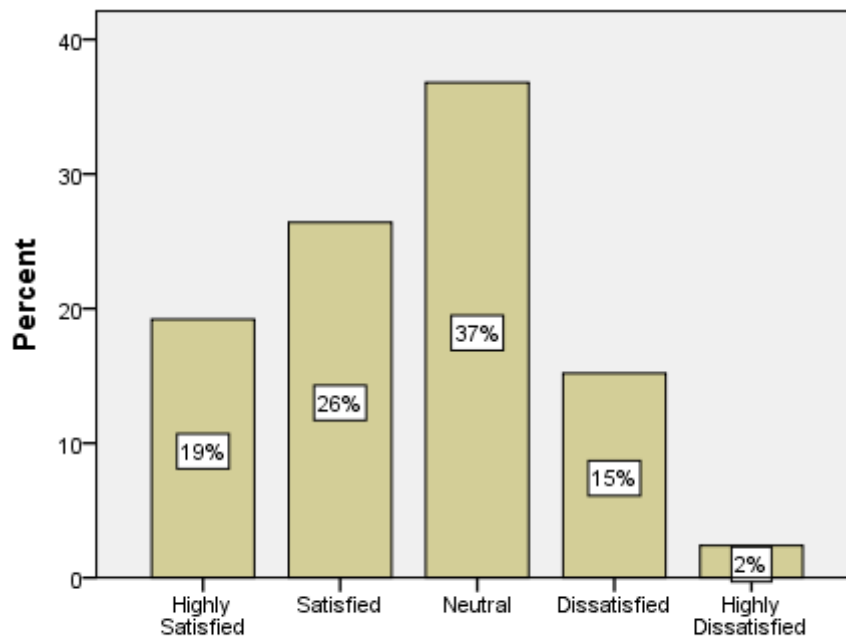
SOURCE: IBM SPSS STATISTICS DATA

Interpretation: 66% of the respondents RFID is considerably reducing the cost and 34% of them said it is not cost effective

TABLE 20
ADOPTION OF RFID TECHNOLOGY REDUCES COST

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Highly Satisfied	24	19.2	19.2	19.2
	Satisfied	51	26.4	26.4	45.6
	Neutral	28	36.8	36.8	82.4
	Dissatisfied	19	15.2	15.2	97.6
	Highly Dissatisfied	3	2.4	2.4	100.0
	Total	125	100.0	100.0	

CHART 20
ADOPTION OF RFID TECHNOLOGY REDUCES COST



SOURCE: IBM SPSS STATISTICS DATA

Interpretation: 24% of them are highly satisfied with the impact of RFID technology on warehouse management of Freightrix Cargo Solutions Pvt Ltd, 51% of them are satisfied, 28% of them said they are neither satisfied nor dissatisfied, 19% of them are found to be dissatisfied and the rest 3% of them said they are highly dissatisfied.

STATISTICAL TOOLS AND ANALYSIS

CHI- SQUARE TEST I – (ψ^2)

Chi-square is the sum of the squared difference observed (o) and the expected (e) data (or the deviation, d), divided by the expected data in all possible categories.

Null hypothesis (Ho):

There is a relationship between the experience in supply chain management and RFID technology to increase visibility.

Alternate hypothesis (H1):

There is no relationship between the experience in supply chain management and RFID technology to increase visibility.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
EXPERIENCE IN SUPPLY CHAIN MANAGEMENT * RFID TECHNOLOGY TO INCREASE VISIBILITY	1	100.0%	0	.0%	125	100.0%

EXPERIENCE IN SUPPLY CHAIN MANAGEMENT * RFID TECHNOLOGY TO INCREASE VISIBILITY Crosstabulation

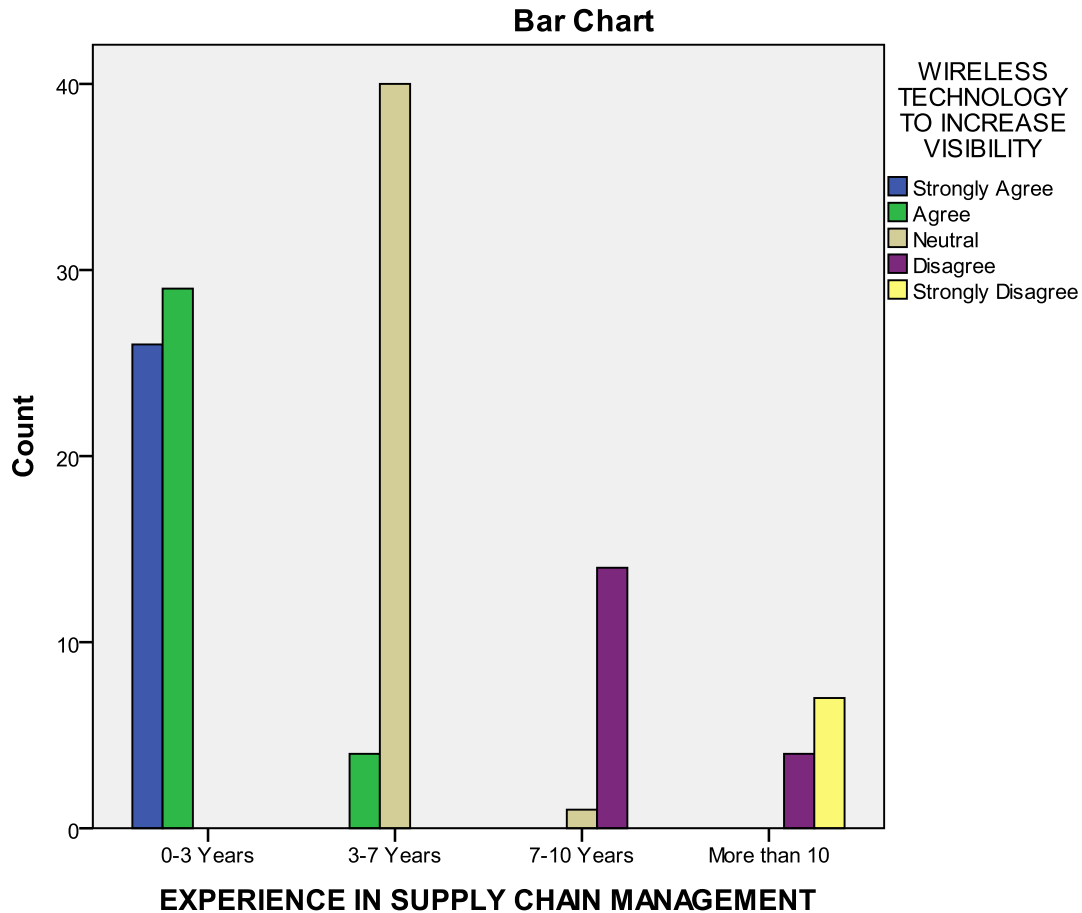
			RFID TECHNOLOGY TO INCREASE VISIBILITY					Total
			Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
EXPERIENCE IN SUPPLY CHAIN MANAGEMENT	0-3 Years	Count	26	29	0	0	0	55
		% within EXPERIENCE IN SUPPLY CHAIN MANAGEMENT	47.3%	52.7%	.0%	.0%	.0%	100.0%
		% within RFID TECHNOLOGY TO INCREASE VISIBILITY	100.0%	87.9%	.0%	.0%	.0%	44.0%
		% of Total	20.8%	23.2%	.0%	.0%	.0%	44.0%
	3-7 Years	Count	0	4	40	0	0	44
		% within EXPERIENCE IN SUPPLY CHAIN MANAGEMENT	.0%	9.1%	90.9%	.0%	.0%	100.0%
		% within RFID TECHNOLOGY TO INCREASE VISIBILITY	.0%	12.1%	97.6%	.0%	.0%	35.2%
		% of Total	.0%	3.2%	32.0%	.0%	.0%	35.2%
	7-10 Years	Count	0	0	1	14	0	15
		% within EXPERIENCE IN SUPPLY CHAIN MANAGEMENT	.0%	.0%	6.7%	93.3%	.0%	100.0%
		% within RFID TECHNOLOGY TO INCREASE VISIBILITY	.0%	.0%	2.4%	77.8%	.0%	12.0%
		% of Total	.0%	.0%	.8%	11.2%	.0%	12.0%
	More than 10	Count	0	0	0	4	7	11
		% within EXPERIENCE IN SUPPLY CHAIN MANAGEMENT	.0%	.0%	.0%	36.4%	63.6%	100.0%

	% within RFID TECHNOLOGY TO INCREASE VISIBILITY	.0%	.0%	.0%	22.2%	100.0%	8.8%
	% of Total	.0%	.0%	.0%	3.2%	5.6%	8.8%
Total	Count	26	33	41	18	7	125
	% within EXPERIENCE IN SUPPLY CHAIN MANAGEMENT	20.8%	26.4%	32.8%	14.4%	5.6%	100.0%
	% within RFID TECHNOLOGY TO INCREASE VISIBILITY	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	20.8%	26.4%	32.8%	14.4%	5.6%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	284.844 ^a	12	.000
Likelihood Ratio	246.420	12	.000
Linear-by-Linear Association	105.526	1	.000
N of Valid Cases	125		

a. 12 cells (60.0%) have expected count less than 5. The minimum expected count is .62.



Degree of Freedom= $(r-1) * (c-1)$

$$= 3 * 4 = 12$$

Calculated value = 284.844

Tabulated value = 21.026

$Z = Z_{cal} > Z_{tab}$

$$Z = 284.844 > 21.026$$

Hence, the Alternate hypothesis [H1] is accepted

INFERENCE:

Since the calculated value is greater than the tabulated value, we accept the alternate hypothesis and hence there is a relationship between the experience in supply chain management and RFID technology to increase visibility.

ONE-WAY ANOVA CLASSIFICATION

Null hypothesis (Ho):

There is a significance difference between the adoption of RFID technology reduces cost and level of satisfaction with the impact of RFID technology on warehouse management.

Alternate hypothesis (H1):

There is no significance difference between the adoption of RFID technology reduces cost and level of satisfaction with the impact of RFID technology on warehouse management.

Descriptive

ADOPTION OF RFID TECHNOLOGY REDUCES COST

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Mean			
					Lower Bound	Upper Bound		
Highly Satisfied	24	1.00	.000	.000	1.00	1.00	1	1
Satisfied	51	1.00	.000	.000	1.00	1.00	1	1
Neutral	28	1.14	.356	.067	1.00	1.28	1	2
Dissatisfied	19	2.00	.000	.000	2.00	2.00	2	2
Highly Dissatisfied	3	2.00	.000	.000	2.00	2.00	2	2
Total	125	1.21	.408	.036	1.14	1.28	1	2

Test of Homogeneity of Variances

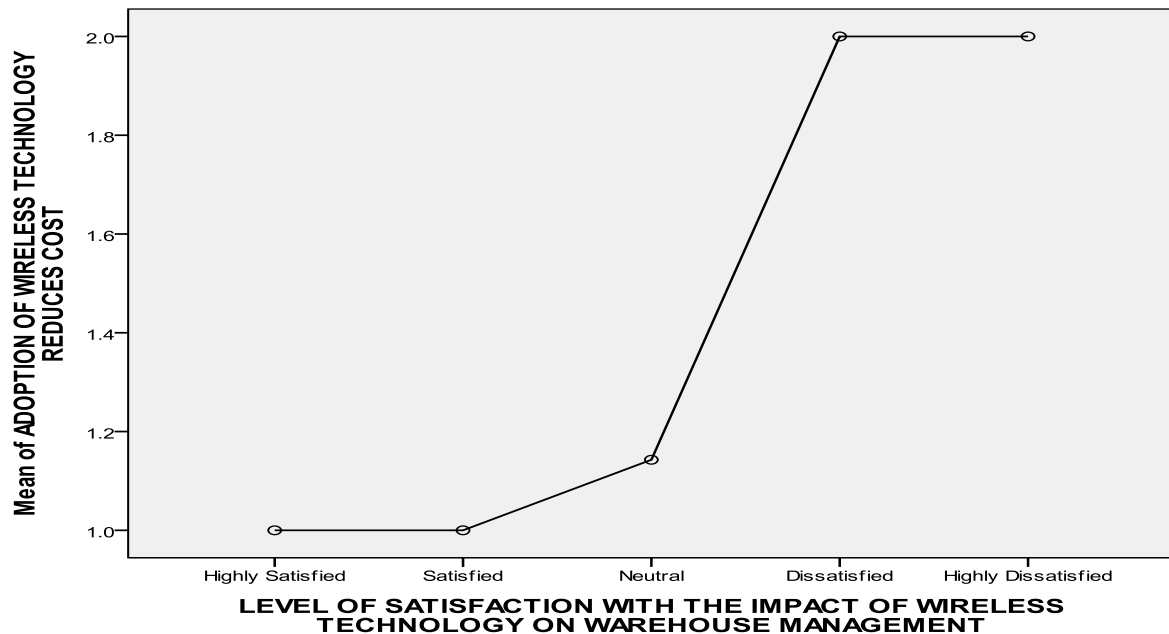
ADOPTION OF RFID TECHNOLOGY REDUCES COST

Levene Statistic	df1	df2	Sig.
22.349	4	120	.000

ANOVA

ADOPTION OF RFID TECHNOLOGY REDUCES COST

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17.163	4	4.291	150.180	.000
Within Groups	3.429	120	.029		
Total	20.592	124			



INFERENCE:

The calculated value of F is greater than the tabulated value. Hence, we reject the null hypothesis and conclude that there is no significance difference between the adoption of RFID technology reduces cost and level of satisfaction with the impact of RFID technology on warehouse management.

ANALYSIS USING KARL PEARSON'S CORRELATION

Correlation analysis is the statistical tool used to measure the degree to which two variables are linearly related to each other. Correlation measures the degree of association between two variables.

Null hypothesis (H0):

There is positive relationship between the RFID technologies to lower inventory and RFID technologies for competitive advantage.

Alternate hypothesis (H1):

There is negative relationship between the RFID technologies to lower inventory and RFID technologies for competitive advantage.

Correlations

		RFID TECHNOLOGIES TO LOWER INVENTORY	RFID TECHNOLOGIES FOR COMPETITIVE ADVANTAGE
RFID TECHNOLOGIES TO LOWER INVENTORY	Pearson Correlation	1	.950**
	Sig. (2-tailed)		.000
	N	125	125
RFID TECHNOLOGIES FOR COMPETITIVE ADVANTAGE	Pearson Correlation	.950**	1
	Sig. (2-tailed)	.000	
	N	125	125

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

INFERENCE

Since r is positive, there is positive relationship between the RFID technologies to lower inventory and RFID technologies for competitive advantage.

FINDINGS

1. 87% said that all the functions like Logistics Management, handling distribution and Dealing Suppliers are dealt by in-house SCM.
2. 53% said they are using stock locator for inventory management
3. Most of the respondents are neutral towards the RFID Technologies to lower inventory
4. 61% of the respondents are neutral towards the RFID technologies for competitive advantage
5. 41% of the respondents are neutral towards the RFID technology to Increase visibility
6. 25% of respondents gave less important that RFID technology reduce operating cost
7. 33% of the respondents are neutral towards the statement that RFID technology reduce order cycle
8. 38% of the respondents agree that Company outlook is the pre requisite for RFID Technologies initiative.
9. 45% of the respondents agree that involvement of management is the pre requisite for RFID Technologies initiative.
10. 48% of the respondents agree that Budget allocations are the pre requisite for RFID Technologies initiative.
11. 38% of the respondents neither agree nor disagree that existence of ERP software is the pre requisite for RFID Technologies initiative.
12. 35% of the respondents neither agree nor disagree that trained manpower is the pre requisite for RFID Technologies initiative.
13. 38% of the respondents agree that supplier's involvement is the pre requisite for RFID Technologies initiative.
14. 37% of them are having 3-7 years' experience,
15. 48% of the respondents agree that implementation of technology in the company creates pressure from major players.
16. 19% of the respondents strongly agree that implementation of technology in the company creates compliance to standards, 38% agree this statement, 12% of them are neutral towards this, 9% of them disagree this, and 22% of them strongly disagree this opinion.

17. 14% of the respondents strongly agree that implementation of technology in the company creates pressure from major select process, 9% agree this statement, 35% of them are neutral towards this, 30% of them disagree this, and 12% of them strongly disagree this opinion.
18. 28% of the respondents strongly agree that implementation of technology in the company creates competitive advantage, 38% agree this statement, 3% of them are neutral towards this, 9% of them disagree this, and 22% of them strongly disagree this.
19. 64% agree this statement that adoption of new technology is needed to prevent pilferage and counterfeiting
20. 39% of them are neutral towards this agree adoption of new technology is needed to enhance customer experience,
21. 67% of them said RFID technology is a trend setter in supply chain management
22. 34% of them are neutral towards agree that adoption of new technology is needed to increase asset efficiency
23. 64% agree this statement, that adoption of new technology is needed to prevent pilferage and counterfeiting
24. 39% of them are neutral towards adoption of new technology is needed to enhance customer experience
25. 67% of them said that RFID technology is a trend setter in supply chain management
26. 34% of them are neutral towards adoption of new technology is needed to increase asset efficiency
27. 47% agree this statement that adoption of new technology is needed to increase corporate control over mechanisms
28. 86% respondents strongly agree that after implementation of RFID there is increase revenue of the organization
29. 19% of the respondents strongly agree that biggest barrier to implement ERP systems for RFID Technologies is insufficient knowledge, 38% agree this statement, 12% of them are neutral towards this, 9% of them disagree this, and 22% of them strongly disagree this opinion.
30. 14% of the respondents strongly agree that biggest barrier to implement ERP systems for RFID Technologies is lack of vendor participation, 9% agree this

statement, 35% of them are neutral towards this 30% of them disagree this and 12% of them strongly disagree this.

31. 28% of the respondents strongly agree that biggest barrier to implement ERP systems for RFID Technologies is organizational readiness to accept, 38% agree this statement, 3% of them are neutral towards this, 9% of them disagree this, and 22% of them strongly disagree this opinion.

32. 20% of the respondents strongly agree that biggest barrier to implement ERP systems for RFID Technologies is cost of implementation, 48% agree this statement, 12% of them are neutral towards this, 8% of them disagree this and 12% of them strongly disagree this opinion.

33. 19% of the respondents strongly agree that biggest barrier to implement ERP systems for RFID Technologies is lack of sufficient business value, 38% agree this statement, 12% of them are neutral towards this, 9% of them disagree this, and 22% of them strongly disagree this opinion.

34. 28% of the respondents strongly agree that biggest barrier to implement ERP systems for RFID Technologies is technology maturity, 38% agree this statement, 3% of them are neutral towards this, 9% of them disagree this, and 22% of them strongly disagree this opinion.

35. 31% said it is between 20-30% of expected growth of RFID technologies will be seen in the next 5 years

36. 66% of the respondents RFID is considerably reducing the cost

37. 37% of them said they are neither satisfied nor dissatisfied with the impact of RFID technology on warehouse management of Freighterix Cargo Solutions Pvt Ltd

SUGGESTIONS

Tracking represents an additional layer of security to ensure goods reach their destination in the same condition as they began their journey, though other layers must be put in place to achieve a more comprehensive level of safety for vehicle and cargo transit. Company is trying to make additional layer of security to ensure whether the products are reached properly.

The main barrier in supply chain vulnerability is often overlooked as the movement of goods from the manufacturer to the port or border crossing, or from the port to the distribution center. Company has to take steps to overcome the problems

Vendor participation in this process is less in the company, so if losses happened it has to be borne by the company alone. The security issue within ERP has been there for a long time, but most of the solutions are based on the assumption that an ERP system is a closed environment. Given current trends, where the ERP is more likely to be an open system, these solutions are insufficient to provide the security. Although there are many researchers working in this area and some solutions are provided to better suited the open environment, yet the security mechanism for ERP system has not yet been brought to the open environment for discussion.

CONCLUSION

The warehouse often forms the heart of an organization's operations. It's the place through which all materials, products and merchandise flow end route to their final destinations. And among the many industries that rely on warehousing, retailers are leading the growing trend to embrace RFID technologies to transform their warehouse operations and gain ground on the competition. Advances in RFID technology are providing opportunities for companies to think more broadly about how they sell to their customers by extending their sales channels. Mobile technology enables companies to offer customers new methods of access that help streamline processes such as billing, access to product and services information and purchasing.

While Wi-Fi has enabled organizations to significantly increase warehouse efficiencies, it has also made them critically reliant on a technology that can sometimes be complex to troubleshoot. Any interruption in the network that leads to downtime can completely halt operations at the expense of the organization. Recent developments in the realm of international trade have increased the need for heightened security to prevent multi-frontal attacks.

QUESTIONNAIRE

1. Name :

2. Designation :

3. Which part of the in-house supply chain management activities do you lay focus on?

- ☐ Dealing only with suppliers
- ☐ Handling distribution of finished goods to customers
- ☐ Logistics management
- ☐ All of the above

4. What kind of inventory management system does your company have?

- ☐ Manual
- ☐ Stock locator
- ☐ Freightrix Cargo Solutions Pvt Ltd Management System
- ☐ ERP system

5. Is RFID Technologies important to lower excess inventory?

- ☐ Very Important
- ☐ Important
- ☐ Neutral
- ☐ Less Important
- ☐ Least Important

6. Do you think RFID Technologies helps to gain competitive advantage?

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

7. Is RFID Technologies needed to increase visibility in supply chain by tracking goods in supply chain?

- ☐ Strongly Agree

- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

8. RFID Technologies is essential in reducing in reducing operations cost?

- ☐ Very Important
- ☐ Important
- ☐ Neutral
- ☐ Less Important
- ☐ Least Important

9. “To reduce order cycle RFID Technology is important” - Comment

- ☐ Very Important
- ☐ Important
- ☐ Neutral
- ☐ Less Important
- ☐ Least Important

10. What is the most important prerequisite for supply chain management initiative?

Description	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Company outlook					
Involvement of management					
Budget allocations					
Existence of ERP software					
Trained manpower					
Suppliers involvement					

11. How many years' experience in Supply Chain Management?

- ☐ 0-3 years
- ☐ 3-7 years

- ☐ 7-10 years
- ☐ 10 and above

12. What is your perception towards RFID technology implementation in a company?

Description	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Pressure from major players					
Compliance to standards					
Select process (point solution for specific app)					
Competitive advantage					

13. Is RFID Technology helps to prevent pilferage and counterfeiting stock?

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

14. Do you agree that RFID Technology helps to enhance customer experience?

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

15. Do you think RFID technologies are a trend setter in Supply Chain Management?

- ☐ Yes
- ☐ No

16. Is RFID Technology helpful in increasing asset efficiency?

- ☐ Strongly Agree
- ☐ Agree

- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

17. “RFID Technology increase corporate control over mechanisms” – Comment

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

18. Do you agree that there is an increase in revenue after implementation of RFID in the organization?

- ☐ Yes
- ☐ No

19. What do you perceive as the biggest barriers to RFID implementation?

Description	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Insufficient knowledge of RFID					
Lack of vendor participation					
Organizational readiness to accept RFID					
Cost of implementation					
Lack of sufficient business value					
Technology maturity					

20. What is the expected growth of RFID technologies in next 5 years?

- ☐ Less than 5%
- ☐ 5% - 10%
- ☐ 10% - 20%
- ☐ 20% - 30%
- ☐ 30% and above

21. Is adoption of RFID technology reduces cost?

- ☐ Yes
- ☐ No

22. Is impact of RFID Technology on Management of Freighterix Cargo Solutions Pvt Ltd is efficient?

- ☐ Highly Satisfied
- ☐ Satisfied
- ☐ Neutral
- ☐ Dissatisfied
- ☐ Highly Dissatisfied

23. Your overall suggestions towards RFID Technology in Freighterix Cargo Solutions Pvt Ltd

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Freighterix Cargo Solutions

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03/01/2022

TO WHOMSOEVER IT MAY CONCERN

Sub: Confirmation of MBA Project

We wish to confirm that **Mr. RAHUL. K (REG.NO: 40410134)**, pursuing final year MBA in Sathyabama Institute Of Science And Technology, Chennai has been offered to do the Operation project in our concern from 03/01/2022 - 01/04/2022

We wish the student to complete this project successfully.

For Freighterix Cargo Solutions Pvt Ltd,

Kovendan. N

Project Manager





Freighterix Cargo Solutions

12/8, 9C, Krishnan Koil Street, Parrys, Chennai – 600 001

[www. freighterixcargosolutions.com](http://www.freighterixcargosolutions.com), Phone: 044- 43322527

03/03/2022

TO WHOMSOEVER IT MAY CONCERN

Sub: Completion of MBA Project

We wish to confirm that **Mr. RAHUL. K (REG.NO: 40410134)**, pursuing final year MBA in Sathyabama Institute Of Science And Technology, Chennai, has been offered to do the Operations project in our concern titled **“USAGE OF RFID TECHNOLOGY IN WAREHOUSES FOR TRACING GOODS AT FREIGHTERIX CARGO SOLUTIONS PVT LTD”** from 03/01/2022 - 03/03/2022

During the tenure with us, his conduct & behavior was observed to be good.

We wish success in all the future endeavors.

For Freighterix Cargo Solutions Pvt Ltd,

Kovendan. N

Project Manager

