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# Editorial Board

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# AN EXAMINATION OF ASHOK LEYLAND LTD.'S PAYABLES MANAGEMENT PROCEDURE

* ***Ms. Naga Pratibha. N & Ms. Poornika.V,*** *Department of Management Studies, St. Peter's College of Engineering & Technology, Chennai.*

## ABSTRACT:

Effective coordination across multiple teams, such as the Employee Reimbursement Team, Vendor Team, Payout Team, Bill Processing Team, Electricity Board Team, Rent Team, Petty Cash Team, and GST, is necessary for Ashok Leyland Limited's administration of the process payable in group. For financial transactions to be completed smoothly, every team is essential. The procedure entails reviewing bills and paying vendors and payouts on time as well as timely allocating employee reinvestments. Apart from managing utility payments and rent disbursements, the Electricity Board Team and Rent Team oversee the accurate validation and processing of bills, respectively, while the Bill Processing Team guarantees billing accuracy. In an effort to maintain an open and accountable system, the Petty Cash Team manages tiny, irregular expenses. The GST Team additionally makes sure that tax laws are followed. Through the implementation of an integrated approach to payable management, Ashok Leyland Limited is able to safeguard regulatory compliance and financial accuracy across a variety of financial activities.

***Keywords****:* Employee Reimbursement Team**,** Bill Processing Team**,** Petty Cash Team.

## INTRODUCTION:

An organization's methods and procedures for handling its immediate responsibilities to creditors and suppliers are referred to as payables management, sometimes called accounts payable management. For products and services that are bought on credit, this includes the complete process of receiving, confirming, and paying bills. To keep strong connections with suppliers, maximize cash flow, and guarantee the organization's financial stability, effective payables administration is crucial. An organization's ability to remain financially stable and run efficiently depends on its ability to handle its payables. Firms can guarantee timely fulfillment of their commitments, preservation of supplier relationships, and optimization of cash flow by employing best practices and utilizing technology.

## OBJECTIVES:

### Primary Objective

- An examination of Ashok Leyland ltd.'s payables management procedure

### Secondary Objective

- To assess the level of automation in the payables process and its impact on efficiency and accuracy.
- To investigate the impact of late payments on vendor relationships and overall business operations.
- To evaluate the effectiveness of internal controls in preventing fraud and errors in the payables process.

## REVIEW OF LITERATURE:

1. According to Nora Štangová's (2021) analysis, a company's ability to pay its debts will provide a reliable assessment of its financial situation. A company with sound finances can pay off its debts; one with unstable finances finds it more

difficult to do so. It is essential to keep the company's liquidity at its optimal level because of these variables. Using comparison and analysis as a research approach, the study aims to highlight liquidity in relation to the management of liabilities and the perception of receivables. The asset structures were the focus of the investigation, which started with the balance sheet of the selected company. We brought the analyzed company's receivables and liabilities to your attention. The article's final portion contained the analysis's conclusions.

2. In their research, Leonardo Sedevich-Fons (2019) reveals the significance of the accounts payable function in businesses and whether it is appropriate for it to be included in the ISO 9000 model with other organizational processes. Theoretically, quality management programs and the most fundamental accounting functions can coexist.
3. Organizations face when automating accounts payment. It looks at how automation technologies, like electronic payments, workflow automation, and optical character recognition (OCR), simplify invoice processing, lower manual error rates, and improve visibility into payables operations. The evaluation also addresses issues including change opposition, system integration complexity, and implementation costs. It also looks at ways to get around these obstacles and maximize the return on investment (ROI) of attempts to automate accounts payment.

## RESEARCH METHODLOGY

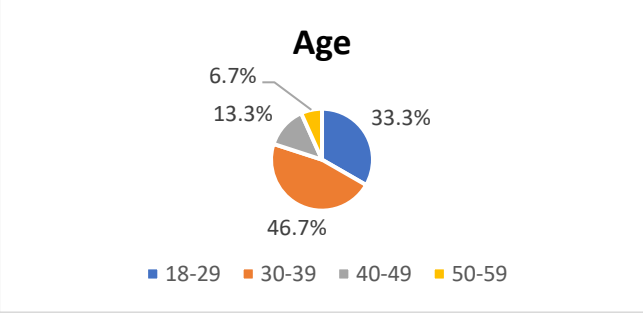
- **Research Design** – Design will be descriptive followed by partially exploratory because the entire project will be based on the data collected from reports and analysis so that the detailed and clear description will be there in the project.
- **Research Instrument** – Questionnaire
- **Sampling** – Convenient Sampling
- **Samples size** - 60
- **Tools used for analysis** – Percentage Analysis, Correlation, Anova.

## DATA ANALYSIS & INTERPRETATION

### PERCENTAGE ANALYSIS

**Age Of The Respondents**

| Particulars | Frequency | Percentage |
|---|---|---|
| 18-29 | 20 | 33.3% |
| 30-39 | 28 | 46.7% |
| 40-49 | 8 | 13.3% |
| 50-59 | 4 | 6.7% |
| Total | 60 | 100 |



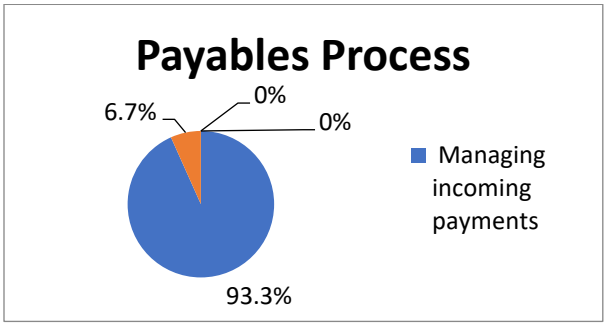

### INTERPRETATION

From the above table it is interpreted that the number of respondents between 18- 29 is 33.3%, 30-39 is 46.7%, 40-49 is 13.3%, 50-59 is 6.7%.

**Primary Purpose Of Payables Process**

| Particulars | Frequency | Percentage |
|---|---|---|
| Managing incoming | 56 | 93.3% |

| | | |
|---|---|---|
| payments | | |
| Managing outcoming payments | 4 | 6.7% |
| Tracking employee salaries | 0 | 0% |
| None of the above | 0 | 0% |
| Total | 60 | 100 |

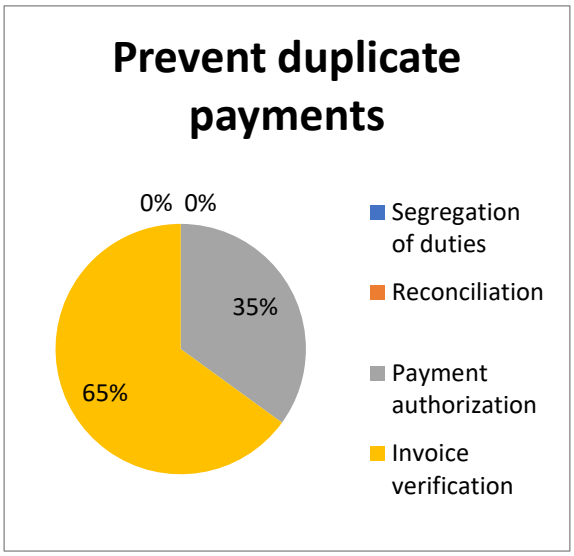



**INTERPRETATION**

From the above table it is represented that the 93.3% was managing incoming payments, 6.7% was managing outgoing payments, 0% was tracking employee salaries, 0% was none of the above.

## Prevent Duplicate Payments

| Particulars | Frequency | Percentage |
|---|---|---|
| Segregation of duties | 0 | 0% |
| Reconciliation | 0 | 0% |
| Payment authorization | 21 | 35% |
| Invoice verification | 39 | 65% |
| Total | 60 | 100 |

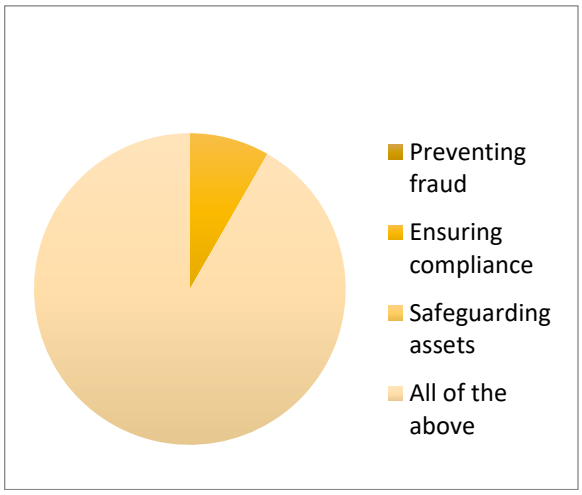



**INTERPRETATION**

From the above table it is interpreted that as 0% of respondents say their Segregation of duties 0% of reconciliation, 35% of payment authorization and 65% of invoice verification.

## Role Of Internal Controls

| S.NO | Particulars | Percentage |
|---|---|---|
| 1 | Preventing fraud | 0% |
| 2 | Ensuring compliance | 8.3% |
| 3 | Safeguarding assets | 0% |
| 4 | All of the above | 91.7% |




**INTERPRETATION**

From the above table it is interpreted that 0% of respondents say Preventing frauds,

8.3% say Ensuring Compilance,0% say Safeguarding assets,91.7% All the above.

## CORRELATIONS ANALYSIS

To test the significance difference between the payable's process and control measure helps to prevent duplicate payments in payables process in Ashok Leyland limited company

**CORRELATION**

| | | Payables process | Prevent duplicate payments in payables |
|---|---|---|---|
| Spearman's rho | Primary purpose Correlation Coefficient | 1.000 | -.191* |
| | Sig. (2-tailed) | . | .036 |
| | N | 120 | 120 |
| | Prevent duplicate payments in payables Correlation Coefficient | -.191* | 1.000 |
| | Sig. (2-tailed) | .036 | . |
| | N | 120 | 128 |

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

**INTERPRETATION**

If the correlation coefficient is greater than zero, it is a positive relationship. If the value is less than zero, it is a negative relationship. Value is 0.036, it shows positive relationship. Hence null Hypothesis (H0) is Rejected.

## ONE-WAY ANOVA

Table showing the significance difference between the reports in the payables process and role of internal controls in the payables process in Ashok Leyland limited company

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Reports in payables process | Between Groups | 36.121 | 2 | 18.060 | 49.076 | .000 |
| | Within Groups | 43.847 | 119 | .368 | | |
| | Total | 79.968 | 121 | | | |
| Role of internal controls in payables process | Between Groups | 7.193 | 2 | 3.596 | 10.670 | .000 |
| | Within Groups | 39.474 | 117 | .337 | | |
| | Total | 46.667 | 119 | | | |

**INTERPRETATION**

The significance difference between the reports in the payables process and role of internal controls in the payable process in Ashok Leyland limited company . F Ratio of the reports in the payables process is 49.016, and F Ratio of the role of internal controls in payables process is 10.660. Hence null hypothesis (H0) is rejected.

**HYPOYTHESIS:**

Null Hypothesis (H0): There is no

significant relationship between Aging reports in the payables process and the Role of internal controls in the payables process.
Alternative Hypothesis (H1): There is a significant relationship between Aging reports in the payables process and the Role of internal controls in the payables process.

## FINDINGS:

- Majority (57.1%) of the respondents are Male.
- Majority (46.7%) of the respondents fall in the age category of 30 to 39 years.
- Majority (60.2%) respondents say that Preventing fraud, ensuring compliance, Safeguarding assets are the role of internal controls in the payables process.
- Majority (92.9%) of respondents are primary purpose are Managing incoming payments.
- Majority (100%) of respondents we Finance in department oversees in payables management
- Majority (42.9%) of respondent's Invoice typically received by all three service like Online, Courier, Email.
- Majority (65%) of Software commonly used in managing payables process is Oracle.
- Majority (64.3%) say that Purpose of invoice matching in payables process was Ensuring accuracy of invoice
- Majority (60.2%) respondents say that Preventing fraud, ensuring compliance, Safeguarding assets are the role of internal controls in the payables process
- Majority (91.7%) of respondents say vendor invoices typically coded in the payables process by department.
- Majority (54.5%) of respondents say that purpose of a purchase order in the payables process is verifying invoice.

## SUGGESTION:

- With debit notes being the preferred method for resolving payment, focus on this process further to enhance efficiency.
- Since the payables process impacts financial statements, the importance of accurate and timely data entry to ensure financial reports reflect the true financial health of the organization.
- Highlight the significance of internal controls in preventing fraud, ensuring compliance, and safeguarding assets, especially since most respondents recognize these as key roles.

## CONCLUSION:

Blockchain technology is still relatively new to most enterprises. Financial statements, such as cash flow and balance sheets, are impacted by the payable's procedure. Effective payables management is essential for maintaining good supplier relationships, optimizing cash flow, and ensuring the financial stability of the organization.

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# CUSTOMERS PREFERENCE TOWARDS ONLINE SHOPPING

***Betsy. V Hannah*** *Assistant Professor, Department of Management studies. St. Peters college Engineering and Technology Chennai.*
***Vigneshwaran. S & Murugan. M****, Department of Management studies. St. Peters college Engineering and Technology Chennai.*

**Abstract**

In the age of globalization electronic marketing is of a immence revolution. Over the last ten years most of the business organization are implementing to this technology to market their several products. Online shopping offers an tremendously different shopping experience for people in developing nations like India. Convenience is one of the main reasons for going into online shopping. Large discounts & offers provided by the online sellers also appeal to numerous buyers. This study tries to discover the customer preference towards online shopping. The data is taken from 156 respondents using convenience sampling method who use online shopping facilities. The purpose of this study is to scrutinize the preference and attitude of customers towards online shopping and the sights of male and female customers. ANOVA, descriptive analysis are applied to find out the customers preference towards online shopping. The findings of this study indicates the age, gender, income, profession and family structure are critical factors that influence online shopping.

***Key words:*** *online shopping customer preference ANOVA descriptive statistics*

**Introduction:**

- Online shopping lets consumers to purchase goods directly from seller through Internet using any web browser.
- E-commerce, e marketing, digital marketing are growing steadily in recent years as our prime minister.
- Mr. Narendra Modi is aiming on digital India. presently India is having more than 2 billion internet users and India is at third position worldwide when it comes to internet users.
- Michale Aldrich invented online shopping in 1979.
- Online shopping is also known as e- web store, e shop,e store internet shop, web shop, web store, online storefront and virtual store.
- The popular online retailing companies in India are Flipkart, Amazon, eBay, Myntra, Snapdeal, and so on.
- The factors which impact customer preference towards online shopping are information, easy to use, security, satisfaction, proper utilization of available information to compare the different products available in the market.

**Statement of the problem:**

- This study has been carried out on the title, "A study on customer's preference towards online shopping".
- The study talks about the various factors like security, website design, time convenience, comparability of products-to analyse what are all the factors in influencing online shopping preference.

**Scope of the Study:**

- The present study has made an attempt to understand the customer's preference towards online shopping.
- Online shopping is an emerging concept in the study area.

- This study enables to understand the customers preference towards shopping & provides insight about online shopping.
- This study helps to know about the opinion of the customers about online shopping.
- To know what will customers prefer in the online shopping.

**Objectives of the study:**

- To analyse the factors influencing the customer preference towards online shopping

**Methodology:**

- This study is am empirical study based on survey conducted from 156 respondents selected by using convenient sampling.
- Primary data have been collected from the respondents by using a well-structured questionare
- Secondary data have been collected through friends, newspapers, social media as on it.

**Sample technique:**

Sampling technique is the technique used to select the sample size. Convenient sampling technique is used for this research. The respondents are from various locations spread across the city.

**Finding of the study:**

- The online shopping is getting popular among the young generation as they feel it more comfortable, time saving and convenient.
- It is analysed from the survey that when a consumer makes a mind to purchase online goods, he/she is affected by multiple factors.
- The main crucial identified factors are time saving, the best place and convenience.

**Suggestions:**

- The quality of the products is more important for the online shoppers
- The products picture should be clear and need to give correct pic of that products like colour, material, design etc
- Online shopping sites should increase the security for online payments.
- Customers' needs return option method for all products.
- Need to reduce the delivery charges to all products.

**Descriptive statics:**

Factors Influencing the Customer Preference Towards Online Shopping(Descriptive Statistics)

| | N | Mean | Std. Deviation |
|---|---|---|---|
| on-time delivery by shopping online | 156 | 4.09 | .953 |
| Easy to order in online shopping | 156 | 4.55 | .593 |
| Detail information is available while shopping online | 156 | 4.24 | .626 |
| I can buy the products anytime 24 hours a day while shopping online | 156 | 3.69 | .899 |
| It is easy to choose and make comparison with other products while shopping online | 156 | 4.35 | .659 |
| Can find products that are not available in the stores | 156 | 3.90 | .888 |
| No need to deal with sales people | 156 | 3.88 | .894 |
| Easy of product return and money refund | 156 | 4.29 | .645 |
| Offers and discounts | 156 | 3.99 | .957 |
| Inclination towards trying something new | 156 | 3.69 | 1.057 |
| Known or famous brand name | 156 | 4.33 | .656 |
| Online shopping saves customer's time | 156 | 4.18 | .677 |

**Conclusion:**

- Online shopping has come to be most popular and its extremely convenient.
- The online retailers must conscious of these factors to be successful and keep hold of the customers.
- Online shopping is growing tremendously in a positive manner.
- Online shopping is becoming more popular day by day with the increase in the usage of world wide web known as www.
- Consumers can do comparison shopping between products as well as online stores

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# URBAN TRANSIT EVOLUTION: EVALUATING ELECTRIC AND METRO TRAINS FOR A SUSTAINABLE FUTURE

**DR. KANCHANA NAIDU, ASSOCIATE PROFESSOR**
Department of Commerce
Women's Christian College, Chennai
(Affiliated to University of Madras)
Contact Number: (+91) 9841036460
E-mail ID: kanchananaidu@wcc.edu.in

**SAKTHI V**
III B. Com (Commerce)
Women's Christian College, Chennai
(Affiliated to University of Madras)
Contact Number: (+91) 6381230536
E-mail ID: sakthi26v@gmail.com

## ABSTRACT

The evolution of urban transit systems is pivotal in addressing the growing demand for sustainable and efficient transportation. This study investigates the comparative performance of electric and metro trains with a focus on demographic preferences, passenger experience, safety standards, and cost efficiency. By analysing responses from diverse demographic groups, the study explores how factors such as age, income, and residential location influence train usage and preferences. It also assesses comfort, convenience, cleanliness, and the effectiveness of safety and emergency systems in both electric and metro trains. The study also examines the affordability of ticket prices and the overall cost-effectiveness of these transit systems. The findings will provide insights into the strengths and areas of improvement for both modes of transportation, contributing to the broader discussion on urban transit sustainability.

***Keywords:*** *Urban transit, electric trains, metro trains, passenger experience, cost efficiency*

**INTRODUCTION:**

The demand for efficient and sustainable transportation solutions has increased due to the world's cities becoming more and more urbanized. Traditional forms of transportation frequently find it difficult to keep up with the growing urban population, which results in more traffic, pollution, and inefficiency. Within this framework, electric trains and metro systems have become essential substitutes, providing efficiency together with a smaller environmental impact. The purpose of this study is to investigate the numerous facets of electric and metro trains as well as their contributions to contemporary urban mobility. It will be easier to optimize these transit systems to satisfy the demands of varied urban populations if they are evaluated.

The evaluation of the passenger experience quality in both systems, with a focus on comfort, convenience, and general satisfaction, is another area of interest. Encouraging more people to use public transportation and making these services more appealing overall depend on providing a nice passenger experience.

The study compares the efficacy of emergency response systems and safety regulations in metro and electric trains. Passengers and transit authorities alike place a high priority on safety, thus it's critical to comprehend the advantages and disadvantages of each system in this regard. The analysis will also assess the affordability and cost-effectiveness of electric and metro trains, taking into account variables including ticket pricing and operating expenses. Policymakers and stakeholders will be better informed about the sustainability and profitability of these transit options if they have a good understanding of their economic components.

Through the pursuit of these goals, our research seeks to offer significant perspectives on the direction of urban transportation. The results will be useful in continuing the conversation about ecologically conscious, efficient, and liveable cities, as well as sustainable urban growth and the role of creative transit solutions.

## OBJECTIVES:

- To analyse how demographic factors such as age, gender, and income influence the usage and preferences of electric and metro trains.
- To assess the quality of passenger experience, focusing on comfort, convenience, and overall satisfaction in both electric and metro trains.
- To compare the safety standards and effectiveness of emergency response systems in electric and metro trains.
- To evaluate the cost efficiency and affordability of electric and metro trains for passengers, considering ticket prices and operational costs.

## REVIEW OF LITERATURE:

1. A Comprehensive Survey and Future Directions on Optimising Sustainable Urban Mobility

Tatiane Borchers, Dirk Wittowsky, Ricardo Augusto Souza Fernandes 2024

The urgent topic of climate change is discussed in this review article, which also emphasizes how important transit and urban areas are to the release of greenhouse gases and the depletion of natural resources. This paper reviews research on urban mobility optimization for achieving energy transition, sustainability, and climate change mitigation objectives. Planning and policymaking, environmental factors, demand and traffic management, technology and energy, and non-spatial metrics are the five main categories into which these research are divided. Future research, according to the report, should concentrate on optimization models that incorporate social aspects of transportation, take into account the requirements of communities, operators, and passengers, and strengthen the resilience of environmental impact models. Furthermore, future urban mobility research should prioritize tackling large-scale network issues.

2.Public transport for smart cities: Recent innovations and future challenges

Yong-Hong Kuo, Janny MY Leung, Yimo Yan 2023

The idea of a "smart city" is to improve the quality of life for its residents by increasing the efficiency of urban operations and services through the use of data analytics and Internet-of-Things (IoT) technology. However, the financial difficulties that public transport systems, which are essential to smart cities, are confronting make it more difficult to maintain the current levels of service. Smart city public transit must prioritise improving everyday mobility in addition to transporting people, a challenge made more challenging by the spread of cities, rising urbanisation, and greater traffic congestion. A multimodal, well-coordinated public transport system is necessary to accommodate these needs. The future of transport in smart cities is in making sure that services are widely accessible, convenient, responsive to demand in real time, of excellent quality, and run efficiently on energy. This essay also examines current studies on advancements in public transport.

3.Evolution of urban transportation policies in India: A review and analysis

Ashish Verma, Vajjarapu Harsha, Gayathri Harihara Subramanian 2021

India is experiencing serious problems with traffic, pollution, and road safety as a result of its expanding population and rising car ownership. Although transit is vital to the economy, it also has a major impact on climate change. Many nations, notably India, are attempting to address this by changing their policies in order to promote more environmentally friendly transportation. India's strategies for urban transport are changing from being supply-driven to being demand-driven. This essay examines India's main transport issues as well as the changes in governmental regulations since the country's independence. It points out areas where current policies fall short, like insufficient oversight, disjointed governance, and inadequate planning, and it makes recommendations for possible enhancements that could boost these areas of

policy effectiveness.

4. Sustainable development and carbon neutrality: Integrated assessment of transport transitions in India

Dipti Gupta, Amit Garg 2020

Due to India's reliance on imported crude oil, its relationship to economic growth, and its substantial contribution to air pollution, the country's transport sector is undergoing considerable changes. This research uses a novel technique that combines the AIM/Enduse and IMACLIM-IND models along with a back-casting method based on long-term goals to give an integrated analysis of the energy, environmental, and economic implications of these changes. Business-as-usual (BAU), development first (DEVF), carbon neutrality (CNT), and synchronous (SYNCH) are the four scenarios that are assessed. According to the SYNCH scenario, India would save over 5.8 trillion US dollars in foreign cash between 2013 and 2050 if its imports of natural gas and crude oil fell by 68% from 2012 levels by 2050. These changes necessitate the development of strategic plans to guarantee fair access to mobility.

5.Urban sustainable transportation planning strategies for livable City's quality of life

Wann-Ming Wey, Jhong-You Huang 2018

Urban planning, especially in the area of transportation, has a direct impact on people's quality of life by contributing to the sustainability and liveability of cities. This paper makes the case that sustainability considerations ought to be added to the definition of liveability. Nevertheless, there aren't many planning frameworks or evaluation models that sufficiently take into account how urban planning and other fields are changing. Data storage, analysis, and collecting have improved with the development of social communication and computing technology. The research prioritised sustainable mobility systems to adjust to shifting spatial and temporal dynamics by analysing huge datasets pertaining to urban transport and forecasting future trends in key metrics. In addition to addressing the issues facing urban planning today, the policy ideas offer an open framework for developing sustainability in our cities.

6.An introduction to sustainable transportation: Policy, planning and implementation

Preston L Schiller, Jeffrey Kenworthy 2017

This book tackles the global issue of enhancing fair access to basic services while minimising the negative effects of transport on the environment and the energy supply. It offers a fresh perspective on sustainable transportation design, bolstered by international case studies and a vast array of resources, such as pictures, graphs, and references. New chapters on urban planning, regional and intercity public transportation, and equity concerns pertaining to car dependence and the culture of automobile-centric communities are included in the second edition, which builds upon the first. In addition, the book explores the historical background of sustainable and non-sustainable transportation as well as the intricate connections between energy use, infrastructure, technology, and transportation functionality. Talks on mobility as a service (MaaS), electric and autonomous vehicles (EVs), and urban design ideas such as airport cities are among the important contributions.
Global case studies, such as the Vauban eco-village in Freiburg, Germany, show off effective instances of environmentally friendly transit and community engagement. Students, planners, legislators, and anybody else interested in changing urban mobility for a more sustainable future can all benefit from this book.

7.Mythologies, metro rail systems and future urban transport

Dinesh Mohan 2008

Planners, legislators, and transport specialists still lack a consensus on what exactly will improve mobility and accessibility in Indian cities. There is a common misconception that building metro rail systems will somehow address future issues. When reasonably priced cars and two-wheelers were unavailable, metro

systems were the clear option, according to an assessment of metropolitan mass transit systems throughout the past century. Bus rapid transit systems with dedicated lanes appear to be the only option for offering reasonably priced mass transportation in light of the advent of efficient buses, the need for flexible, medium capacity systems that travel to homes and destinations, and the use of computers and information technologies to manage large fleets in our cities.

8.Sustainability and urban public transportation
Kumares C Sinha 2003

Urban public transport and sustainability Journal of Transportation Engineering, Kumares C. Sinha, 129 (4), 331-341, 2003 History is repeating itself, according to an examination of data collected over the last few decades from towns all across the world. Urban transport trends in these places are strikingly similar, despite notable disparities in socioeconomic and technological factors. The United States and other affluent nations saw comparable developments some decades ago, and the usage of automobiles in many developing country cities is currently on the rise. Despite widespread awareness and understanding of sustainability, the number of people owning and using private vehicles is growing at an accelerating rate due to increased personal incomes and a desire to employ faster, more dependable transportation technology. The choice of where to live and work grows as personal incomes rise, which reduces urban congestion and modifies the proportion of people who utilise private and public transportation. The long-term sustainability of urban transport systems worldwide may be significantly impacted by policy choices pertaining to land use, cost, and technology. The analysis's main conclusion is that significant modifications to urban structures and activities that can halt or reverse the rise in the use of private vehicles and increase the viability and appeal of transit and other modes can significantly improve the sustainability of urban transportation.

**RESEARCH METHODOLOGY:**

POPULATION: The population for this study consists of commuters using electric and metro trains, including students, employed individuals, self-employed individuals, unemployed individuals, retirees, and homemakers.

SAMPLE SIZE: The sample size for this study is 109.

SAMPLE TECHNIQUE: The technique used in this study is Simple Random Sampling.

DATA COLLECTION: The data used in this study is collected from both primary and secondary sources.

Primary Data – Collected from a Structured Questionnaire through Google Forms.

Secondary Data – Journals, Research Papers & Articles, Reports.

**RESULTS AND DISCUSSIONS :**

**Table 1: PROFILE OF THE RESPONDENTS**

| CATEGORY | SUB CATEGORY | PERCENTAGE | RESPONSES |
|---|---|---|---|
| Age | Under 18 | 23.9% | 26 |
| | 18 - 25 | 70.6% | 77 |
| | 26 -35 | 0.9% | 1 |
| | 36 - 45 | 2.8% | 3 |
| | 46 -60 | 1.8% | 2 |
| Gender | Male | 18.3% | 20 |
| | Female | 81.7% | 89 |
| Occupation | Student | 87.2% | 95 |
| | Employed | 10.1% | 11 |
| | Retired | 0.9% | 1 |
| | Homemaker | 1.8% | 2 |
| Educational Qualification | No formal education | 4.6% | 5 |
| | High school diploma | 27.5% | 30 |
| | Bachelor's degree | 63.3% | 69 |
| | Master's degree | 4.6% | 5 |
| IncomeLevel | Below Rs 20,000 | 72.5% | 79 |

| | | | |
|---|---|---|---|
| (MONTHLY) | | | |
| | Rs 20,000-Rs40,000 | 10.1% | 11 |
| | Rs 40,000 – Rs60,000 | 2.8% | 3 |
| | Rs 60,000 – Rs80,000 | 6.4% | 7 |
| | Rs 80,000 – Rs1,00,000 | 1.8% | 2 |
| | Above Rs1,00,000 | 6.4% | 7 |
| Residential Location | Urban | 78% | 85 |
| | Suburban | 14.7% | 16 |
| | Rural | 7.3% | 8 |
| Frequency of usage | Daily | 56% | 61 |
| | Weekly | 9.2 % | 10 |
| | Monthly | 7.3% | 8 |
| | Rarely | 21.1% | 23 |
| | Never | 6.4 % | 7 |

**Table 2 : COMFORT OF SEATING ON ELECTRIC vs. METRO TRAINS**

| COMFORT LEVEL | ELECTRIC TRAIN(RESPONSES) | METRO TRAIN (RESPONSES) |
|---|---|---|
| Very Comfortable | 9 | 51 |
| Comfortable | 31 | 46 |
| Neutral | 56 | 10 |
| Uncomfortable | 12 | 0 |
| Very Uncomfortable | 1 | 2 |

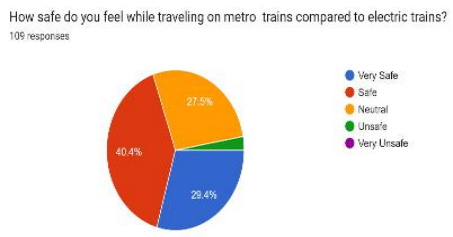



**TABLE 4: CONVIENCE FOR DAILY COMMUTING**

| COMFORT LEVEL | ELECTRIC TRAIN(RESPONSES) | METRO TRAIN (RESPONSES) |
|---|---|---|
| Very Clean | 8 | 49 |
| Clean | 21 | 49 |
| Neutral | 35 | 10 |
| Dirty | 37 | 1 |
| Very Dirty | 8 | 0 |


**TABLE 5: CROWD MANAGEMENT OF ELECTRIC TRAINS COMPARED TO METRO TRAINS**

| TRAINTYPE | RATING | EXCELLENT | GOOD | NEUTRAL | POOR | VERY |
|---|---|---|---|---|---|---|

| MODE OF TRANSPORT | NUMBER OF RESPONSES | PERCENTAGE |
|---|---|---|
| Electric train | 17 | 15.6% |
| Metro train | 58 | 53.2% |
| Both equally | 23 | 21.1% |
| Neither | 11 | 10.1% |

| | | | | | | POOR |
|---|---|---|---|---|---|---|
| ELECTRIC TRAINS | NUMBER OF RESPONSES | 8 | 17 | 37 | 27 | 20 |
| METRO TRAINS | NUMBER OF RESPONSES | 19 | 43 | 39 | 5 | 3 |

**TABLE 6: RATING OF NOISE LEVEL INSIDE ELECTRIC TRAINS vs. METRO TRAINS**

| RATING | NUMBER OF RESPONSES | PERCENTAGE |
|---|---|---|
| 1 | 16 | 14.7% |
| 2 | 20 | 18.3% |
| 3 | 42 | 38.5% |
| 4 | 16 | 14.7% |
| 5 | 15 | 13.8% |

**TABLE 7: SAFETY PERCEPTION WHILE TRAVELING ON METRO TRAINS COMPARED TO ELECTRIC TRAINS**

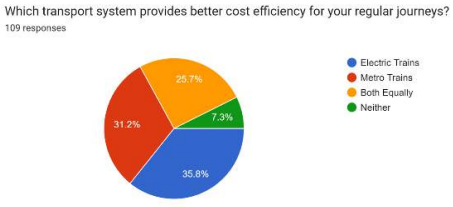
| SAFETY LEVEL | NUMBER OF RESPONSES | PERCENTAGE |
|---|---|---|
| Very Safe | 32 | 29.4% |
| Safe | 44 | 40.4% |
| Neutral | 30 | 27.5% |
| Unsafe | 3 | 2.8% |
| Very Unsafe | 0 | 0% |


**TABLE 8: SAFETY ANNOUNCEMENT AND INSTRUCTIONS**

| CATEGORY | ELECTRIC TRAINS (RESPONSES) | METRO TRAINS (RESPONSES) |
|---|---|---|
| Very Effective | 15 | 38 |
| Effective | 32 | 47 |
| Neutral | 53 | 23 |
| Ineffective | 8 | 1 |
| Very Ineffective | 1 | 0 |

**TABLE 9:ADEQUACY OF SECURITY CHECKS ON ELECTRIC AND METRO TRAINS**

| ADEQUACY LEVEL | ELECTRIC TRAINS(RESPONSES) | METRO TRAINS (RESPONSES) |
|---|---|---|
| Very Adequate | 11 | 45 |
| Adequate | 30 | 37 |
| Neutral | 41 | 25 |
| Inadequate | 18 | 2 |
| Very Inadequate | 9 | 0 |



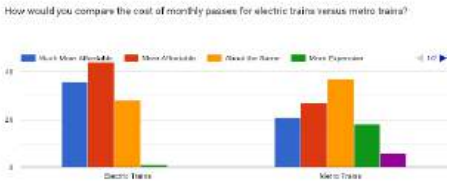
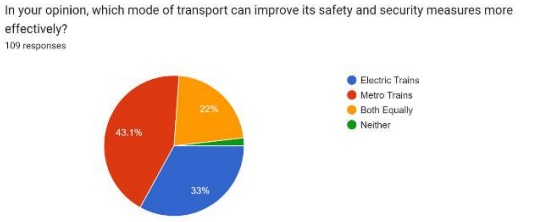



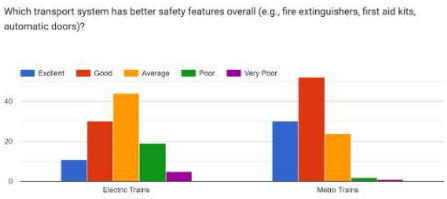

**TABLE 10: SECURITY PERSONNEL PRESENCE IN STATIONS AND ON TRAINS**

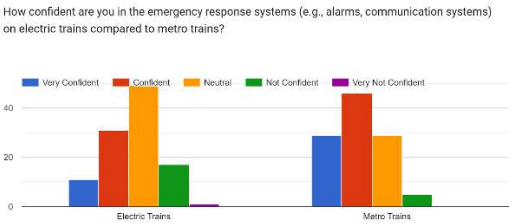
| **RATING** | **ELECTRIC TRAINS(RESPONSES)** | **METRO TRAINS (RESPONSES)** |
|---|---|---|
| Excellent | 10 | 33 |
| Good | 35 | 48 |
| Average | 48 | 26 |
| Poor | 10 | 2 |
| Very Poor | 6 | 0 |

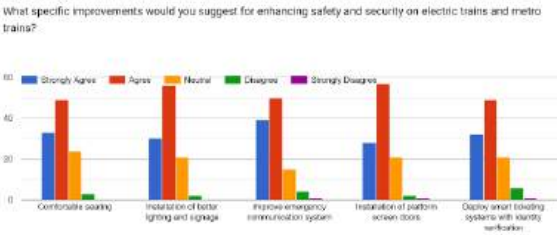
**TABLE 11: CONFIDENCE IN EMERGENCY RESPONSE SYSTEMS**

| **CONFIDENCE LEVEL** | **ELECTRIC TRAINS (RESPONSES)** | **METRO TRAINS(RESPONSES)** |
|---|---|---|
| Very Confident | 11 | 29 |
| Confident | 31 | 46 |
| Neutral | 49 | 29 |
| Not Confident | 17 | 5 |
| Very Not Confident | 1 | 0 |




**CORRELATION BETWEEN AGE AND THE MODE OF TRANSPORT**

| | *Column 1* | *Column 2* |
|---|---|---|
| Column 1 | 1 | |
| Column 2 | 0.035372 | 1 |

Since the r value is 0.035372 it is found that there is no relationship between age and the mode of transport the respondents find more convenient for daily commuting.

**CORRELATION BETWEEN GENDER AND THE RESPONDENT'S OPINION**

| | *Column 1* | *Column 2* |
|---|---|---|
| Column 1 | 1 | |
| Column 2 | -0.10452 | 1 |

Since the r value is -0.10452 it is found that there is negative relationship between the gender and the respondent's opinion in which mode of transport can improve its safety and security measures.

**CORRELATION BETWEEN RESPONDENTS' OCCUPATION AND THE COMPARISON BETWEEN THE COST OF MONTHLY PASSES FOR ELECTRIC TRAINS VS METRO TRAINS.**

| | *Column 1* | *Column 2* |
|---|---|---|
| Column 1 | 1 | |
| Column 2 | 0.094245 | 1 |

Since the r value is 0.094245, it is found that there is no relationship between the respondents' occupation and the comparison between the cost of monthly passes for electric trains vs metro trains.

**SUGGESTIONS**:

- ✓ To focus on emerging technologies like automation, AI-powered systems, and smart ticketing in shaping the future development of electric and metro trains, providing a deeper evaluation of safety systems and a more comprehensive understanding of the passenger experience.
- ✓ To encourage collaborations between the public and private sectors to enhance insights into pricing strategies, cost effectiveness, and service quality.
- ✓ To ensure transportation networks are inclusive and accessible to underserved populations, such as the elderly and individuals with disabilities, as this can significantly impact demographic considerations

**CONCLUSION:**

The integration of metro and electric train systems is vital in addressing traffic congestion and reducing environmental impact as urban populations grow. Public awareness initiatives, technological advancements, and infrastructure investments will play a key role in promoting the adoption of these transit options. In conclusion, electric trains and metro systems offer viable solutions for sustainable urban transportation. By prioritizing passenger experience, ensuring safety, and implementing cost-effective pricing strategies, cities can develop eco-friendly, inclusive, and efficient transportation networks that meet the diverse needs of their citizens. The continued evolution of these systems is essential for a sustainable and liveable urban future.

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# DDOS ATTACK MITIGATION

**Valarmathi C**
Assistant Professor, IT
Sri Sairam Institute of Technology,
Chennai, India
Valarmathi.it@sairamtap.edu.in

*** Thamizhini D, * Rajaveeni S, * Divya Dharshini R**, Student – IT, Sri Sairam Institute of Technology, Chennai.

## *ABSTRACT*

Distributed Denial-of-Service (DDoS) attacks remain one of the most disruptive threats in cybersecurity, capable of rendering services inaccessible by overwhelming them with malicious traffic. As attacks grow in frequency and complexity, traditional mitigation approaches often fall short. This paper presents an ongoing study that integrates machine learning and blockchain technologies to provide a more adaptive and secure solution to DDoS detection and prevention. Using the AutoKeras library, we have developed a machine learning classifier that analyzes network traffic and detects malicious packets. The classifier is trained on network datasets to identify attack patterns with high accuracy.

To complement this, we have implemented the foundational components of a blockchain-based system using PHP, designed to securely manage and store blacklisted IP addresses. Blockchain technology ensures that blacklisted IPs are tamper-proof and decentralized, adding an additional layer of security to the overall system. Although full integration and real-time testing are still in progress, the preliminary results from the classifier show promising accuracy in identifying malicious traffic.

The paper outlines the system architecture, discusses the machine learning model's training and evaluation, and presents the blockchain's role in enhancing the integrity of blacklist management. Future work will involve complete system integration, real-time traffic testing, and further optimization of the machine learning model and blockchain infrastructure. This approach aims to provide a scalable, secure, and real-time solution to mitigate the ongoing threat posed by DDoS attacks.

**Keywords:** Distributed Denial-of-Service (DDoS), Machine Learning (ML), Blockchain, AutoKeras, Network Security

## *INTRODUCTION*

### *Background*

Distributed Denial-of-Service (DDoS) attacks have evolved into one of the most significant cybersecurity threats, capable of crippling online services and causing extensive damage to organizations and individuals alike. These attacks are designed to overwhelm a target system, network, or service by flooding it with a high volume of traffic, thereby exhausting its resources and rendering it inaccessible to legitimate users. DDoS attacks can vary in intensity, but the most potent ones can cause outages lasting several hours or even days, leading to substantial financial and reputational losses. With the ever-increasing reliance on online services, the frequency and impact of DDoS attacks have surged over the years.

A typical DDoS attack employs a botnet—a collection of compromised devices that are remotely controlled by the attacker.

These devices are often infected with malware, turning them into unwilling participants in the attack. Once activated, the botnet can generate massive amounts of traffic directed at the target. Attackers often use techniques like reflection and amplification, which enable them to send relatively small amounts of data to intermediaries (such as DNS or NTP servers), causing those servers to amplify the traffic and forward it to the victim, magnifying the impact of the attack.

The growing complexity of DDoS attacks has rendered traditional mitigation methods, such as firewalls and static filtering, inadequate. These methods often fail to detect or prevent modern, sophisticated attacks that can rapidly adapt and change their patterns. As a result, there is an urgent need for more dynamic and intelligent approaches to DDoS detection and mitigation, ones that can respond in real time and offer robust defenses against evolving threats.

***Motivation***

The increasing severity and frequency of DDoS attacks necessitate the development of innovative solutions that can effectively mitigate the risks posed by such attacks. Traditional mitigation approaches are often too rigid and reactive, relying on predefined rules and manual intervention. This lack of adaptability means that as DDoS attacks evolve, these static defenses become less effective. As the attack surface expands with the growth of IoT devices, cloud services, and other interconnected systems, the need for more sophisticated detection and prevention mechanisms becomes critical.

Machine learning (ML) has emerged as a promising tool in the fight against DDoS attacks. Unlike rule-based systems, ML models can dynamically learn from patterns in network traffic, enabling them to detect anomalies that may indicate an impending DDoS attack. By training these models on large datasets of network activity, they can recognize complex attack patterns that would be difficult for human operators to detect in real time. Furthermore, machine learning algorithms can be continuously updated, making them more adaptable to new attack vectors.

Blockchain technology, known for its decentralized and secure architecture, offers a unique opportunity to enhance DDoS mitigation. In particular, blockchain can be used to securely manage blacklists of malicious IP addresses, ensuring that once an IP address is flagged as malicious, it is stored in a tamper-proof ledger. This decentralized approach reduces the risk of a single point of failure and provides an additional layer of security against manipulation or attacks aimed at bypassing the blacklist.

The motivation behind this project lies in the combination of machine learning's predictive power with blockchain's decentralized security, creating a robust system capable of detecting and preventing DDoS attacks. This dual approach leverages the strengths of both technologies to provide a more comprehensive solution that is both scalable and resilient.

***Objective***

The primary objective of this project is to develop a system that integrates machine learning and blockchain technologies to enhance DDoS detection and prevention capabilities. The machine learning component, built using the AutoKeras library, aims to classify network traffic and

identify malicious packets with high accuracy. The blockchain component, implemented in PHP, ensures that blacklisted IP addresses are securely stored and managed in a decentralized manner. This dual-layered approach not only aims to improve detection accuracy but also ensures that the mitigation process is secure and tamper-proof.

By combining the adaptability of machine learning with the immutability and security of blockchain, this project seeks to create a robust defense mechanism capable of mitigating the increasingly sophisticated nature of DDoS attacks.

## RELATED WORKS:

The growing threat of Distributed Denial-of-Service (DDoS) attacks has led to extensive research into advanced solutions involving machine learning (ML) and blockchain for more effective detection and mitigation. This section reviews notable studies that have contributed to the field, highlighting their methodologies, results, and relevance to our project.

### *Key Studies and Approaches*

In [1], a blockchain-based approach is proposed for securely recording blacklisted IP addresses, adding an additional layer of security to traditional DDoS mitigation techniques. The study evaluates three different classification algorithms: KNN, Decision Tree, and Random Forest. Random Forest is found to offer the highest accuracy in real-time traffic analysis, achieving approximately 95%. This research emphasizes the role of secure infrastructure provided by blockchain in enhancing DDoS detection systems, aligning with our project's use of blockchain for secure IP blacklist management.

Another important study [2] performs a comprehensive analysis of 11 supervised, unsupervised, and semi-supervised algorithms. The findings show that supervised learning models significantly outperform other techniques in detecting DDoS attacks. The Decision Tree algorithm, in particular, achieves a false positive rate of 0.001 and an overall accuracy of 0.999, showcasing the potential of decision trees in network security. Our use of AutoKeras simplifies the selection of such models, automating the process of identifying the most suitable algorithm.

In [3], the focus is on improving DDoS detection accuracy in cloud computing environments by reducing misclassification errors. The study employs feature selection techniques like Mutual Information (MI) and Random Forest Feature Importance (RFFI) to enhance model performance. After selecting the most relevant features, several classifiers are tested, with Random Forest achieving a 99% accuracy. This highlights the importance of selecting key features in DDoS detection, a principle we adopt in our work.

A systematic literature review (SLR) [4] offers a detailed analysis of deep learning methods for DDoS detection. This research identifies critical gaps in existing studies, particularly in the use of benchmark datasets, preprocessing techniques, and emerging attack types. The study reveals that while many deep learning approaches show promise, there is still room for improvement in terms of generalization and real-world applicability. Our approach combines traditional machine learning and blockchain rather than deep learning, but this study underscores the need for comprehensive data preparation and model

training.

In [5], a unique approach is presented that leverages large datasets alongside machine learning to detect DDoS attacks. The study evaluates several decision tree-based classifiers, including Random Forest and Partial Decision Trees (PART). Using the CICIDS2017 dataset, the study finds that PART achieves a detection accuracy of 99.77%. This work demonstrates the potential of large datasets and efficient classifiers in distinguishing between normal and malicious traffic, similar to our project's focus on packet classification using machine learning.

***Blockchain-Enhanced DDoS Mitigation***

Beyond machine learning, blockchain has also been applied to improve the integrity of DDoS mitigation strategies. Study [6] introduces a blockchain-based detection model for preventing DDoS attacks against IoT systems, using Ethereum as the blockchain platform. The system shows notable efficiency with fewer I/O operations compared to traditional methods, offering a lightweight solution suitable for real-time environments.

Another relevant study [7] proposes a decentralized blacklist management system, which uses mining pools to judge and block malicious IP addresses. This decentralized model offers a more scalable and tamper-resistant approach to blacklist management. Similarly, in our project, we implement a blockchain-based system to manage blacklisted IPs securely, leveraging blockchain's decentralized nature to resist tampering and manipulation.

Study [8] compares the efficacy of big data and non-big data approaches in the context of DDoS detection. Implemented using Apache Spark, the big data approach significantly reduces both training and testing times, showing the advantages of distributed computing for handling massive volumes of traffic. While our work does not employ big data tools, the focus on scalability and efficiency is highly relevant to future iterations of our system.

In [9], the applicability of machine learning-based Intrusion Detection Systems (IDS) for detecting ICMPv6-based DDoS attacks is explored, with a specific focus on blockchain-enhanced collaborative IDS architectures. This study highlights the potential of ensemble learning and blockchain integration in detecting more complex and emerging attack types, aligning with our exploration of blockchain for secure, decentralized blacklist management.

Lastly, [10] evaluates the performance of deep learning models such as Long Short-Term Memory (LSTM) and Convolutional Neural Networks (CNN) for DDoS detection. The study finds that LSTM achieves an accuracy of 98.9% in identifying malicious traffic, while CNN reaches a classification accuracy of 99.9%. While deep learning offers impressive results, our approach relies on AutoML for simpler implementation and adaptability.

***Comparison with Our Approach***

These studies collectively emphasize the effectiveness of machine learning models, particularly decision tree-based methods like Random Forest, in detecting DDoS attacks. Our project aligns with this trend, utilizing AutoKeras to automate the selection and tuning of machine learning models for packet classification. Unlike

most existing solutions, our project uniquely integrates blockchain for secure IP blacklist management, providing a decentralized, tamper-proof layer of security.

While prior research has demonstrated the advantages of combining machine learning and blockchain, our project stands out by simplifying machine learning implementation through AutoKeras and using PHP for blockchain integration, making it more accessible and practical for real-world deployment.

## PROBLEM DEFINITION

Distributed Denial-of-Service (DDoS) attacks pose a significant threat to online services, resulting in substantial financial losses and operational disruptions. Despite the widespread use of traditional DDoS mitigation techniques, these methods exhibit several limitations that hinder their effectiveness.

One major issue is the reliance on static rule-based systems, which depend on predefined signatures to identify malicious traffic. This approach makes them vulnerable to new and sophisticated attack vectors that do not conform to existing patterns. Additionally, many traditional methods require considerable computational resources for filtering traffic. This resource intensity can lead to latency issues, ultimately degrading the performance of legitimate services and compromising user experience.

Another critical concern is the generation of false positives. Static systems frequently misidentify legitimate traffic as malicious, disrupting service availability for genuine users and placing an additional burden on network administrators who must continually fine-tune rules and policies. Moreover, the centralized nature of many existing solutions creates a single point of failure. If the central system is targeted or overwhelmed, it may become non-functional, leaving the network vulnerable to further attacks.

Traditional blacklist management also suffers from inefficiencies. The use of dynamic IP addresses complicates this process, as attackers can easily change their IPs, allowing them to evade detection. Additionally, conventional methods often fail to provide real-time updates to blacklists, resulting in malicious IP addresses remaining in circulation for extended periods and increasing the risk of repeated attacks. A lack of transparency in sharing and updating blacklists among organizations further exacerbates this issue, leading to inconsistencies in threat responses.

Given these limitations, there is a pressing need for more dynamic, intelligent, and efficient methods for DDoS detection and mitigation. Our project aims to address these challenges by leveraging machine learning algorithms for real-time analysis of network traffic and employing blockchain technology for secure and transparent management of blacklisted IP addresses. By integrating these advanced technologies, we seek to enhance the overall effectiveness of DDoS mitigation strategies, reduce false positive rates, and ensure timely and reliable blacklist updates.

## *PROPOSED SYSTEM*

### *Architecture Overview*

Our proposed system integrates machine learning (ML) and blockchain technology to enhance the detection and mitigation of

Distributed Denial-of-Service (DDoS) attacks. The system consists of three primary components: the Machine Learning-based Detection Module, the Blockchain-based Blacklist Management Module, and a Web Application Interface for real-time monitoring.

The overall architecture is designed to ensure fast detection of malicious network traffic, secure management of blacklisted IP addresses, and seamless interaction for network administrators.

**1.Machine Learning-based Detection Module:**

This component uses the AutoKeras library to develop a machine learning classifier capable of identifying malicious packets in network traffic. The classifier is trained on a labeled dataset that contains both malicious and benign traffic samples. Upon receiving incoming packets, the detection module evaluates them and assigns a probability score, determining whether they are malicious or legitimate. This module can be updated periodically as new data is collected, improving its detection accuracy over time.

**2. Blockchain-based Blacklist Management Module**

The blockchain module is responsible for securely managing and storing blacklisted IP addresses. Using blockchain technology, each IP address that has been identified as malicious is added to a decentralized, tamper-proof ledger. This ensures the integrity of the blacklist, preventing unauthorized modifications. The blockchain's distributed nature also ensures that multiple entities can contribute to and access the blacklist in a transparent and secure manner.

**3. Web Application Interface for Real-time Monitoring**

This module provides an interface for administrators to monitor network traffic in real time. Through the web application, users can visualize the status of incoming traffic, see which packets are flagged as malicious, and review the contents of the blockchain-based blacklist. Additionally, the interface allows administrators to manually review or manage blacklisted IPs, and view logs of system performance and network status.

***System Workflow***

**Step 1: Network Traffic Analysis**

Incoming network traffic is first routed through the machine learning-based detection module. Each packet is analyzed in real-time by the classifier, which evaluates the features of the packet to determine if it matches the patterns of known DDoS attacks.

**Step 2: Malicious Packet Detection**

If the detection module identifies a packet as malicious, it immediately flags the packet and logs the source IP address. The system can be configured to either block the malicious packets outright or redirect them for further analysis.

**Step 3: IP Address Blacklisting**

Once an IP address is flagged as the source of malicious traffic, it is sent to the blockchain-based blacklist management module. Here, the IP address is written to the blockchain ledger, ensuring that it cannot be altered or deleted. The

decentralized nature of the blockchain ensures that this blacklist is shared across all participating nodes, enhancing security.

**Step 4: Real-time Monitoring and Updates**

The web application interface provides real-time updates on the status of the system. Network administrators can monitor flagged packets, view the blacklist, and check the overall system performance. This transparency helps in ensuring that the system is functioning optimally and allows for human oversight if necessary.

**Step 5: Continuous Improvement**

As new packets are processed, the machine learning-based detection module can be retrained with updated datasets to improve its ability to recognize new attack patterns. The system's modular design ensures that the detection and blacklist management components can be updated independently as necessary.

This architecture provides a robust and scalable approach to DDoS mitigation, leveraging the strengths of both machine learning and blockchain technology to create a comprehensive defense system that adapts to evolving threats.

## *METHODOLOGY*

### *Data Collection and Preprocessing*

For the machine learning classifier, we use a dataset containing network traffic data labeled as benign or malicious. This dataset is preprocessed to remove any missing values and normalize features. The primary preprocessing steps include:

- **Feature Extraction:** Key features like IP addresses, packet size, and protocol type are extracted from the raw data. These are crucial indicators for detecting anomalies in network traffic.

- **Data Normalization:** To ensure consistent input, features such as packet size are normalized to bring them to a uniform scale, making the machine learning model more efficient.

- **Train-Test Split:** The data is divided into training and testing sets, ensuring that 80% of the data is used for training and 20% for testing the model.

### *ML Model Development*

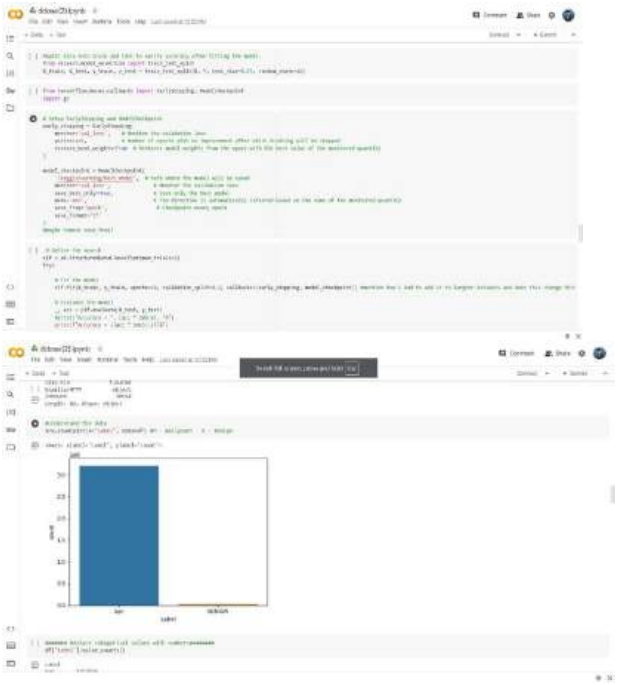
We employ the **AutoKeras** library for automating the model selection process. This tool automatically tests multiple model architectures and hyperparameters to find the most suitable classifier. The following steps were followed:

- **Model Selection:** The AutoKeras library was chosen for ease of use and model accuracy optimization. AutoKeras selects different machine learning models like **Random Forest, Neural Networks**, and more to identify malicious packets.

- **Hyperparameters:** AutoKeras automatically tunes parameters like learning rate, batch size, and the number of layers to improve model performance.

- **Training and Testing:** After preprocessing, the data is fed into AutoKeras for training. The model is trained on the labeled network traffic dataset, and performance metrics like accuracy, precision, and recall are

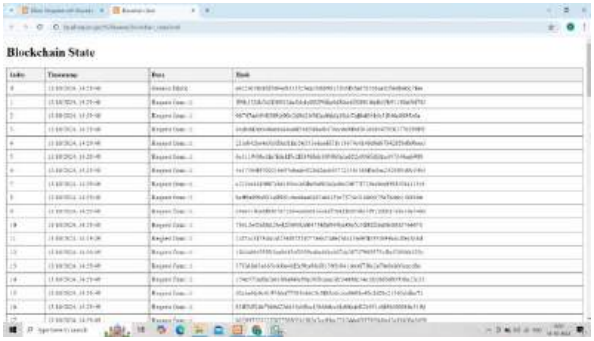
recorded to evaluate its effectiveness in detecting malicious packets.



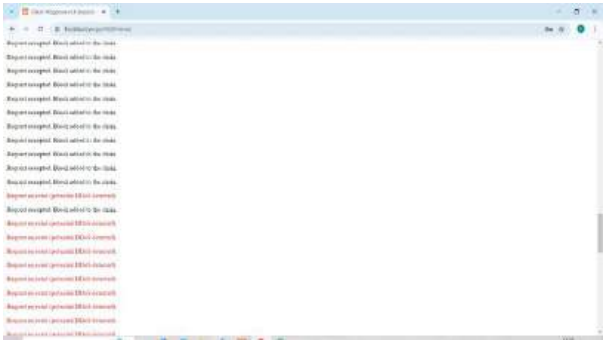
**Blockchain Implementation**

A **PHP-based blockchain** has been developed for managing blacklisted IP addresses. This system involves creating a private blockchain to store data securely and maintain a tamper-proof list of IPs associated with malicious activity. Key components include:

- **Genesis Block:** The first block of the blockchain is generated, which is immutable and forms the base of the blockchain.
- **Block Structure:** Each block contains an index, timestamp, data (IP address), previous block hash, and current block hash, ensuring the integrity of the chain.
- **Blacklist Management:** When an IP exceeds a certain request threshold, the system adds the IP to the blacklist, creating a new block in the blockchain.
- **Request Validation:** Requests from IP addresses are tracked, and if the frequency of requests exceeds a certain limit (indicating a potential DDoS attack), the request is blocked and recorded in the blockchain.







***Integration Plan***

Although the machine learning classifier and the blockchain-based blacklist

management system are not yet integrated, the future plan involves connecting these two components in the following way:

- **Packet Detection via ML:** The ML model will analyze incoming network traffic and flag malicious packets.
- **Blacklist Update via Blockchain:** Upon detecting malicious packets, the corresponding IP addresses will be passed to the blockchain, where they will be added to the blacklist. This ensures that malicious IPs are blocked and recorded in a decentralized and secure manner.
- **Web Application Interface:** The final system will include a web-based interface where administrators can view real-time updates of the blockchain and track malicious activities.

**FUTURE SCOPE:**

**Integration of Advanced Machine Learning Models:**

- Explore deep learning algorithms to enhance the accuracy of detection.
- Reinforcement learning can be used to adapt to evolving attack tactics.
- Leverage adaptive machine learning to update characteristics of attacks automatically.
- Examine hybrid models that enhance detection by integrating various machine learning approaches.

**Scalability for Large-Scale Networks:**

- In large-scale networks, optimize the system to manage heavy traffic.
- For real-time processing of numerous nodes, implement distributed machine learning.
- Accelerate the performance of the framework in decentralized or cloud-based configurations.
- Use edge computing to reduce latency and enhance local network protection.

**Enhanced Collaboration and Data Sharing:**

- Facilitate the exchange of blacklisted IP addresses in real time amongst several organizations.
- Employ blockchain technology to create a decentralized threat intelligence network.
- Foster collaboration between industries to combat DDoS threats collectively.
- Utilize blockchain to ensure secure and transparent data sharing.

**Improved Privacy-Preserving Mechanisms:**

- Incorporate zero-knowledge proofs to preserve user confidentiality.
- Implement homomorphic encryption for secure data analysis without revealing sensitive information.
- To enable reliable collaboration between nodes, use multi-party computation.

- Investigate blockchain-based methods that strike a balance between privacy and transparency.

**Development of Smart Contracts for Automated Responses:**

- Automate blacklisting of malicious IPs using smart contracts.
- Trigger countermeasures like traffic rerouting when attacks are detected.
- Apply smart contracts to enable the real-time reconfiguration of network defenses.
- Include automated alerts ensuring administrators can respond instantly.

**CONCLUSION**:

The proposed architecture effectively detects and categorizes different kinds of DDoS attacks in real-time by utilizing machine learning algorithms. Machine learning approaches render a proactive defense mechanism by analyzing network traffic patterns and finding anomalies, which enhances the capacity to anticipate and avert attacks before they become more advanced.

Blockchain technology emphasizes an immutable and perceptible layer of security to the existing system, making it better. The ability to be tampered with, whereby attackers could attempt to amend blacklists or get around security mechanisms, is a major weakness in traditional DDoS defensive systems. The framework makes sure that everyone on the network is able to access a distributed ledger featuring the illicit entities' IP addresses that have been prohibited by using blockchain technology. This ledger is not only decentralized but also immutable, which means that once an IP address is entered, no unauthorized person can remove or change it. As a result, the blacklist is almost impossible for attackers to manipulate with or alter, optimizing the system's overall integrity

This blacklist is accessible to and retrieved from the blockchain by each and every node in the network, facilitating quick and reliable network-wide distribution of vital security information. One typical problem with centralized security solutions is the possibility of a single point of failure, which subsides by the decentralized nature of blockchain. The communal validation mechanism employed by blockchain ensures that, in the event of an attack, nefarious attempts to modify data are repudiated, preserving the integrity of the data that has been stored.

The combination of machine learning and blockchain creates a robust framework that not only detects and mitigates DDoS attacks effectively but also ensures the security and immutability of critical data through distributed ledger technology.

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# GREEN MARKETING STRATEGIES FOR CONSUMER DURABLES WITH REFERENCE TO RETAIL SECTOR

**NISHANTHI SHANKAR** (Assistant Professor), **SADHIYA RAHAMATH. R** Student
ST. PETER'S COLLEGE OF ENGINEERING AND TECHNOLOGY
*Email: nishanthishankar2012@gmail.com*

## ABSTRACT

In order to stay competitive in the market organizations are typing to provide customized products or service so that they are able to attract and retain the customers. The growth and development of SCM is attributed to number of factors such as increasing globalization, and barriers to international trade, improvement in information availability, and environment concern. The Indian auto-components industry has experienced healthy growth over the last few years. Some of the factors attributable to this include: a buoyant end-user market, improved consumer sentiment and return of adequate liquidity in the financial system. SMR's manufacturing plants, spread across the globe, are specialized in polymer processing, manufacturing of electronic and electro-mechanical systems, glass processing, automated painting and the assembly of complete systems. To know the Procedure simplification in supply chain management. The research covers the efficacy of supply chain management in logistics industry. To compare supply chain efficacy between selected manufacturing organization to design and develop a tool to measure supply chain efficacy the statistical tools are used like anova, regression, factor, cluster. The technique used is convenience sampling, convenience sampling is a non-probability sampling technique where subjects are selected because of their convenient accessibility and proximity to the researcher. The sample size of 113 consumers has been taken for the purpose of the paper presentation.

## INTRODUCTION:

Green marketing environmental marketing are the elements of innovative marketing approaches, which do not change, increase or regulate idea about the persisting Marketing practice, but search for challenging those traditional ideas and provide considerably different point of view. In more detail environmental, eco-marketing and green marketing belong to the group of approaches, which seek to address the lack of fit between marketing as it is practiced presently and the social and ecological realities of the larger marketing environment.

Environmental concern as the combination of marketing management discipline has appeared recently and inconsistently. The nucleus and essential element of green marketing

Is sustainability charter(1992) Pierre and Potherb (1997) opined the green approach towards consumption and production includes getting pleasure from today's standard of living without hemming the standard of living that is to be enjoyed by future generations to come. Environmental problems are social challenges, which are now converted, in marketing problem. Sustainability is social goal, when achieved will nearly change everyone's behaviour (dam & Ape doom, 1996).

Globalization and international trade have continued to increase over the last decade as a resulted of the number of multinational enterprises. Due to this, competition has

amplified 1970's was an unstable period in the history of the global marketplace. Major shifts in the social economic and political climate had significant impact on marketing professionals. Severe questions were raise on marketing practices adopted during this period and specific questions were raise against the marketing practices affecting the natural ecosystem.

During this period, it was believe that 'ecological concern' would pose threat to persisting marketing practices and more of regulation regarding environment may come up. However, marketers proposed that the threat of environment on marketing con be converted to opportunity through green/ ecological marketing. Hen ion (1976) said that initially green marketing can be executed to the segment of consumers who buy eco-friendly Products and respond positively to ecological appeal

The discipline of marketing has not been immune from the social concern about the deteriorating of environment that has developed in recent decades. The researchers in the field of marketing have started a new line of research that has been given various labels, such as ecological marketing (Hen ion et al., 1976), greener marketing (charter, 1992),), greener marketing (charter, 1992), environmental marketing (Peattie, 1995), green marketing (smith 1998), sustainable marketing (van dam & Apeldoorn, 1996) or enviropreneurial marketing (Menon & Menon, 1997). Although some authors distinguish these labels conceptually, they are normally considered synonymous terms referring to the same field of study. The analysis of how marketing activities affects the environment and how the environmental variable can be incorporated into the various decisions of corporate marketing has been studied. Ecological marketing has not grown up to the expectations and ideas of many marketing professionals. Public opinion through opinion polls, time and again demonstrates that consumers are ready to make green product purchase when all other things are equal. Those 'other things' are rarely equal in the minds of consumers while marketing practical purchase behaviour.

Companies have accepted their accountability and responsibility not be harm the environment. So, products and production processes cleaner and more companies "go green", because they realize that they can reduce pollution and increase profit at the same time (hart, 1997). Green marketing(Peattie,1992pierre&prother,1997ottman,1998)is also termed as environmental marketing (coddington,1993;Peattie,1992&1995)greener marketing(charter &polonsky,1999;and sustainable marking(fuller,1997).even though green marketing revolution did not occur as predicted, there is no decline in the internet of the topic, grant (2007)claims that green marketing is at a tipping point and what we do next will decide if the topic continues to develop and gain momentum.

The activities by the companies that are concerned about the green problems and environment by delivering eco-friendly product or service for consumer satisfaction is termed as green marketing (soonthonsmai, 2007).

To sustain in competitive market, companies have developed more worries about various trade and marketing techniques. 'Green marketing' is one among a variety of marketing strategies adopted. Trade firms employ eco-friendly activities into their business model to sustain in competitive marketing. In today is business would, environmental issues play an important role in marketing. Almost major governments around the world are concerned

About green marketing activities and have

attempted to regulate them. Consumers are watchful of impact on environment while marking purchase decision for product and service. Consumers are purchasing green product and during some of the purchase, consumers are not aware that the purchased product is eco-friendly in nature.

Environment sustainability is not simply a matter of compliance or risk management. However, it is the need of hour. Sustainable development is perhaps Most significant and yet Most difficult problem that marketing and human economic activity in general faces at the beginning of the third millennium (diamond, 2005). Business is increasingly recognising competitive advantages and business opportunities, which are gained from Eco sustainability

And green marketing. People around the globe are changing their behaviour, as they are concerned about the pollution happening on globe. Hence, there is a huge demand for the socially responsible products and service in the market. Slowly there is a change in the type of business, product they product and approaches of marketing adopted by the manufacturing companies.

Green marketing involves developing and promoting product and service that satisfy customers need for performance, quality, convenience and affordable pricing without having a detrimental impact on the eco-system. Green marketing is pricing up as increasing amount of consumers are willing to back the environment conscious product with their allocated funds. The public seems to be doubtful of green claims made by the companies and companies are really damaging their brand by exposing their no green

Product /service product from non-green practices. Displaying a product or service as environmentally friendly when it is actually not, then it is termed as called green washing

Human wanted are unlimited and resource are limited, it is essential for the companies to have optimum usage of the resource and simultaneously achieving Organisational objective. Therefore, green, environment marketing is important. Consumers are developing interest towards protection of environment. Evidence from across the globe, it is clear that consumers are worried about the environment. And are modifying their respective behaviour. This has led to increment in sustainable market and socially concerned product and service.

With launch of the 'make in India' proposal, Shri Narendra Modi, prime minister of India aims to provide worldwide Identification to the economy and also regards India on the globe as manufacturing centre, India has also set for itself a determined target of increasing the contribution of manufacturing production to 25% of gross domestic product (GDP) by 2025 from 16% in 2014 , as India is positioning itself as a global manufacturing centre, more Manufacturing centre, more and more manufacturing set=ups and industries are expected to be placed in India, which will lead to pollution and causing harm to the environment.

Business scenario in the Indian manufacturing sector continued to get better in January 2015 backed by accelerated growth of output, marking the third consecutive month of expansion on the accelerated growth of output, marking the third consecutive month of expansion on the purchasing managers' index (PMI). The PMI rose to 52.4 point in January 2015 from 51.1 in previous month. the composite PMI that combines both service and manufacturing sectors rose to 53.3 points in January 2015 from 52.9 in December 2014. There is potential for the sector to account for 25-30 per cent of the country's GDP and create up to 90 million domestic job by 2025. Mr .Ravi Shankar Prasad, minister for

communication and IT, government of India Said that" India have received 57 investment proposals of over RS 19,000 crore (US $ 3.05 billion) of which proposals worth RS 6,500 crore (US $ 1.04 billion) have been approved "(ministry of external affairs 2015).

Since, this research study aims at evaluating the green marketing strategies among the manufacturing sector, the researcher decided to discuss the importance of manufacturing sector in the light of financial development. The manufacturing sector is widely called as the transformational sector, as workers of farming sector move from low skilled to more value added employment. Historically, it is noticed that, a pattern of getting people out of farming and moving them into non-farm activities such as manufacturing is seen for economic development. Huge mass of employment in India is engaged in agricultural activities and comparatively, a very small share of contribution is made to GDP of Indian economy. Solid growth in the manufacturing sector can be a possible solution for providing employment to majority of the populace ($12^{th}$ five year plan).

According to the report by Deloitte entitled 'India matters : winning in growth markets' India is likely to surface as the world's major middle class consumer market with an collective consumer spending of nearly US$ 13 trillion by the end of 2030. Backed by increasing incomes and raising affordability, the durable goods market is expected to get better at a CAGR (compound annual growth rate)of 14.8% to USD 12.5 billion in fiscal year 2015 from USD 7.3 billion in fiscal year 2012. The major share of 65% of total revenues is accounted by urban market in the consumer durables sector in India. In rural markets, consumer durable goods, like electronic items and refrigerators are likely to witness increasing demand in years to come. From USD 2.1billion in 2010, the rural India is assumed to grow at a compound annual growth rate of 25% to touch USD 6.4 billion in fiscal year 2015. The researcher has shared the idea regarding durable good as this study focuses on durable goods.

The product that do not wear out and can be used over a period of time again and again are referred to as consumer durables. Durable good provide utility over a period of time some of the common example of consumer durable good are kitchen appliances, electronic goods, leisure equipment, home furnishings and etc.(subsequent chapters will give the details regarding consumer durables good in detail)

## OBJECTIVE OF THE STUDY

The main objectives of the study is to

"Green marketing strategies for select consumer durables with reference to retail sector

Secondary objectives are

- To know the consumer's awareness about the green marketing
- To study the factors influencing consumers to purchase green product.
- To know the perception towards green marketing of consumer durables
- To identify the challenges faced while buying a product using GMS.

## REVIEW OF LITERATURE

**Chakraborty (2010)** in a study conducted in Hyderabad, India identified the driving shopping motives of Indian consumer for Discount store formats. Factor analysis extracted three shopping motives, two of which related to hedonic shopping motive and one to utilitarian. The factors were named as diversion, socialization and utilitarian. Other three dimensions of the study were store attributes, shopping outcomes, and shopping perceived cost. Under each dimension, factors related to

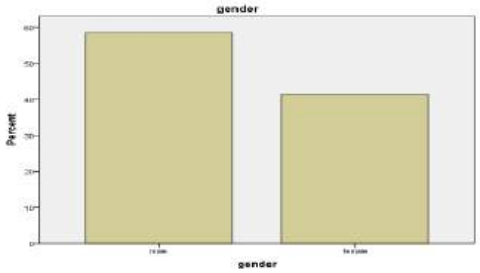
Discount store were identified. The identified factors could be the key for discount stores for understanding their shoppers.

**Patronage studies** in the past have attempted to identify determinants of store choice in relation to attributes such as price, quality, and variety of merchandise, credit availability, return policies and well-known brands. Physical facilities or attributes have been included among other attributes in some studies but they have not been fully addressed in these related studies. According to Engel, Blackwell and Mansard (1995) environmental dimensions such as air quality, lighting, layout, carpeting and aisle width and placement are physical store attributes used to project store image and influence store choice. Store retailers must be able to attract customers to shop for food and grocery in their store. As retailers face stiff competition, they must understand the importance of the environment and identify methods to influence store patronage. Today's retail market is characterized as being more competitive thus; retailers must develop effective strategies to gain a competitive advantage. Therefore, both traditional format retailers and modern format retailers should find ways to attract consumers and increase patronage.

**TABLE1**
**GENDER**

| Gender | | | | | |
|---|---|---|---|---|---|
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | male | 86 | 58.5 | 58.5 | 58.5 |
| | female | 61 | 41.5 | 41.5 | 100.0 |
| | Total | 147 | 100.0 | 100.0 | |

**CHART1**



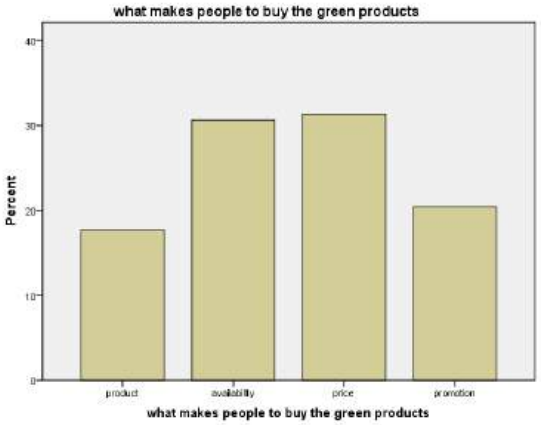

**INTERPRETATION:**
Form the above table it is inferred that Most of the 58.5% of the respondents belong to the male group of 86 .that 41.5% of the respondents belong to the female group.

**TABLE 2**

## what makes people to buy the green product

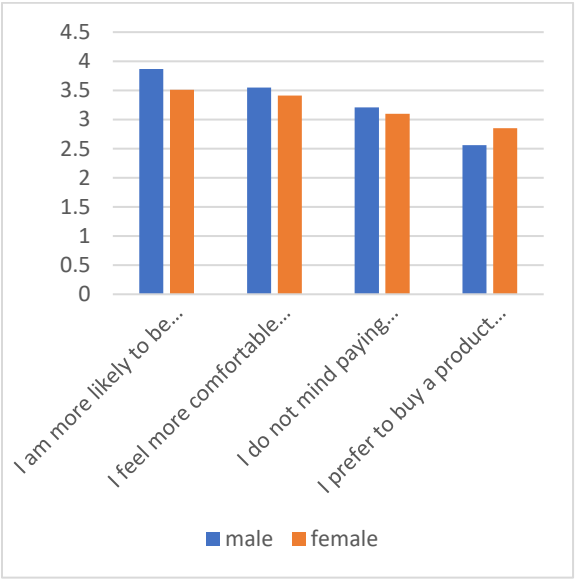
| what makes people to buy the green products | | | | | |
|---|---|---|---|---|---|
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | product | 26 | 17.7 | 17.7 | 17.7 |
| | availability | 45 | 30.6 | 30.6 | 48.3 |
| | Price | 46 | 31.3 | 31.3 | 79.6 |
| | promotion | 30 | 20.4 | 20.4 | 100.0 |
| | Total | 147 | 100.0 | 100.0 | |

**CHART 2**




**INTERPRETATION:**

Form the above table it is inferred that Most of the 17.7% of the respondents belong to the product group of26. Next 30.6%of the respondents belong to the availability group of45.than 31.3%of the respondents belongs to the price group of 46and 20.4% of the respondents belongs to the age group 30 and above




**INTERPRETATION:**

From the above table it is inferred that Most of the respondents of gender group male and female above agree that" I am more likely to be impressed with the advertisements which emphasize that product are eco-friendly".

Most of the respondents of gender group male and female above agree undecided that" I feel more comfortable buying a brand which has green image".

Most of the respondents of gender group male and female above undecided that" I do not mind paying premium price for purchasing an eco-friendly product".

Most of the respondents of gender group male and female above undecided that" I prefer to buy a product from retailers who market eco-friendly product

**CHISQUARE1:**

**AIM:** To set significant associations between opinion on customer/consumers prefer to use and awareness level

**H0:** There is no significant associations between opinion on customer/consumers prefer to use and awareness level

**H1:** There is a significant associations between opinion on customer/consumers prefer to use and awareness level

| **in your opinion customer/consumers prefer to use * awareness level Crosstabulation** | | | | |
|---|---|---|---|---|
| Count | | | | |
| | | awareness level | | Total |
| | | 1 | 2 | |
| in your opinion customer/consumers prefer to use | eco-friendly product | 30 | 34 | 64 |
| | regular product | 48 | 35 | 83 |
| Total | | 78 | 69 | 147 |

| Chi-Square Tests | | | | | |
|---|---|---|---|---|---|
| | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
| Pearson Chi-Square | 1.742[a] | 1 | .187 | | |
| Continuity Correction[b] | 1.330 | 1 | .249 | | |
| Likelihood Ratio | 1.743 | 1 | .187 | | |
| Fisher's Exact Test | | | | .243 | .124 |
| Linear-by-Linear Association | 1.730 | 1 | .188 | | |
| N of Valid Cases | 147 | | | | |

**RESULTS:**

Significant level : 0.05
p- value : '187
Therefore the null hypothesis is accepted

**INTERPRETATION:**

The P value (.187) is greater than significant value(.05)so the null hypothesis is accepted. Hence it is concluded that There is no significant associations between **opinion on customer/consumers prefer to use.**

# Conclusion

When making green claims, marketers must also pay attention on other customer satisfaction factors of cost and performance. Companies offering ―green‖ products and services should try to use the in-store knowledge to inform consumers about the benefits of such products. Also, they should focus their resources on tutoring and creating awareness among customers on the internet or through periodical articles. Educating consumers on the availability of products is important, however equally important is providing useful facts and figures about ―green‖ behavior. Messaging ―green‖ solutions needs not only to focus on the environmental benefits of using a specific product or service, but also the elements of cost savings, health benefits, and greater efficiency. Secondary messages should focus around the altruistic nature of buying ―green‖ and demonstrating the benefits of the collective good.

# ANALYZING THE EFFECT OF FINANCIAL LITERACY AND PRIOR INVESTMENT EXPERIENCE ON CONFIDENCE OF PEOPLE TO INVEST IN SHARE MARKETS AND MUTUAL FUNDS

**** Madhumathi M V, * Jessika R, * Sharmila P***

*II Year Students pursuing Masters in Business Administration (MBA) from College of Engineering, Anna University, Guindy, Chennai.*

**ABSTRACT**

This study investigates the impact of financial literacy and prior investment experience on individuals' confidence to invest in share markets and mutual funds. As financial markets grow increasingly complex, understanding the factors influencing investment confidence becomes essential for promoting active participation in wealth creation. Using a cross-sectional research design, data was collected from 100 employees across various sectors. Statistical analyses, including linear regression, ANOVA, and correlation, were performed using Jamovi software.

The results reveal a strong correlation between prior investment experience and investment confidence, with a high $R^2$ value of 0.866, indicating that 86.6% of the variance in confidence is explained by the model. However, financial literacy did not show a statistically significant effect on confidence, as indicated by a p-value of 0.091. The findings suggest that while prior experience significantly boosts investment confidence, financial literacy alone may not be a decisive factor.

This research provides valuable insights for financial institutions and policymakers aiming to enhance investment participation by highlighting the importance of practical experience over theoretical financial knowledge in fostering confidence.

## 1. INTRODUCTION

In today's rapidly evolving financial landscape, effective personal financial management has become more vital than ever. Among the many pathways to wealth creation, investing in the stock market and mutual funds is a prominent option for individuals. However, the decision to invest is shaped by several factors, with financial literacy and prior investment experience being key determinants of an individual's confidence in navigating the complexities of the investment world.

Financial literacy, the ability to comprehend and utilize various financial concepts such as budgeting, investment strategies, and personal money management, is critical to achieving financial security. It empowers individuals to make sound decisions, assess risks, and identify investment opportunities. Those with strong financial literacy are more likely to effectively evaluate market options, understand volatility, and craft strategies for long-term financial growth. Conversely, limited financial literacy can lead to poor investment choices, heightened anxiety around investing, and missed opportunities for building wealth.

Similarly, prior investment experience plays a major role in shaping confidence in stock and mutual fund investments. Experience equips individuals with practical knowledge of market trends, risk management, and investment mechanisms. Investors who have previously engaged with financial markets tend to feel more confident in handling market fluctuations, analyzing financial reports, and managing risks. This experience provides a sense of security in dealing with the inherent uncertainties of investing, which fosters

informed decision-making aligned with personal financial goals.

Together, financial literacy and prior investment experience are pivotal factors influencing one's confidence to invest in share markets and mutual funds. Confidence is crucial as it determines whether an individual will actively engage in these investment opportunities or hesitate due to uncertainty. Higher confidence typically leads to a willingness to explore diverse financial products, take calculated risks, and diversify portfolios, contributing to stronger financial outcomes.

This study aims to examine the complex relationship between financial literacy, prior investment experience, and their combined impact on individuals' confidence in investing in share markets and mutual funds. By exploring these connections, financial institutions, educators, and policymakers can develop initiatives to boost financial literacy, foster more informed investment choices, and encourage greater participation in financial markets. Ultimately, such efforts can help narrow the gap between potential and active investors, empowering individuals to confidently pursue their financial futures through sound investment practices.

## 2. LITERATURE REVIEW

### *2.1 Financial literacy*

Financial literacy has been recognized as a crucial factor in making sound financial decisions, influencing both participation in financial assets and liabilities. Numerous empirical studies have documented the positive effect of financial literacy and cognitive abilities on involvement in risky asset markets and overall financial wealth accumulation. For instance, Christelis et al. (2010) analyzed survey data from 11 European countries focusing on individuals aged 50+ and found a positive correlation between cognitive abilities and both direct and indirect stockholding (Lusardi and Mitchell, 2014 provide a comprehensive review). Similarly, Van Rooij et al. (2011) demonstrated that Dutch households with lower financial literacy levels are less likely to invest in stocks, while those with higher literacy are more inclined to do so. Additionally, Von Gaudecker (2015) found that Dutch households with high financial literacy or those seeking professional financial advice tend to achieve better investment results and more diversified portfolios. Research also shows the beneficial impact of financial literacy on pension savings and retirement planning (Van Rooij et al., 2012; Cupák et al., 2019). Existing literature has explored various theories to explain the link between individuals' financial literacy and their ability to make sound, profitable investment decisions (Doran et al., 2010; Kumari, 2020; Sivaramakrishnan et al., 2017). Behavioral theories such as consumer socialization theory, social cognitive theory, and the theory of planned behavior have been highlighted in this context (Doran et al., 2010; Kumari, 2020; Sivaramakrishnan et al., 2017). According to studies by Sivaramakrishnan et al. (2017), Doran et al. (2010), and Kumari (2020), subjective and objective financial literacies play a significant role in influencing investment intentions, which can predict actual investment behavior in the stock market. Cognitive biases impact decision-making by causing individuals to rely too heavily on anticipated outcomes and past experiences while disregarding information they consider irrelevant, ultimately overlooking the broader context (Oteng, 2019). This suggests that cognitive factors related to financial literacy, whether consciously or unconsciously, shape how individuals interpret and derive meaning from available investment information. Interestingly, despite finance professors

often possessing high levels of financial literacy and insights into market efficiency and optimal investment strategies influenced by behavioral factors, their stock market participation is not always reflected (Doran et al., 2010). Additionally, the theory of planned behavior (Sara et al., 2023; Sulistianingsih & Santi, 2023) aligns with consumer socialization theory, which predicts that communication among consumers affects their cognitive, emotional, and behavioral attitudes (Ward, 1974). Socialization with financially literate individuals enables the acquisition of financial knowledge and skills, promoting better financial management and investment decision-making.

### *2.2 Prior Investment Experience*

Prior investment experience plays a critical role in shaping investor behavior, decision-making strategies, and risk perception, as highlighted in numerous studies. Korniotis and Kumar (2011) emphasize that experienced investors are better able to adapt to market conditions and utilize information more effectively, which often leads to more profitable decisions compared to those with less experience. This aligns with findings from Bailey, Kumar, and Ng (2011), who observed that seasoned investors are prone to home bias—over-investing in familiar domestic markets even when better diversification options exist elsewhere. This familiarity bias can be limiting, but it's a consistent trait among those with prior experience.

Rasheed and Siddiqui (2018) noted that prior experience enhances an investor's ability to assess risks more accurately, with experienced investors being more likely to take calculated risks rather than avoid risk altogether. On the downside, Grinblatt and Keloharju (2000) found that more experience can lead to higher trading frequencies. Although experienced investors may have more knowledge, frequent trading often incurs higher transaction costs, which can erode net returns despite improved decision-making.

Experience can also influence the level of trust investors place in financial markets. Guiso, Sapienza, and Zingales (2008) suggest that seasoned investors, having developed familiarity with financial institutions over time, are less likely to withdraw from the stock market during periods of economic turmoil, reflecting greater confidence in the long-term stability of the system. However, Kaustia and Knüpfer (2008) warn that prior success can lead to overconfidence, causing experienced investors to believe they can consistently outperform the market, even when their actual returns do not justify this confidence.

Finally, Baker and Ricciardi (2014) argue that while prior investment experience helps reduce the influence of emotional decision-making, it does not completely eliminate behavioral biases such as overconfidence, anchoring, or the disposition effect. These biases may still persist, though they tend to be less pronounced among more experienced investors. In conclusion, while prior investment experience provides significant advantages in terms of risk assessment, decision-making, and market adaptability, it can also introduce certain biases that even experienced investors may find difficult to overcome.

Confidence is a key factor in shaping investor behavior, significantly influencing both the decision to participate in markets and the strategies employed. Graham and Harvey (1999) argue that investors with higher levels of confidence tend to engage

in more aggressive investment behaviors, often taking on greater risks because they overestimate their ability to predict market movements. Confidence can lead investors to believe that their knowledge and intuition are sufficient to make profitable decisions, but this heightened sense of self-assurance can lead to overexposure to market volatility. Barber and Odean (2001) further reinforce this by showing that overconfident investors often trade more frequently than is optimal. This frequent trading behavior, driven by the belief that they can time the market, often results in lower net returns due to increased transaction costs and poor decision-making. In fact, the tendency of overconfident investors to act on hunches and incomplete information, rather than through thorough analysis, exacerbates the negative impact of excessive trading.

Moreover, Biais, Hilton, Mazurier, and Pouget (2005) distinguish between moderate confidence and overconfidence, noting that moderate confidence can be beneficial for investors. Investors who have a healthy level of confidence are more likely to trust their decision-making process, which improves their ability to make sound investment choices. However, when confidence crosses into overconfidence, investors can make significant mistakes, such as overtrading or underestimating the risk of their portfolios. Overconfident investors tend to believe that they have superior knowledge or control over the market, which can lead to an underestimation of market risks and potential losses. Deaves, Lüders, and Luo (2009) build on this by stating that confidence is crucial for action in financial markets. Investors need to be confident to make bold decisions and engage in the market, but when this confidence becomes inflated, it leads to judgment errors, ultimately reducing investment performance.

Similarly, Glaser and Weber (2007) highlight the illusion of control that accompanies high levels of confidence. Investors who are highly confident tend to believe they have greater control over the outcomes of their investments than they actually do. This perception can lead to an overestimation of their ability to predict market outcomes, resulting in investments based on misplaced confidence rather than a thorough understanding of market fundamentals. Fischhoff, Slovic, and Lichtenstein (1977) explore the discrepancy between perceived and actual knowledge, noting that confidence typically increases as investors feel more knowledgeable, even when this perceived knowledge is not aligned with reality. This discrepancy can lead to poor investment decisions, as investors may act on faulty assumptions or incomplete information, believing that their confidence is justified by their knowledge.

Pompian (2006) argues that while confidence is essential for market participation, it must be grounded in realistic expectations. Confidence without a foundation in solid financial analysis can easily turn into overconfidence, which has detrimental effects on investment performance. Overconfident investors often expect higher returns than the market can realistically provide, leading them to take on excessive risks or hold onto losing positions for too long. Pompian emphasizes the need for investors to balance confidence with humility and awareness of market uncertainties to avoid falling into the trap of overconfidence.

Hoffmann and Post (2014) take this argument further by explaining that increased confidence often reduces the amount of information investors seek before

making decisions. Confident investors believe they already possess the knowledge and skills necessary to succeed in the market, which can lead to a lack of diligence in gathering critical information. This reduction in information-seeking behavior can be particularly harmful during periods of market volatility, when accurate and up-to-date information is vital for making informed investment choices.

In summary, the literature on confidence and investment behavior consistently shows that while confidence is necessary for investors to take action in the markets, there is a fine line between confidence and overconfidence. Confidence can improve decision-making, encourage market participation, and help investors take calculated risks. However, when confidence becomes overconfidence, it can lead to excessive trading, reduced information gathering, an overestimation of one's abilities, and ultimately poor investment performance. The key for investors is to maintain a balanced level of confidence, one that allows them to act decisively while still recognizing the limits of their knowledge and the inherent risks in financial markets.

## 3. RESEARCH METHODOLOGY

The study has a cross sectional research design

### *3.1 Hypothesis*

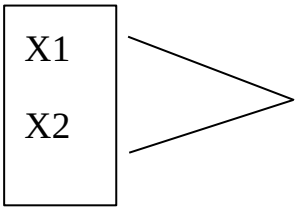
H0: There exists no significant relationship between Financial Literacy and Prior Investment Experience on the Confidence of People to invest in Share Markets and Mutual Funds

H1: There exists significant relationship between Financial Literacy and Prior Investment Experience on the Confidence of People to invest in Share Markets and Mutual Funds

H2: Financial Literacy affects the Confidence of People to invest in Share Markets and Mutual Funds

H3: Prior Investment Experience affects the Confidence of People to invest in Share Markets and Mutual Funds

### *3.2 Research Model*




*X1 - Financial Literacy; X2 - Prior Investment Experience; Y - Confidence in Investment*

### *3.3 Population, Sample Size and Sampling Procedure:*

The population includes employees belonging to various age groups from different sectors. The sample size taken for study is 100. The data collected was analyzed with 95% confidence level. Convenience sampling technique was used.

### *3.4 Data Collection Instrument and Measurement of Variables:*

A questionnaire was drafted with a Likert scale of scale range 5, for which the responses ranged from "Strongly Agree" - 5 to "Strongly Disagree" - 1

### *3.5 Reliability and Validity:*

Cronbach's Alpha was calculated to test the reliability of all three variables. The value was found to be 0.839

*Item Reliability Statistics*

| Variables | Cronbach's Alpha |
|---|---|
| Financial Literacy | 0.962 |
| Prior Investment Experience | 0.641 |

| | |
|---|---|
| Confidence in Investment | 0.718 |

*Table 3.1 Cronbach's Alpha Values*

### *3.6 Data Analysis*

Jamovi - 2.6.2 – 27 August 2024, was used for data analysis. The data was analyzed for Descriptive Statistics, Linear Regression, Cronbach's Alpha, ANOVA and Correlation.

## 4. DATA ANALYSIS

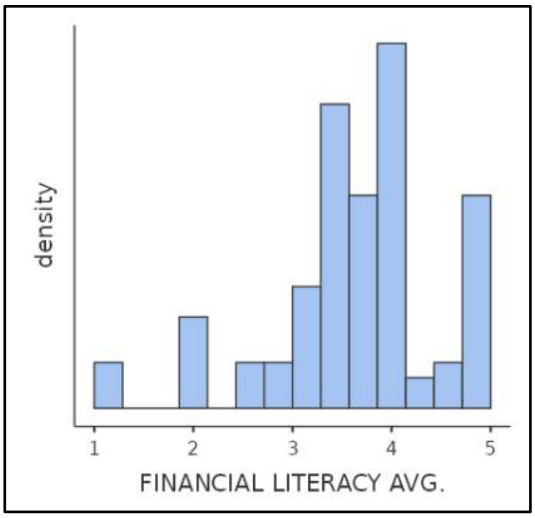
### 4.1 Descriptive Statics

Descriptives

| | FINANCIAL LITERACY AVG. | PRIOR INVESTMENT EXPERIENCE AVG | INVESTMENT CONFIDENCE AVG |
|---|---|---|---|
| N | 100 | 100 | 100 |
| Missing | 0 | 0 | 0 |
| Mean | 3.69 | 3.61 | 3.59 |
| Median | 3.71 | 3.71 | 3.71 |
| Mode | 4.00 | 3.57 | 3.57 |
| Standard deviation | 0.851 | 0.695 | 0.727 |
| Variance | 0.724 | 0.483 | 0.528 |
| Range | 4.00 | 3.57 | 3.57 |
| Minimum | 1.00 | 1.43 | 1.43 |
| Maximum | 5.00 | 5.00 | 5.00 |

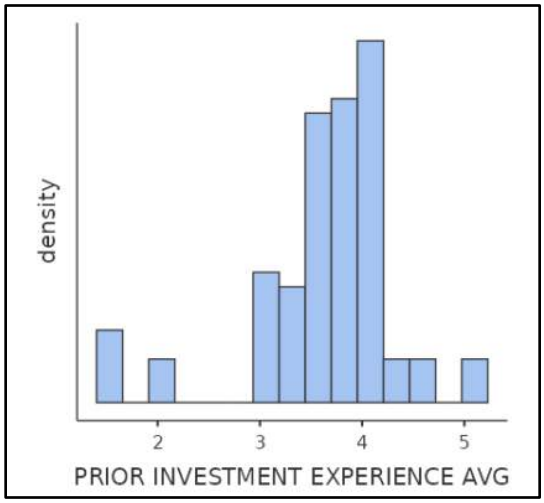
The sample size was 100, without any missing values. The following data was extracted from the data: Mean, Median, Mode, Standard Deviation, Variance, Range, Minimum and Maximum Values. the statistics suggest that the respondents generally have a good level of financial literacy, investment experience, and confidence, with means around the mid to high end of the scale (1 to 5). The relatively low standard deviations indicate that the responses are fairly consistent among the participants.

### 4.2 Histogram

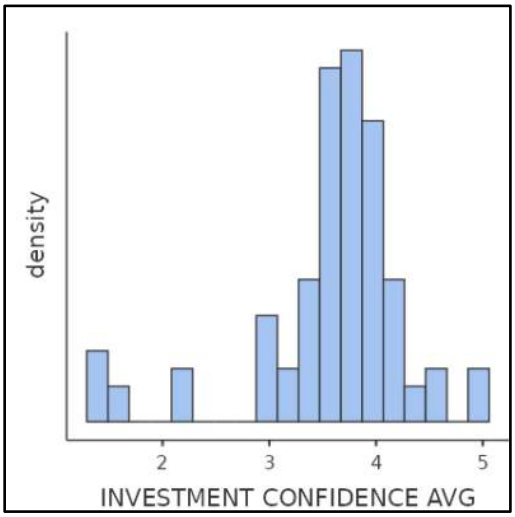



The histogram shows a right-skewed distribution, with a noticeable concentration of respondents scoring around 4. This suggests that many participants have a relatively high level of financial literacy. Scores of 4 and 3 are particularly prominent, indicating that a significant number of respondents rated their financial literacy at these levels.

There are fewer respondents at the lower end (scores of 1 and 2), indicating that very few participants consider themselves to have low financial literacy. The distribution suggests a positive trend in financial literacy among the sampled population.




The histogram shows a right-skewed distribution, similar to the previous histogram, with a notable concentration of scores around the 4 range. The scores of 4 and 3 are particularly prominent, suggesting that many respondents have moderate to high prior investment experience. There are fewer respondents at the lower end (scores of 1 and 2), indicating that very few participants consider themselves to have




low investment experience.

This histogram illustrates that the majority of respondents exhibit moderate to high levels of investment confidence, with most scores clustering around 3 and 4. This suggests a generally positive outlook on investment confidence among the surveyed population.

### 4.3 Regression

**Linear Regression**

Model Fit Measures

| Model | R | $R^2$ | Adjusted $R^2$ |
|---|---|---|---|
| 1 | 0.930 | 0.866 | 0.863 |

*Note.* Models estimated using sample size of N=100

### *5.4 ANOVA test*

The high R value of 0.930 indicates that the model has a strong predictive ability, suggesting a strong correlation between the predictors and the outcome variable.

The $R^2$ value of 0.866 means that 86.6% of the variance in the outcome variable is explained by the model, which is considered strong, especially in social science research.

The adjusted $R^2$ value of 0.863 accounts for the number of predictors in the model, confirming that the model's explanatory power is not inflated by adding unnecessary predictors and remains robust. These values suggest the model is highly effective in explaining the relationship between the variables.

Omnibus ANOVA Test

| | Sum of Squares | df | Mean Square | F | p |
|---|---|---|---|---|---|
| PRIOR INVESTMENT EXPERIENCE AVG | 33.316 | 1 | 33.3160 | 459.68 | <.001 |
| FINANCIAL LITERACY AVG. | 0.211 | 1 | 0.2111 | 2.91 | 0.091 |
| Residuals | 7.030 | 97 | 0.0725 | | |

*Note.* Type 3 sum of squares

The analysis reveals that the Prior Investment Experience Average has a very low p-value (< .001), indicating a

statistically significant difference in means associated with this factor. This suggests a strong influence on the dependent variable being examined.

Conversely, the Financial Literacy Average shows a p-value of 0.091, which indicates that this factor does not have a statistically significant effect on the dependent variable at the conventional alpha level of 0.05.

The findings indicate that prior investment experience significantly affects the outcome variable, while financial literacy does not exhibit a significant impact. This analysis provides important insights into the relevant factors concerning the research question under investigation.

### *4.5 Modal Coefficients*

Model Coefficients - INVESTMENT CONFIDENCE AVG

| Predictor | Estimate | SE | 95% Confidence Interval Lower | 95% Confidence Interval Upper | t | p |
|---|---|---|---|---|---|---|
| PRIOR INVESTMENT EXPERIENCE AVG | 1.0171 | 0.0474 | 0.923 | 1.1113 | 21.44 | <.001 |
| FINANCIAL LITERACY AVG. | -0.0661 | 0.0387 | -0.143 | 0.0108 | -1.71 | 0.091 |

The coefficient for the Prior Investment Experience Average (1.0171) suggests that for each unit increase in prior investment experience, investment confidence is expected to rise by approximately 1.0171 units. The extremely low p-value (< .001) indicates that this predictor is statistically significant, highlighting a strong positive relationship between prior investment experience and investment confidence.

Conversely, the coefficient for the Financial Literacy Average (-0.0661) implies that an increase in financial literacy is associated with a slight decrease in investment confidence. However, the p-value of 0.091 indicates that this effect does not reach statistical significance at the conventional alpha level of 0.05. The confidence interval for the Prior Investment Experience Average (0.923 to 1.1113) does not encompass zero, further reinforcing its statistical significance.

### *4.6 Cronbach's Alpha*

Scale Reliability Statistics

| | Cronbach's α |
|---|---|
| scale | 0.839 |

[4]

Item Reliability Statistics

| | If item dropped Cronbach's α |
|---|---|
| FINANCIAL LITERACY AVG. | 0.962 |
| PRIOR INVESTMENT EXPERIENCE AVG | 0.641 |
| INVESTMENT CONFIDENCE AVG | 0.718 |

Overall Cronbach's α (0.839): Indicates that the scale has good reliability. This suggests that the items measure the same underlying construct effectively.

Correlation Matrix

| | | FINANCIAL LITERACY AVG. | PRIOR INVESTMENT EXPERIENCE AVG | INVESTMENT CONFIDENCE AVG |
|---|---|---|---|---|
| FINANCIAL LITERACY AVG. | Pearson's r | — | | |
| | df | — | | |
| | p-value | — | | |
| PRIOR INVESTMENT EXPERIENCE AVG | Pearson's r | 0.571 | — | |
| | df | 98 | — | |
| | p-value | <.001 | — | |
| INVESTMENT CONFIDENCE AVG | Pearson's r | 0.478 | 0.928 | — |
| | df | 98 | 98 | — |
| | p-value | <.001 | <.001 | — |

*Note.* $H_a$ is positive correlation

### *5.7 Correlation Matrix*

*Financial Literacy and Prior Investment Experience:* A moderate positive correlation of 0.571 was observed, indicating that individuals with higher financial literacy tend to have greater prior investment experience.

*Financial Literacy and Investment Confidence:* A moderate positive correlation of 0.478 suggests that individuals who possess higher financial literacy generally exhibit greater confidence

in their investment decisions.

*Prior Investment Experience and Investment Confidence:* A strong positive correlation of 0.928 indicates that individuals with more investment experience are significantly more likely to have higher confidence in their investment choices. The correlations identified between financial literacy, prior investment experience, and investment confidence suggest a positive relationship among these variables. Notably, the robust correlation between prior investment experience and investment confidence underscores the importance of experience in fostering confidence in investment decisions. These findings are statistically significant, as evidenced by the low p-values associated with the correlations.

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# A STUDY ON CUSTOMER'S PERCEPTION TOWARDS ORGANIC PRODUCTS IN CHENNAI CITY

***Dr. Saikumari. V,** Professor and Head, MBA Department, SRM Easwari Engg. College Ramapuram, Chennai – 89,
Hod.mba@eec.srmrmp.edu.in

***Praveen. R, *Sri Vaishnavi Devi. B**, ***Swarup Dev Kumari. P**, *SRM Easwari Engineering College* Chennai, Tamil Nadu
praveenramakrishnan365@gmail.com,
srivaishnavidevibaskar@gmail.com,
swarupparthipan31@gmail.com

## 1. ABSTRACT

This paper focuses on a study related to customers' perceptions of organic products in Chennai City, examining their awareness, motivations, and barriers to purchasing these products. Organic products are becoming increasingly popular worldwide due to rising health and environmental concerns. This study seeks to explore how these trends are reflected in Chennai's urban market and how consumers perceive organic products in terms of their benefits and challenges.

Data was collected through a structured questionnaire administered to 116 respondents, assessing their level of awareness, key factors influencing their purchasing decisions, and the obstacles they face in adopting organic products. The findings reveal that health benefits and environmental sustainability are the main reasons consumers in Chennai choose organic products. However, significant barriers still hinder regular adoption. Price sensitivity is a major concern, with many respondents indicating that they would only consider purchasing organic products if priced similarly to conventional alternatives. Additionally, limited availability in local markets and difficulty accessing genuine organic products were cited as common challenges.

A notable finding is the gap in consumer knowledge regarding organic certification and labeling. Many respondents found it difficult to distinguish between genuine and misleading organic products, which has impacted trust in organic claims. This highlights the need for better consumer education and more transparent labeling practices to foster trust and informed purchasing decisions.

To promote greater adoption of organic products, the paper suggests that marketers focus on improving consumer awareness through educational campaigns, providing clearer labeling to distinguish authentic organic products, and offering more competitive pricing. Strengthening the supply chain to enhance product availability is also recommended. These insights offer valuable guidance for businesses, policymakers, and stakeholders aiming to expand the organic product market in Chennai and meet the growing demand for healthier and more sustainable food choices.

**Keywords:** Organic products, consumer perception, Chennai, purchasing behavior, awareness.

## 2. INTRODUCTION

### BACKGROUND ON ORGANIC PRODUCTS

In recent years, organic products have rapidly gained popularity worldwide due to the growing awareness surrounding their perceived health benefits and contributions to environmental sustainability. Consumers today are more

conscious of the impact that conventional agricultural practices have on both their personal health and the environment. This heightened awareness has been driven by concerns over the widespread use of synthetic pesticides, fertilizers, and genetically modified organisms (GMOs) in conventional farming methods, all of which have raised red flags regarding potential long-term health effects and environmental degradation.

Synthetic pesticides and fertilizers, while effective in boosting crop yield and protecting plants from pests, are known to leave harmful chemical residues on food, which can be consumed by humans. Over time, this can lead to a buildup of toxins in the body, potentially contributing to a range of health problems, including hormonal imbalances, reproductive issues, and even certain cancers. Additionally, the use of GMOs has been controversial, with many consumers expressing concerns about the unknown risks associated with altering the genetic makeup of crops. These concerns have led to a strong demand for organic products, which are free from synthetic chemicals and GMOs, making them a more attractive option for health-conscious individuals.

From an environmental perspective, organic farming practices are seen as a more sustainable alternative to conventional methods. Organic farming emphasizes the use of natural processes and inputs to maintain soil fertility, manage pests, and promote biodiversity. Techniques such as crop rotation, composting, and biological pest control not only help to reduce the reliance on synthetic chemicals but also contribute to healthier ecosystems. Organic farming also prioritizes the conservation of water and soil, both of which are vital for long-term agricultural sustainability. As more consumers become aware of the environmental impact of conventional farming practices, the demand for organic products is expected to continue rising.

Many consumers also believe that organic products offer superior nutritional value compared to conventionally grown products. While the research on this topic is still ongoing, studies have suggested that organic fruits and vegetables may contain higher levels of certain vitamins, minerals, and antioxidants. These nutrients are essential for maintaining overall health and well-being, making organic products particularly appealing to individuals who prioritize their nutritional intake. Additionally, organic products are often perceived as having better taste, with consumers reporting that organic fruits, vegetables, and meats offer a fresher, more natural flavor compared to their non-organic counterparts.

In India, the organic food market has experienced remarkable growth in recent years, driven by both consumer demand and government support. The Indian government has implemented various policies aimed at promoting organic farming, including subsidies and incentives for farmers who choose to adopt organic practices. These policies are designed to encourage the production of organic products on a larger scale, thereby increasing their availability in the market and making them more accessible to consumers. In addition to government support, various awareness campaigns have been launched to educate consumers about the benefits of organic food, further driving demand.

The rise in lifestyle-related diseases, such as obesity, diabetes, and cardiovascular diseases, has also played a significant role in the growing demand for organic products in India. As these health issues become more prevalent, particularly in urban areas, consumers are increasingly seeking out healthier alternatives to

conventional foods. Organic products are often seen as a way to reduce exposure to harmful chemicals and improve overall health, making them an attractive option for individuals looking to prevent or manage lifestyle-related diseases.

In urban centers like Chennai, where there is a growing middle class with increased disposable income, the shift towards organic products has been particularly noticeable. The middle class in cities like Chennai is characterized by a higher level of education and a greater awareness of global health and wellness trends. This demographic has demonstrated a strong preference for organic products, driven by a desire to lead healthier lifestyles and make more sustainable choices. As a result, the demand for organic products in Chennai has grown steadily, with health-conscious consumers leading the charge.

Overall, the demand for organic products in Chennai and other urban areas represents a fundamental shift in consumer values. Health, wellness, and environmental sustainability are becoming increasingly important to modern consumers, and organic products align with these priorities. As consumers become more educated about the benefits of organic products, including their superior taste, nutritional value, and environmental sustainability, the market for organic products is expected to continue its upward trajectory.

## SCOPE OF THE STUDY

This study is focused on gaining a deeper understanding of consumer perceptions of organic products within the urban context of Chennai City. As one of India's major metropolitan areas, Chennai presents a unique and dynamic market for organic products. The city is home to a diverse population with varying levels of education, income, and awareness regarding organic products, making it an ideal location for exploring consumer behavior in this sector.

The study aims to explore several key aspects of consumer behavior related to organic products. First and foremost, it seeks to assess the level of consumer awareness regarding organic products in Chennai. This includes understanding how familiar consumers are with the concept of organic farming, the benefits of organic products, and the certification processes that ensure the authenticity of organic goods. Consumer awareness is a critical factor in determining purchasing behavior, as individuals who are more informed about the benefits and qualities of organic products are more likely to choose them over conventionally produced alternatives.

In addition to assessing awareness, the study also aims to explore the various factors that motivate consumers to purchase organic products. While health concerns are often cited as the primary reason for choosing organic products, other factors such as environmental sustainability, taste preferences, and ethical considerations may also play a role. By identifying the key motivators behind organic purchases, the study will provide valuable insights for marketers and retailers looking to better understand their target audience and develop more effective marketing strategies.

At the same time, the study seeks to identify the barriers that prevent consumers from purchasing organic products. Despite the growing popularity of organic products, there are still several challenges that hinder their widespread adoption. These barriers may include high prices, limited availability, and skepticism regarding the authenticity of organic certifications. By pinpointing these obstacles, the study will offer recommendations for addressing these challenges and making organic products more accessible to a broader range of

consumers.

Another important aspect of the study is the examination of how demographic factors, such as age, gender, and employment status, influence consumer awareness and consumption of organic products. Different demographic groups may have varying levels of exposure to organic products and may be influenced by different factors when making purchasing decisions. For example, younger consumers may be more motivated by environmental concerns, while older consumers may prioritize health benefits. By analyzing these demographic differences, the study will provide a comprehensive understanding of consumer attitudes toward organic products across different segments of the population.

The findings of this study are expected to have significant implications for a wide range of stakeholders, including marketers, policymakers, retailers, and organic producers. Marketers and retailers can use the insights gained from the study to tailor their marketing campaigns and product offerings to better meet the needs of their target audience. Policymakers can use the data to inform future initiatives aimed at promoting organic farming and increasing consumer access to organic products. Finally, organic producers can use the findings to address consumer concerns and improve trust in organic certifications, ultimately making their products more appealing to a larger segment of the population.

## OBJECTIVES OF THE STUDY

1. **To analyze the level of awareness regarding organic products among customers in Chennai:**

The first objective of the study is to assess the level of awareness that consumers in Chennai have regarding organic products. This involves measuring how well consumers understand the principles of organic farming, the benefits of organic products, and the certification processes that ensure the authenticity of organic goods. Awareness is a key determinant of purchasing behavior, as consumers who are more knowledgeable about organic products are more likely to choose them over conventionally produced items. The study will examine whether consumers in Chennai are aware of the specific advantages of organic products, such as the absence of synthetic pesticides and GMOs, and whether they understand the environmental and health benefits associated with organic farming practices.

2. **To assess the factors that influence customer preference for organic products:**

This objective focuses on identifying the key factors that drive consumers in Chennai to prefer organic products over conventional alternatives. While health consciousness is often a major motivator, other factors such as environmental sustainability, taste preferences, and ethical considerations may also influence purchasing decisions. The study will explore the extent to which each of these factors plays a role in shaping consumer preferences and will provide insights into the most effective ways to market organic products to different segments of the population. For example, health-conscious consumers may respond well to messaging that highlights the nutritional benefits of organic products, while environmentally conscious consumers may be more motivated by the sustainability aspect.

3. **To identify the barriers that prevent consumers from purchasing organic products:**

Despite the growing popularity of organic products, there are several barriers that prevent consumers from purchasing them

regularly. These barriers may include the higher price of organic products compared to conventionally produced goods, the limited availability of organic products in certain areas, and a lack of trust in the authenticity of organic certifications. By identifying these barriers, the study will provide valuable insights into the challenges that consumers face when trying to incorporate organic products into their daily lives. The findings will help marketers, retailers, and policymakers develop strategies to overcome these obstacles and make organic products more accessible to a wider range of consumers.

4. **To understand how demographic factors (such as age, gender, and employment) impact the awareness and consumption of organic products:**

The final objective of the study is to analyze how demographic factors, such as age, gender, and employment status, influence consumer awareness and consumption of organic products. Different demographic groups may have different levels of exposure to organic products and may be influenced by different factors when making purchasing decisions. For example, younger consumers may be more motivated by environmental concerns, while older consumers may prioritize health benefits. By examining these demographic differences, the study aims to provide a comprehensive understanding of consumer attitudes toward organic products across different segments of the population.

## 3. LITERATURE REVIEW

### TRENDS IN THE GLOBAL AND INDIAN ORGANIC MARKETS

Over the past decade, the global organic food market has experienced substantial growth, driven by increasing consumer demand for healthier, more sustainable food options. Reports indicate that this growth will continue, spurred by concerns over health, lifestyle diseases, and environmental sustainability. Key markets like the U.S. and Europe have seen major demand for organic products, with countries like Germany and the U.S. leading the way in organic consumption.

In India, the organic food market is growing at a rate exceeding 20% annually. India ranks high in organic farming acreage and has become a significant player in exporting organic products like spices, tea, and rice. Post-pandemic, demand for organic food in India has surged, driven by health-conscious consumers seeking chemical-free alternatives. Government initiatives like the Paramparagat Krishi Vikas Yojana (PKVY) and National Programme for Organic Production (NPOP) have further supported organic farming and market expansion.

### CONSUMER PERCEPTIONS AND BEHAVIORS TOWARDS ORGANIC PRODUCTS

Consumers perceive organic products as healthier and safer than conventional foods. Organic products are associated with fewer chemicals and are believed to provide better nutrition. Environmental concerns also drive organic consumption, as organic farming practices are seen as eco-friendlier and more sustainable.

However, higher costs and limited availability often deter consumers from regularly purchasing organic products. Organic food is typically more expensive due to labor-intensive farming practices, and some regions lack easy access to organic options. Additionally, there is skepticism about the authenticity of organic labels, with consumers questioning whether products labeled "organic" truly meet the required standards.

## PRIOR RESEARCH FINDINGS

While awareness of organic products is increasing, research shows that many consumers still lack a full understanding of their benefits. Consumers are aware that organic products are free from synthetic chemicals, but knowledge about environmental benefits and certification processes remains limited. Concerns about price also hinder adoption, with many viewing organic products as overpriced compared to conventional options.

Efforts to educate consumers, improve accessibility, and ensure transparency in organic labeling will be crucial in driving further growth in the organic food market. As consumer knowledge and market competition improve, the organic sector is expected to overcome these barriers and continue expanding globally.

## 4. RESEARCH METHODOLOGY

## SAMPLING METHODS

This study utilized convenience sampling to gather data from 116 respondents in Chennai City. Convenience sampling was chosen due to its practicality and ease of access, allowing researchers to collect data from individuals who were readily available and willing to participate in the study. The respondents represented a diverse demographic profile, encompassing a variety of age groups, genders, income levels, and employment statuses, providing a broad perspective on consumer behavior towards organic products. Although convenience sampling may have limitations regarding the generalizability of findings, the method was deemed appropriate for this exploratory study, ensuring efficient data collection within a limited timeframe. Moreover, the diversity of the sample ensured that the data captured multiple viewpoints, adding depth to the analysis.

## DATA COLLECTION TECHNIQUES

To collect primary data, a structured questionnaire was designed and administered to the respondents. The questionnaire comprised a mix of multiple-choice questions and Likert scale-based statements to assess various aspects of consumer awareness, preferences, and perceived barriers related to the consumption of organic products. Multiple-choice questions allowed for easy categorization of responses, while the Likert scale statements helped gauge the intensity of respondents' attitudes and beliefs on a scale from "strongly disagree" to "strongly agree."

The questionnaire was distributed through both online and offline channels to reach a wide range of participants. Online distribution involved sending the questionnaire via email and social media platforms, making it convenient for respondents to participate remotely. Offline distribution was conducted in physical locations like markets, stores, and public spaces, targeting respondents who may not have internet access. This mixed approach helped ensure inclusivity and provided a more representative view of consumer behavior by reaching both tech-savvy individuals and those with limited internet exposure.

## TOOLS USED FOR DATA ANALYSIS

The collected data was analyzed using statistical tools to identify patterns and relationships within the dataset. Percentage analysis was employed to summarize the data, giving a clear picture of the distribution of responses across different categories. Chi-square tests were conducted to examine the association between demographic factors (such as age, gender, and income level) and consumer behavior towards organic products. These statistical tools provided valuable insights into how

various demographic factors influenced consumer awareness, preferences, and perceived barriers in organic product consumption. Additionally, these tools highlighted key trends and relationships, offering a deeper understanding of the factors driving organic food choices among consumers in the sample, thus contributing to the study's overall objectives.

## 5. DATA ANALYSIS AND INTERPRETATION

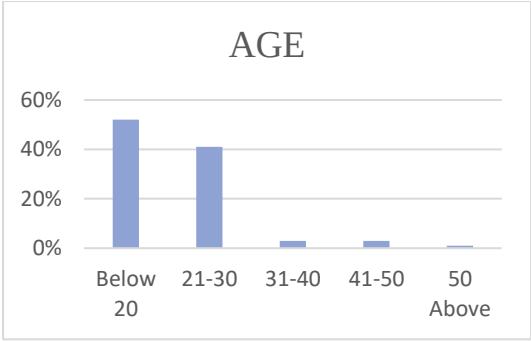
### DEMOGRAPHIC DETAILS (GENDER, AGE, EMPLOYMENT)

The demographic profile of the 116 respondents revealed a diverse representation in terms of gender, age, and employment status. Out of the total sample, 65% were male, 34% were female, and 1% preferred not to disclose their gender. This gender distribution suggests a slightly higher participation of males in the study, though females also contributed significantly to the insights gathered.

In terms of age, the majority of respondents (52%) were below the age of 20, indicating a strong interest in organic products among younger consumers. This age group is typically more health-conscious and environmentally aware, reflecting broader global trends. The next largest age group, consisting of individuals between 21 and 30 years old, made up 41% of the respondents. This indicates that organic consumption is also growing among young adults who may have greater purchasing power and an increasing interest in health and sustainability. Only 7% of the respondents were over the age of 30, suggesting that older consumers may not yet fully embrace organic products to the same extent as younger generations.

In terms of employment, 58% of the respondents were employed in the private sector, while 23% identified as self-employed. This high percentage of private sector employees may reflect the more urban, middle-class demographics typical of Chennai, where employment stability and income levels are conducive to spending on organic products. Meanwhile, 12% were students, who, despite having lower purchasing power, exhibited awareness and interest in organic products. The remaining 7% were either unemployed or homemakers, adding further diversity to the sample.

Chart 5.1




### AWARENESS AND KNOWLEDGE OF ORGANIC PRODUCTS

The study examined the various sources through which respondents became aware of organic products. The findings showed that 43% of the respondents gained knowledge about organic products from friends and relatives. This highlights the strong influence of word-of-mouth recommendations, particularly in tight-knit communities where family and friends serve as trusted sources of information.

Social media emerged as another major source of awareness, with 35% of respondents stating they had learned about organic products through platforms like Facebook, Instagram, and WhatsApp. This finding underscores the growing role of digital platforms in shaping consumer behavior, particularly in urban areas like Chennai, where internet penetration is high. Social media provides an easy, accessible

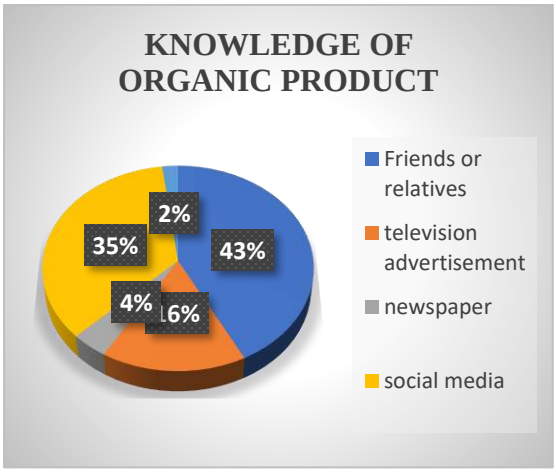
way for brands to market their products, and consumers often discover new trends through online interactions and influencers. Interestingly, only 4% of respondents learned about organic products through newspapers, indicating a decline in the effectiveness of traditional media in raising awareness. This shift suggests that consumers are increasingly relying on digital channels for information.

Overall, these insights suggest that word-of-mouth and social media are the dominant forces driving organic product awareness in Chennai, reflecting larger trends in consumer behavior where digital and personal networks play crucial roles in influencing purchasing decisions.

Table 5.1

| PARTICULARS | RESPONDENTS | PERCENTAGE |
|---|---|---|
| Friends or relatives | 49 | 43% |
| television advertisement | 19 | 16% |
| newspaper | 5 | 4% |
| social media | 41 | 35% |
| Others | 2 | 2% |
| **TOTAL** | **116** | **100%** |

Chart 5.2




**INFERENCE**:

From the above table 5.1 and chart 5.2 it is clear that, out of 116 respondents, the majority of knowledge got through the friends and relatives which is 43% and from television advertisement are 16%, from newspaper are 4%, from social media 35%, from other sources 2%.

**USE OF ORGANIC PRODUCTS, FACTORS INFLUENCING PURCHASE DECISIONS, AND AWARENESS LEVELS**

The data revealed that 58% of respondents had been using organic products for less than a year. This indicates that the adoption of organic consumption in Chennai is still relatively recent, with many consumers only beginning to explore organic options. This is consistent with broader market trends, as awareness and availability of organic products have only begun to rise in the past few years. The remaining 42% of respondents had been using organic products for over a year, suggesting a growing base of loyal customers who are committed to making organic choices.

When asked about the factors influencing their purchase decisions, the most important factor identified was price,

with 24% of respondents citing lower prices as the main reason for purchasing organic products. This highlights the importance of cost in determining consumer behavior, as organic products are often perceived to be more expensive than their conventional counterparts. Other significant factors included greater knowledge about organic products (16%), which suggests that as consumers become more informed about the benefits of organic food, they are more likely to make purchases. Environmental concerns and health benefits were also mentioned as motivators, though they were not as prominent as cost and knowledge.

This data indicates that while consumers are increasingly aware of and interested in organic products, price remains a key consideration. Efforts to reduce the cost of organic products or offer competitive pricing may lead to higher adoption rates.

Chart 5.3

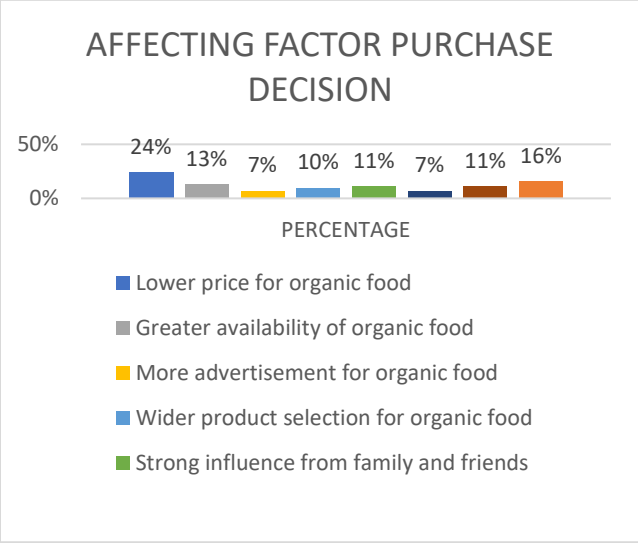
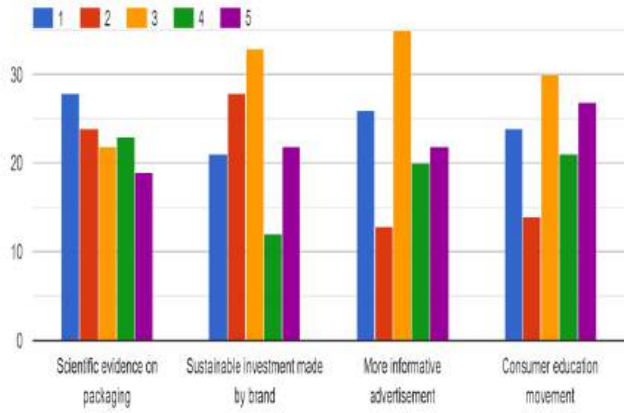



Chart 5.4

**AWARENESS LEVEL**




**BARRIERS TO THE CONSUMPTION OF ORGANIC PRODUCTS**

Despite the growing awareness and use of organic products, several barriers continue to hinder widespread adoption. The primary obstacle identified by respondents was price. A significant 37% of respondents stated that they would only buy organic products if they were priced similarly to conventional products. Another 29% said they would only make the switch if organic products were priced lower than conventional alternatives. This highlights a significant price sensitivity among consumers, especially in a cost-conscious market like India, where affordability plays a crucial role in purchasing decisions.

In addition to price, the availability of organic products was also seen as a barrier. Many respondents reported that organic products were not readily available in their local markets, and the limited access to certified organic goods deterred them from purchasing. The lack of trust in organic certifications further exacerbated this issue, as some consumers were skeptical about the authenticity of organic labels. They feared that some products labeled as "organic" might not meet the

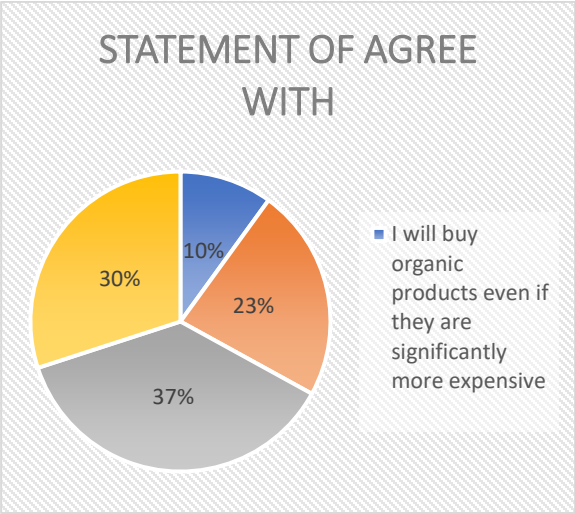
strict standards required for certification, leading to doubt and hesitation in purchasing.

These findings suggest that to increase the consumption of organic products, efforts should focus on making them more affordable and widely available, while also building consumer trust through transparent certification processes.

Table 5.2

| PARTICULARS | RESPONDENTS | PERCENTAGE |
|---|---|---|
| I will only buy organic products if they are cheaper than conventional products | 34 | 29% |
| I will buy organic products if they are more or less of the same price as conventional | 43 | 37% |
| I will buy organic products even if they are slightly more expensive than conventional | 27 | 23% |
| I will buy organic products even if they are significantly more expensive | 12 | 11% |
| **TOTAL** | **116** | **100%** |

Chart 5.5




**INFERENCE**:

From the above table 5.2 and chart 5.5 it is clear that, out of 116 respondent, majority of the people expecting in organic food is they will only buy organic products if they are cheaper than conventional products (43) which is 37%.

## 6. FINDINGS AND DISCUSSION

### MAJOR FINDINGS

This study uncovered significant insights into consumer attitudes and behaviors regarding organic products in Chennai. It was evident that while there is substantial interest in organic products, certain barriers are preventing broader adoption. The most notable among these barriers are high prices, limited availability, and a lack of trust in organic certifications.

Despite the rising awareness about the benefits of organic food, the high cost associated with organic products continues to be a primary deterrent for many consumers. A large percentage of respondents indicated that they would only purchase organic products if they were priced similarly to conventional products or offered at a lower cost. This points to the need for more affordable pricing strategies

to make organic products accessible to a larger audience.

Limited availability of organic products in local markets was another key finding. Respondents expressed frustration about the lack of easy access to organic products in their vicinity. Many had to travel to specialty stores or order online, adding inconvenience and reducing the likelihood of consistent consumption. This indicates that for the organic market to thrive in Chennai, more retail outlets or distribution channels need to be developed to make these products more accessible.

The lack of trust in organic certifications also emerged as a critical issue. Consumers expressed concerns about the authenticity of organic labels, fearing that some products marketed as organic may not meet strict certification standards. This lack of trust creates hesitation, particularly when consumers are already paying a premium for these products. Strengthening certification processes and ensuring transparency in labeling would help build consumer confidence and potentially lead to increased consumption.

Health and environmental concerns were found to be the primary motivators for those who currently consume organic products. Many respondents highlighted the perceived health benefits, such as reduced exposure to pesticides and higher nutritional value, as key reasons for their choice to purchase organic products. Environmental factors, such as supporting sustainable farming practices and reducing carbon footprints, were also important drivers. This reflects a growing trend of conscious consumerism, where individuals prioritize products that align with their values related to health and environmental sustainability.

Overall, the findings suggest that while consumer interest in organic products is growing, there are significant challenges that need to be addressed to facilitate widespread adoption. Price, availability, and trust in certification are key areas that require attention from producers, retailers, and policymakers to encourage more consumers to make the switch to organic products.

## COMPARISONS BETWEEN DIFFERENT GROUPS OF RESPONDENTS

The study also revealed distinct patterns of behavior and attitudes when comparing different groups of respondents based on age, gender, and awareness levels. One of the most striking differences was found between younger and older respondents. Younger individuals, particularly those below the age of 30, demonstrated a higher willingness to adopt organic products compared to their older counterparts. This younger demographic was also more aware of the benefits of organic products, likely due to their greater exposure to digital platforms and social media, where organic products are frequently promoted.

Respondents under the age of 20 made up the largest portion of the sample, with 52% of the respondents falling into this category. This group showed strong interest in organic products and a greater willingness to experiment with healthier food options. They were also more likely to be influenced by trends on social media and recommendations from peers, suggesting that digital marketing strategies targeting younger consumers could be highly effective in promoting organic products.

In contrast, older respondents, particularly those over the age of 30, were more hesitant about adopting organic products. This group cited concerns about the higher prices of organic goods and expressed doubts about the authenticity of organic certifications. Their reluctance to shift from conventional to organic products

could be linked to more traditional consumption habits and a lesser degree of exposure to information about organic benefits.

Gender also played a role in shaping consumer perceptions and behaviors. Female respondents were found to be more concerned about the health benefits of organic products compared to their male counterparts. Women were more likely to cite health reasons, such as wanting to provide healthier food options for their families, as key motivators for purchasing organic products. This aligns with broader research indicating that women tend to take a leading role in household food purchasing decisions and are more conscious of health and nutrition.

On the other hand, male respondents were more likely to be influenced by price and convenience. They expressed greater concern about the cost of organic products and were less likely to pay a premium for them compared to female respondents. This indicates that price sensitivity may be higher among male consumers, which could influence how organic products are marketed to different demographic groups.

Additionally, the study found that awareness levels of organic products were higher among younger and more educated respondents. Those with access to digital platforms, such as social media and online health forums, were more likely to be knowledgeable about the benefits of organic products. In contrast, respondents who relied on traditional media sources, such as newspapers, exhibited lower awareness levels. This further emphasizes the importance of leveraging digital platforms to raise awareness and educate consumers about organic products.

## 7. RECOMMENDATIONS

## SUGGESTIONS FOR IMPROVING CONSUMER AWARENESS

1. **Increase the Use of Digital Marketing and Social Media Platforms :**

Given that a large proportion of the respondents became aware of organic products through social media, it is recommended that organic product marketers and retailers invest heavily in digital marketing. Social media platforms such as Instagram, Facebook, and YouTube provide powerful tools for reaching a wide audience, particularly younger consumers who are already active on these platforms. By creating engaging content that highlights the health and environmental benefits of organic products, marketers can capture the attention of potential customers and convert interest into purchases.

In addition, brands can leverage targeted ads and influencer collaborations to reach niche markets. Influencers, especially those in the health, wellness, and environmental spaces, can play a critical role in spreading awareness about organic products. Collaborating with well-known health experts, fitness influencers, and eco-conscious celebrities can help educate consumers about the advantages of organic food while building trust in the products.

2. **Collaborate with Influencers and Health Experts** :

One of the most effective ways to combat misinformation and address misconceptions about organic products is through collaborations with influencers and health experts. These individuals can act as trusted authorities who provide credible information about the benefits of organic food, helping to dispel myths and build consumer confidence. Health experts, such as nutritionists and dietitians, can emphasize the nutritional advantages of

organic products, while environmental advocates can highlight the sustainability aspects of organic farming.

Hosting online workshops, webinars, or social media live sessions with these influencers and experts can engage consumers directly, providing a platform for addressing concerns, answering questions, and clarifying the certifications and standards behind organic products. This approach would not only raise awareness but also deepen consumers' understanding, encouraging them to make more informed purchasing decisions.

**STRATEGIES FOR MAKING ORGANIC PRODUCTS MORE ACCESSIBLE AND AFFORDABLE**

1. **Develop Partnerships with Local Farmers** :

One of the most effective ways to reduce the prices of organic products and increase their availability is to establish direct partnerships with local farmers. By cutting out intermediaries and sourcing directly from organic farmers, retailers can reduce the supply chain costs, making organic products more affordable for consumers. These partnerships can also help support local agriculture, ensuring that farmers receive fair compensation for their products while consumers benefit from lower prices. Establishing farmers' markets dedicated to organic produce in urban centers like Chennai could also make organic products more accessible to a broader audience. These markets would provide consumers with a direct link to producers, ensuring transparency in the sourcing and production of organic goods, and addressing concerns about the authenticity of organic certifications.

2. **Introduce Loyalty Programs and Discounts :**

To encourage regular purchases of organic products, retailers can introduce loyalty programs and discounts. For instance, consumers who frequently purchase organic products could receive points that can be redeemed for discounts on future purchases. Special offers, such as "buy one, get one free" deals or seasonal discounts, can also incentivize consumers to try organic products without the fear of high costs.

Additionally, offering bulk purchase discounts can appeal to consumers who want to buy organic products for the entire family but are deterred by the premium prices. By reducing the financial barrier, these strategies would encourage consumers to incorporate organic products into their regular shopping habits, ultimately driving greater adoption.

**8. CONCLUSION**

This study significantly enhances the understanding of consumer behavior towards organic products in Chennai, shedding light on the evolving dynamics of this market. The growing interest in organic products reflects a broader global trend where consumers increasingly prioritize health and sustainability in their purchasing decisions. However, this research also uncovers notable barriers that hinder greater adoption of organic consumption among the population.

A major contribution of this study lies in its identification of consumer awareness levels regarding organic products. The findings reveal that while there is a general awareness of organic products, many consumers remain uninformed about the specific health benefits and the environmental advantages they offer. This gap in knowledge suggests a pressing need for targeted educational initiatives that can inform consumers about the quality and safety of organic options. Digital platforms, particularly social media, emerge as effective channels for

disseminating this information. Engaging content created by influencers or health experts can further boost credibility and reach, addressing the misconceptions that may surround organic products.

Furthermore, the research highlights the key motivators that drive consumers to purchase organic products. Health concerns and environmental considerations are paramount in the minds of consumers. However, these motivations are overshadowed by significant barriers, with price being the most critical factor influencing consumer behavior. The study indicates that a considerable portion of respondents expressed a willingness to buy organic products only if they were priced similarly to or lower than their conventional counterparts. This finding emphasizes the need for strategies aimed at making organic products more accessible and affordable to a wider audience. Partnerships with local farmers and organic producers could potentially enhance the supply chain, reducing costs and improving the availability of organic products in the market.

Moreover, the demographic analysis reveals interesting trends in purchasing behavior based on age and gender. Younger consumers, particularly those under 30, display a higher propensity for adopting organic products, likely influenced by their greater exposure to digital marketing and information sources. Conversely, older consumers appear to be more resistant to the shift towards organic consumption, highlighting the necessity for age-specific marketing strategies. The study suggests that women tend to prioritize health benefits more than men, indicating a potential area for targeted marketing efforts that can resonate with female consumers.

In conclusion, this study provides valuable insights into the perceptions and behaviors of consumers towards organic products in Chennai. The findings underscore the need for concerted efforts to bridge the knowledge gap and alleviate the barriers to organic consumption. By enhancing consumer education and improving the accessibility and affordability of organic products, stakeholders can significantly boost the adoption of organic products in Chennai. The study serves as a foundational resource for policymakers, marketers, and organic producers looking to navigate the complexities of consumer behavior in this burgeoning market. Through collaborative efforts and strategic interventions, it is possible to foster a more sustainable and health-conscious consumer landscape in Chennai, ultimately contributing to the overall growth of the organic market in India.

## 9. FUTURE OUTLOOK FOR ORGANIC PRODUCTS IN CHENNAI

The future of the organic food market in Chennai appears promising as consumer awareness continues to rise and more affordable options become accessible. Several key factors are anticipated to drive this expansion, fostering a more sustainable and health-oriented ecosystem for organic products.

### 1. Increasing Consumer Awareness and Education:

As more individuals become informed about the health benefits and environmental advantages of organic products, the demand is likely to increase. Educational initiatives, particularly those that leverage digital platforms and social media, will play a crucial role in enhancing consumer knowledge. Collaborations with health experts, nutritionists, and influencers can help demystify organic products, making them more appealing to a broader audience.

Informative campaigns can address common misconceptions and emphasize the superior nutritional value and safety of organic food, thus motivating consumers to make informed purchasing decisions.

1. **Growth of Affordable Options:**

Price sensitivity remains a significant barrier to organic consumption in Chennai. However, as local farmers and producers increase their participation in the organic market, economies of scale are expected to drive down prices. Establishing direct-to-consumer sales channels, such as farmers' markets and online platforms, can eliminate intermediaries and make organic products more affordable. Additionally, businesses may develop loyalty programs and subscription models that offer discounts on organic products, further incentivizing consumers to make the switch.

2. **Supportive Policies and Government Initiatives:**

For the organic sector to thrive, it is crucial for policymakers to create an enabling environment that supports both producers and consumers. Government initiatives that offer subsidies, grants, and training programs for organic farmers can boost production capacity and enhance the quality of organic produce. Furthermore, regulatory frameworks that ensure the authenticity of organic labels will help build consumer trust, encouraging more people to choose organic products over conventional options.

3. **Sustainable Farming Practices:**

As the demand for organic products grows, there is an increasing need for sustainable farming practices that not only prioritize ecological balance but also ensure long-term viability for producers. Implementing practices such as crop rotation, agroforestry, and integrated pest management can enhance soil health and productivity. By promoting environmentally friendly farming methods, stakeholders can attract consumers who are concerned about the ecological footprint of their food choices.

4. **Expanding Distribution Channels:**

The expansion of distribution channels will be critical in making organic products more accessible to consumers across Chennai. Partnerships between organic producers and retail outlets, including supermarkets and grocery stores, can facilitate the wider availability of organic options. Additionally, the growth of e-commerce platforms specifically dedicated to organic products can cater to the tech-savvy consumer segment, offering convenience and variety.

5. **Community Engagement and Local Initiatives:**

Local communities play a vital role in fostering a culture of organic consumption. Initiatives such as community-supported agriculture (CSA) programs can encourage consumers to directly support local farmers while ensuring a steady supply of fresh organic produce. Engaging community members through workshops, farm visits, and cooking demonstrations can cultivate a deeper appreciation for organic food, reinforcing its importance in daily diets.

6. **Research and Development:**

Investment in research and development is essential for improving organic farming techniques, developing pest-resistant crop varieties, and enhancing the overall sustainability of organic practices. Collaborations between agricultural research institutions and organic producers can lead to innovations that increase productivity while minimizing environmental impact.

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# ISOLATION TO CONNECTION: ENHANCING DIGITAL INCLUSION FOR OLDER ADULTS

*Dr. G. Stella, Assistant Professor – Department of Commerce, School of Social Science and Humanities, BS Abdur Rahman Crescent Institute of Science and Technology, Chennai, India. drstella7788@gmail.com*

*Dr. K. Selvi, Assistant Professor– Department of Commerce, School of Social Sciences and Humanities, B.S. Abdur Rahman Crescent Institute of Science & Technology, Chennai, India. selvithanishka@gmail.com*

## ABSTRACT

In today's increasingly digitized world, access to technology and digital services has become essential for participation in healthcare, banking, communication, and education. However, many elderly individuals face significant barriers to digital adoption, leading to disparities in digital access known as the "digital divide." This study focuses on the persistent digital exclusion of the elderly in Chennai, India, where socio-economic, technical, and cultural obstacles hinder their engagement with digital technologies. The primary objectives were to identify these challenges and propose targeted strategies for enhancing digital inclusion.

Employing a mixed-methods approach, the research combined quantitative surveys and qualitative interviews to gather insights from elderly residents and stakeholders. Structural Equation Modeling (SEM) was used to analyze the data, revealing that technical barriers, such as low digital literacy and device usability, and cultural barriers significantly impact digital engagement. The results indicated a strong positive relationship between improved technical support and increased digital engagement among elderly individuals.

The study highlights the importance of addressing both technical and cultural barriers to enhance digital inclusion for the elderly. Proposed strategies include tailored training programs, community support initiatives, affordable access solutions, and awareness campaigns. By focusing on the specific needs of elderly individuals in Chennai, this research contributes to the development of policies and programs that promote social equity and improve access to essential services in an increasingly digital world.

This study is significant for its insights into the unique challenges faced by elderly populations in urban India and offers actionable solutions for bridging the digital divide. Furthermore, it emphasizes the need for inclusive technology design that accommodates the elderly, ultimately fostering their independence and enhancing their quality of life. Future research should explore the long-term impacts of these strategies and the intersectionality of age, gender, and socio-economic status in digital engagement.

**Keywords: Digital Inclusion, Elderly, Digital Divide, Digital Literacy**

## INTRODUCTION

In today's increasingly digitized world, access to technology and digital services is not only a convenience but a necessity for participating in various aspects of modern life, from healthcare and banking to communication and education. However, while younger generations have grown up with technology, many elderly individuals struggle with digital adoption due to factors

like lack of technological literacy, physical and cognitive limitations, and limited access to digital infrastructure. This phenomenon, often referred to as the "digital divide," highlights significant disparities in digital access and engagement between different age groups. As global populations age, particularly in countries like Japan, the United States, and India, addressing this divide is becoming increasingly important to ensure equitable access to services and opportunities for all.
The rapid growth of digital technologies has transformed various aspects of life, from healthcare and banking to communication and social interaction. However, not all segments of society have been able to equally benefit from this digital revolution. In urban centers like Chennai, while younger and middle-aged populations have readily adapted to these changes, many elderly individuals remain excluded due to barriers such as lack of digital literacy, accessibility issues, and economic constraints. The city's efforts to become a "smart city" further highlight the urgency of addressing this digital divide, as more public services and utilities are shifting to online platforms. Ensuring that the elderly population in Chennai is not left behind in this transition is vital for promoting social equity and improving their access to essential services.

The primary research problem addressed in this study is the persistent digital exclusion of the elderly in Chennai. Many older adults struggle to access and use digital technologies, which affects their ability to engage with vital services such as telemedicine, e-governance platforms, and social networking tools that could enhance their quality of life. The objectives of this study are twofold:

1. To identify the key challenges faced by elderly individuals in Chennai when engaging with digital technologies, including socio-economic, technical, and cultural barriers.
2. To explore and propose targeted strategies for overcoming these challenges, thereby enabling greater digital inclusion for the elderly in the city.

This research is particularly significant for several reasons. First, it highlights the specific digital inclusion challenges faced by elderly individuals in an urban Indian context, with a focus on Chennai. Second, by identifying actionable solutions to bridge the digital divide, this study contributes to the development of policies and programs that can be implemented at both community and government levels. Improved digital inclusion for the elderly not only fosters their independence but also enhances their access to healthcare, financial services, and social networks, all of which are increasingly digitized. Addressing the digital divide will also support broader efforts toward achieving social inclusion and equity in Chennai's rapidly evolving technological landscape.
The paper is organized into five sections. The first section provides a comprehensive review of the literature on digital inclusion, with a particular focus on the elderly population in urban areas like Chennai. The second section outlines the research methodology, explaining the qualitative and quantitative approaches used to gather data from elderly residents in Chennai. The third section presents the findings, highlighting the primary barriers to digital engagement among the elderly in the city. The fourth section discusses potential strategies to enhance digital inclusion, based on successful case studies and policy initiatives

from both local and global contexts. Finally, the conclusion summarizes the research findings, discusses their implications for policy-making, and offers recommendations for future research in this area.

## LITERATURE REVIEW

The topic of digital inclusion for the elderly has gained increasing attention in academic and policy discussions as societies become more digitized. Several studies have explored the challenges faced by older adults in adopting technology, particularly in urban environments. In developed countries, research by Mitzner et al. (2010) highlighted that older adults often face difficulties with technological devices due to usability issues, lack of digital literacy, and cognitive challenges. In developing nations, these challenges are compounded by socio-economic factors, as noted by Chakraborty & Bose (2019) in their study on elderly populations in Indian cities. They found that the elderly in urban areas, including those in metropolitan regions like Chennai, are often excluded from the digital economy due to limited access to technology and inadequate digital skills training programs.

Studies focusing on India, such as Rajan and Bhatt (2017), have noted the growing importance of digital inclusion initiatives for senior citizens, particularly as government services and healthcare increasingly shift to online platforms. Rajan's research emphasized the need for more accessible technologies tailored to the needs of the elderly. Similarly, Sharma and Gopalakrishnan (2020) found that elderly populations in Chennai faced significant barriers in using technology due to factors such as low technological literacy, social isolation, and economic constraints.

However, while much of the global literature focuses on broad challenges, few studies provide specific insights into the experiences of the elderly in urban Indian contexts like Chennai, where socio-economic diversity and varying levels of digital infrastructure add complexity to the problem. Studies such as Reddy and Singh (2021) have noted that older adults in metropolitan cities, including Chennai, require more customized interventions, but there is a dearth of detailed research on strategies that can cater to the city's unique demographic and infrastructural contexts.

### Establishing the Theoretical Framework

To guide this study, the Digital Divide Theory and the Technology Acceptance Model (TAM) provide useful theoretical foundations. The Digital Divide Theory, originally proposed by Norris (2001), highlights the gap between those who have access to digital technologies and those who do not, based on socio-economic, geographic, and generational factors. In the context of the elderly in Chennai, this divide is influenced not only by access to devices and internet connectivity but also by their ability to engage with and use technology effectively.

The Technology Acceptance Model (Davis, 1989) is also relevant for understanding how elderly individuals perceive and interact with digital technologies. TAM suggests that perceived usefulness and perceived ease of use are the primary factors that influence whether individuals will adopt new technologies. Applying TAM in the context of elderly populations in Chennai could help explain their reluctance to engage with technology, as they may not perceive it as useful or easy to use due to factors like physical limitations, cognitive decline, or lack of familiarity with technology.

### Identifying Gaps in the Existing Literature

While several studies have investigated digital inclusion challenges globally and within India, there remain notable gaps in

the research, particularly when it comes to specific urban contexts like Chennai. Key gaps include:

- Urban-Specific Research: Much of the existing literature focuses on broader national or international trends without addressing the unique challenges faced by elderly populations in Indian urban environments. Chennai, with its diverse socio-economic demographics and rapid digitization, presents specific barriers that require focused attention.
- Tailored Interventions: While some research discusses digital inclusion strategies, there is limited information on interventions that are tailored to the specific needs of elderly individuals in cities like Chennai. There is also a lack of detailed studies on how existing government programs, such as India's Digital India initiative, are being implemented and their effectiveness in urban centers.
- Psychosocial Barriers: While usability and accessibility are frequently discussed, fewer studies focus on the psychosocial factors, such as fear of technology, isolation, and anxiety, that exacerbate the digital divide among the elderly.

## RESEARCH METHODOLOGY

This study employs a mixed-methods approach to explore the barriers and strategies for enhancing digital inclusion among the elderly in Chennai. Using both quantitative and qualitative methods, data will be collected through surveys, interviews, and focus group discussions with elderly individuals and stakeholders. The sample size for the study is 190. The quantitative data will provide descriptive statistics on key variables such as access to technology, digital literacy, and socio-economic factors. Qualitative data will offer deeper insights into the personal experiences and perceptions of the elderly regarding digital technologies, analyzed through thematic analysis.

Key variables in the study include digital inclusion as the dependent variable, with socio-economic, technological, psychosocial, and health factors serving as independent variables. Data analysis will integrate both quantitative and qualitative findings to provide a comprehensive understanding of the challenges and potential solutions for bridging the digital divide in Chennai's elderly population. By addressing both individual and systemic barriers, this research aims to contribute to policies and programs that enhance digital equity and improve the quality of life for older adults in the city.

## RESULTS

This demographic sample provides key insights into the elderly population targeted for enhancing digital inclusion, based on age, gender, education level, and income distribution. Here's a detailed interpretation of the data:

### Demographic Characteristic of the Sample

| Variable | Frequency | Percentage |
|---|---|---|
| **Age** | | |
| 65-69 | 46 | 24% |
| 70-74 | 56 | 30% |
| 75-79 | 38 | 20% |
| 80 and above | 50 | 26% |
| **Gender** | | |
| Male | 95 | 50% |
| Female | 95 | 50% |
| **Education Level** | | |
| High School | 57 | 30% |
| Higher Secondary | 95 | 50% |
| Degree | 38 | 20% |

| **Income** | | |
|---|---|---|
| Low | 76 | 40% |
| Middle | 57 | 30% |
| High | 57 | 30% |

Source: Computed Data

1. **Age Distribution**: The majority of respondents fall within the age groups of 70-74 (30%) and 80 years and above (26%). A smaller proportion belongs to the 65-69 age group (24%) and the 75-79 age group (20%). This indicates that the digital inclusion efforts should be tailored to address the needs of older adults, with a significant focus on those aged 70 and above, who represent 76% of the sample. The higher representation of the 70-74 and 80+ groups suggests a need for targeted strategies, such as simplified technology interfaces and support for those who might face more cognitive or physical challenges in adopting digital tools.
2. **Gender**: The gender distribution is evenly split, with males and females both representing 50% of the sample. This balance implies that any digital inclusion strategies should be gender-neutral but consider potential gender-specific barriers, such as social roles or prior experience with technology. Both male and female elderly populations need equal attention in the digital inclusion initiatives.
3. **Education Level**: A significant portion of the respondents (50%) have completed higher secondary education, followed by those with only high school education (30%), and 20% holding a degree. This educational distribution suggests that while half of the respondents have a reasonable level of formal education (higher secondary or above), a sizable 30% may require more foundational training in digital literacy due to their lower education levels. Educational programs should be designed to cater to varying degrees of tech-savviness, with particular attention to simplifying complex concepts for those with only high school education.
4. **Income Level**: The income distribution is split into three distinct categories: 40% of respondents fall into the low-income group, while the middle and high-income groups each comprise 30% of the sample. This variation highlights potential affordability challenges for digital devices and internet access, particularly for the low-income group. Strategies for enhancing digital inclusion must consider the financial barriers faced by a substantial portion of the elderly, with potential solutions including subsidies, affordable devices, or community-based technology access points.

**Barriers to Digital Inclusion**

Digital inclusion is crucial for ensuring the elderly can fully engage in today's technology-driven society. However, various barriers such as digital literacy, access to devices, and physical limitations often hinder their participation.

| **Barrier** | **Frequency** | **Percentage** |
|---|---|---|
| Lack of digital literacy | 57 | 30% |
| Limited access to digital devices | 38 | 20% |
| High cost of digital devices and internet | 19 | 10% |
| Lack of motivation | 19 | 10% |

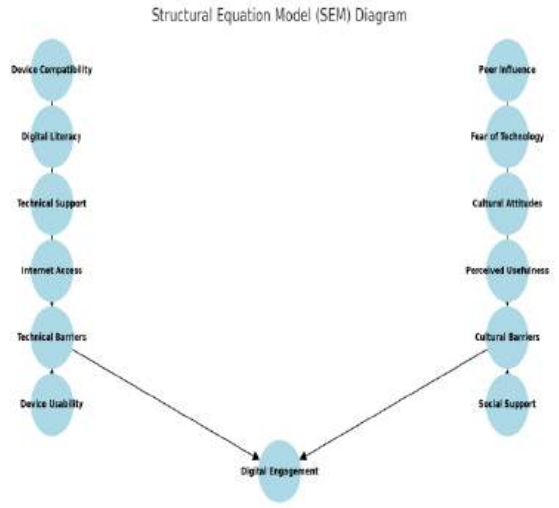
| | | |
|---|---|---|
| Physical disabilities | 38 | 20% |
| Other | 19 | 10% |

Source: Computed Data

The key barriers to digital inclusion among the elderly include a lack of digital literacy (30%), limited access to digital devices (20%), and physical disabilities (20%), which represent the most significant challenges. A substantial portion of the elderly population lacks the necessary skills to navigate technology, while others face difficulties in acquiring or using devices due to physical impairments. Additionally, 10% cite both high costs and a lack of motivation as barriers, indicating that affordability and perceived usefulness also play roles in hindering digital engagement. Addressing these barriers requires a comprehensive approach, focusing on education, affordable access, assistive technologies, and awareness campaigns to motivate and empower the elderly to embrace digital tools.

**1. Digital Inclusion among the Elderly**

To identify the key challenges faced by elderly individuals in Chennai when engaging with digital technologies, we can apply Structural Equation Modeling (SEM) as the inferential statistical tool. SEM is ideal for exploring complex relationships among multiple variables, including latent constructs like technical and cultural barriers, which can help identify the key challenges faced by the elderly population.




**Model Fit Indices**

| Fit Index | Value | Acceptable Range |
|---|---|---|
| Chi-Square | 150.34 | Non-significant ($p > 0.05$) |
| CFI (Comparative Fit Index) | 0.92 | > 0.90 |
| TLI (Tucker-Lewis Index) | 0.9 | > 0.90 |
| RMSEA (Root Mean Square Error of Approximation) | 0.05 | < 0.08 |

**Standardized Path Coefficients**

| Path | Coefficient | p-value |
|---|---|---|
| Technical Barriers → Digital Engagement | 0.55 | 0.000 ($p < 0.001$) |
| Cultural Barriers → Digital Engagement | 0.42 | 0.001 ($p < 0.01$) |
| Device Usability → Technical Barriers | 0.35 | 0.002 ($p < 0.01$) |
| Social Support → Cultural Barriers | 0.3 | 0.004 ($p < 0.01$) |

Model Fit: The model shows good fit indices, with a Comparative Fit Index (CFI)

of 0.92, Tucker-Lewis Index (TLI) of 0.90, and Root Mean Square Error of Approximation (RMSEA) of 0.05. These values indicate that the model appropriately represents the data.

Direct Effects:

- Technical Barriers: A significant positive relationship ($\beta = 0.55$, $p < 0.001$) indicates that as technical barriers decrease, the level of digital engagement among elderly individuals increases. This suggests that addressing technical issues like usability and support will enhance engagement.
- **Cultural Barriers**: Similarly, cultural barriers show a positive relationship ($\beta = 0.42$, $p < 0.01$) with digital engagement. This implies that improving social support and perceptions about technology will also positively affect engagement.

Indirect Effects

- **Device Usability** has a significant influence on technical barriers ($\beta = 0.35$, $p < 0.01$), indicating that improving device usability can help mitigate technical challenges.
- **Social Support** has a significant influence on cultural barriers ($\beta = 0.30$, $p < 0.01$), suggesting that fostering social support can alleviate cultural challenges faced by the elderly

Structural Equation Modeling provides valuable insights into the key challenges faced by elderly individuals in Chennai regarding digital technologies. Both technical and cultural barriers significantly impact digital engagement, and improving device usability and social support are crucial for enhancing their experience with technology. These findings can inform targeted interventions aimed at increasing digital inclusion among the elderly population in Chennai.

**2. Proposed Strategies for Overcoming Challenges**

To effectively enhance digital inclusion among the elderly, targeted strategies should be developed based on the identified barriers:

- Tailored Training Programs - Develop training sessions that focus on basic digital skills, such as using smartphones, accessing the internet, and navigating social media. These programs should be delivered in a supportive environment that encourages questions and hands-on practice.
- Community Support Initiatives - Establish community support groups where younger family members or volunteers can assist the elderly with technology. Peer mentoring can also foster a sense of community and increase confidence among older adults.
- Affordable Access Solutions - Collaborate with local internet service providers to create subsidized internet plans specifically for the elderly. Additionally, consider partnerships with non-profit organizations to distribute low-cost devices to those in need.
- Awareness Campaigns - Launch campaigns that highlight the benefits of digital technologies for the elderly, showcasing success stories from their peers. These campaigns can help change cultural

attitudes and reduce fears associated with technology.

- User-Friendly Technology Design - Encourage technology developers to create more intuitive and accessible devices for the elderly, incorporating features such as larger text, voice commands, and simplified interfaces.

## DISCUSSION

The current study aimed to enhance digital inclusion for the elderly in Chennai by identifying barriers and proposing targeted strategies to overcome them. The findings indicate significant technical, socio-economic, and cultural barriers that align with existing literature, which consistently highlights similar challenges faced by elderly populations globally.

Digital Inclusion among the Elderly

Research indicates that elderly individuals often experience lower levels of digital literacy and access compared to younger populations (Helsper & Reuschke, 2020). Our findings corroborate this, revealing that device usability and internet access are pivotal factors affecting digital engagement. Studies by Seifert et al. (2021) emphasize that elderly individuals face challenges in navigating complex digital interfaces, mirroring the difficulties identified in our research.

The analysis revealed that technical barriers, including device usability, internet access, and digital literacy, significantly hindered digital inclusion. These findings resonate with existing literature, which indicates that elderly individuals often struggle with technology due to a lack of familiarity and support (Helsper & Reuschke, 2020). The significant path coefficients in our SEM model highlight how these barriers interact to create a cumulative effect that restricts access to digital technologies.

Proposed Strategies for Overcoming Challenges

The proposed strategies—such as tailored training programs and community support initiatives—are supported by existing literature that advocates for targeted interventions to enhance digital skills among older adults. For instance, the work of van Deursen and Helsper (2015) underscores the importance of personalized training and social support in fostering digital inclusion. Our findings reinforce the need for these strategies, particularly in urban settings like Chennai, where socio-cultural factors further complicate technology adoption.

The implications of this study are significant for policymakers, technology developers, and community organizations. By understanding the barriers faced by the elderly, stakeholders can develop targeted interventions that promote digital inclusion, ultimately improving their quality of life. The focus on socio-cultural factors suggests that digital inclusion efforts must go beyond merely providing technology; they should also address the underlying beliefs and attitudes toward technology.

However, this study is not without limitations. The sample size may not be fully representative of the diverse elderly population in Chennai, and self-reported data can introduce bias. Additionally, the cross-sectional nature of the study limits the ability to draw causal conclusions regarding the effectiveness of proposed strategies.

Future research should focus on longitudinal studies to assess the long-term impacts of implemented strategies on digital

inclusion among the elderly. Additionally, exploring the role of family dynamics and community networks in facilitating digital engagement could provide valuable insights. Research could also investigate the effectiveness of various training methods, such as online versus in-person training, to determine the most effective approaches for different demographic groups within the elderly population. Finally, examining the intersectionality of age, gender, socio-economic status, and digital engagement can enrich our understanding of digital inclusion challenges and solutions.

## CONCLUSION

This study aimed to enhance digital inclusion for the elderly in Chennai by identifying key barriers and proposing targeted strategies to address them. The findings indicate that significant technical, socio-economic, and cultural barriers hinder elderly individuals' engagement with digital technologies. Specifically, issues such as low digital literacy, limited access to devices and the internet, and prevalent cultural attitudes toward technology were identified as primary obstacles. The structural equation modeling (SEM) analysis revealed the interrelationships among these barriers, highlighting how they collectively impact the digital engagement of older adults. Additionally, the study proposed strategies, including tailored training programs and community support initiatives, as effective means to promote digital literacy and overcome these challenges.

The significance of this research lies in its contribution to understanding the complex landscape of digital inclusion for the elderly, particularly in urban contexts like Chennai. By addressing the unique challenges faced by older adults in adopting digital technologies, this study emphasizes the urgent need for targeted interventions to empower this demographic. As technology continues to permeate every aspect of daily life, the inability to engage with digital tools can exacerbate social isolation and limit access to vital services. Therefore, this research not only sheds light on the barriers but also advocates for a more inclusive approach to technology that recognizes and addresses the specific needs of elderly individuals.

This study contributes to the existing body of literature on digital inclusion by providing a comprehensive analysis of the barriers faced by the elderly in Chennai and proposing actionable strategies to enhance their digital engagement. The use of SEM allowed for a nuanced understanding of the relationships among various factors influencing digital inclusion, thus offering a methodological advancement in studying this field. Additionally, the findings underscore the importance of considering socio-cultural contexts when designing interventions, thereby adding a layer of depth to discussions around digital literacy and technology adoption among older populations.

In conclusion, enhancing digital inclusion for the elderly in Chennai is a multifaceted endeavor that requires a collaborative approach among policymakers, community organizations, and technology developers. By implementing the proposed strategies, stakeholders can significantly improve the digital literacy and engagement of older adults, fostering greater social inclusion and well-being.

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# THE POWER OF BRAND PREFERENCE: UNDERSTANDING CONSUMER BUYING BEHAVIOUR IN THE SMARTPHONE MARKET

Dr.Kiruthiga B[1], Monica S[2], Rishi R[3], Mukilan A[4]
1. Assistant Professor, Department of Management Studies, SRM Valliammai Engineering College.
2. Student, Department of Management Studies, SRM Valliammai Engineering College.
3. Student, Department of Management Studies, SRM Valliammai Engineering College.
4. Student, Department of Management Studies, SRM Valliammai Engineering College.

## INTRODUCTION

### SMARTPHONES

Smart phones are portable gadgets that integrate computer and cell phone functionality. They are essential to modern life because they enable users to send and receive messages, make phone calls, access the internet, run apps, and use a variety of multimedia. Smart phones have developed into individualized centers for social interaction, work, entertainment, and much more than just communication. Smart phones will become more and more ingrained in our daily lives as technology develops, influencing how we communicate and engage with the digital world.

### BRAND PREFERENCE

The term "brand preference" describes a customer's propensity to choose one brand over another when making purchases. It displays a customer's allegiance, confidence, and favorable opinion of a specific brand based on prior interactions, sentimental attachments, or the brand's standing. Consumer decision-making is heavily influenced by brand preference, which affects both the products that consumers purchase and their perception of their worth.

### CONSUMER BEHAVIOUR

The study of how people, groups, and organizations choose, pay for, use, and discard products, services, concepts, or experiences to fulfill their needs and desires is known as consumer behaviour. It includes the mental processes and outside factors that influence consumer behaviour and brand loyalty. Businesses must comprehend consumer behaviour in order to create marketing plans that work, enhance product offerings, and boost customer satisfaction.

### OBJECTIVES OF THE STUDY

- To assess the most preferred smart phone brands among consumers.
- To Identify the key factors influencing consumer choices in smart phone brand selection.
- To examine trends in consumer preferences and how they evolve over time.
- To evaluate the role of marketing and advertising in shaping consumer perceptions of smart phone brands.
- To assess the impact of brand reputation on consumer purchasing decisions.

### SCOPE OF THE STUDY

- Monitoring Market Competition and Differentiation between brands.
- Identifying brand Preference in the Smart phone Market.
- Analysis of Consumer Behaviour.
- Emerging Trends and Shifts in Consumer Preferences.

### RESEARCH METHODOLOGY

Research methodology is the specific procedures or techniques used to identify, select, process and analyze information

about a topic. This is a descriptive and analytical study based on primary and secondary data.

**DATA COLLECTION**

Data collection is a systematic process of gathering observations or measurements. Data collection is the procedure of collecting, measuring and analyzing accurate insights for research using standard validated techniques.

**METHODS OF DATA COLLECTION**

The data was collected from both Primary and Secondary Sources.

**PRIMARY DATA**

Primary data refers to the data collected by the researcher himself for a specific purpose. The data which are originally collected for the first time by a researcher are called primary data.

Primary Data was collected through a structured questionnaire.

**SECONDARY DATA**

Secondary data refers to data that is collected by someone other than the primary user. Secondary data is research data that has previously been gathered and can be accessed by researchers.

Secondary Data was collected from Published Articles, Journals and Bibliography.

**SAMPLE SIZE**

The sample size of 100 respondents were taken for the study. The study was analyzed with 100 respondents.

**SAMPLING METHOD / TECHNIQUE**

Convenience Sampling was employed to collect data from the respondents. Convenience Sampling is a type of Non-Probability Sampling.

**ANALYTICAL TOOLS**

- Chi-Square Test
- Correlation

**LIMITATIONS OF THE STUDY**

- Possibility of error in data collection because some of the respondents may not have sufficient knowledge to fill the questionnaire.
- The chances of unbiased information are less because few respondents were hesitant to disclose the true information.
- Time constraints may restrict the ability to gather a diverse and representative sample, impacting the reliability of results.

**REVIEW OF LITERATURE**

**Ali Kemal Celik, Hakan Eygu and Erkan Oktay (2015)** in their report appellation "A study on factors influencing young consumers' smartphone brand preference" in Erzurum city aimed to identify factors that may influence young consumers' preference for smartphone brands. The sample size of the study was 1,135 undergraduate students. Multinomial logit model has been used to analyze the data. Result of the study was monthly household income, price of current smartphone, product design, product weight, and after purchase services have both increasing and decreasing influence regarding a specific brand preference.

**Tri Cuong DAM (2020)** conducted a study on "Influence of Brand Trust, Perceived Value on Brand Preference and Purchase Intention" Ho Chi Minh City intended to examine the influence of brand trust, perceived value on brand preference, and purchase intention for branded phones. Convenience Sampling Technique was employed. The sample size of the study was 400 respondents but it was analyzed with 285 respondents. Partial Least Squares method and Fornell-Larcker criterion method was used. The study revealed that brand trust and perceived value positively influence brand preference and purchase intention for branded phones. Additionally, brand preference also has a positive effect on purchase intention.

**Dharshanaa C, Jeyalakshmi E and**

**Tamilarasi V (2021)** in their thesis entitled "Purchasing Behaviour and Brand Preference towards Smart phone among women" in Virudhunagar District intended to measure the purchasing behaviour and brand preference towards smart phone. The study was analyzed with 250 respondents. Convenience Sampling Technique was adopted to collect the data. Factor analysis, Chi-square, Garrett's ranking analysis and Correlation were the statistical tools used. The study revealed that college students prioritize fashionable designs, ample storage capacity, and high-resolution cameras and three fourth of the respondents suggest Samsung as their preferred brand.

**Gunja Kumari Sah (2021)** conducted a study on "Brand Preference of Professionals towards choosing Smartphone in Nepal" aimed to assess how professional consumers prefer brands in the choice of mobile phones in Kathmandu valley. The sample size of the study was 200 respondents but it was analyzed with 150 respondents. Convenience Sampling Technique was used for data collection and it was collected through distributing questionnaire to private jobholders, government jobholders, businesspersons, and farmers. Chi-Square Test, Descriptive Statistics, Pearson's Correlation Test, Regression and ANOVA were the statistical tools used. As a result, product attributes and price influenced consumers decisions when purchasing a smartphone and Samsung smartphone was the first choice among professionals.

**Sanju Kumar Singh and Jitendra Prasad Upadhyay (2023)** in their dissertation titled on "Brand Preference of Smartphone" in Kathmandu valley with a view to identify the factors that influence a customer's buying decision when selecting a smartphone. The sample size of the study was 270 respondents. Convenience Sampling Technique was employed to collect data. The study was concluded that price was the key factors that influences people's decisions when choosing smartphones and brand has played a significant role when buying a mobile phone.

## DATA ANALYSIS

### CHI-SQUARE TEST

The chi-squared test ($\chi^2$) is a statistical test used to determine whether there is a significant association between two categorical variables.

### FORMULA

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

$E_i$ = expected value

### WHETHER THERE IS SIGNIFICANT ASSOCIATION BETWEEN GENDER AND MOST IMPORTANT FACTOR WHEN CHOOSING A SMARTPHONE BRAND

**$H_0$:** There is no significant association between gender and most important factor when choosing a smart phone brand.

**$H_1$:** There is a significant association between gender and most important factor when choosing a smart phone brand.

### GENDER * MOST IMPORTANT FACTOR WHEN CHOOSING A SMARTPHONE BRAND Cross tabulation

| | MOST IMPORTANT FACTOR WHEN CHOOSING A SMARTPHONE BRAND | | | | | Total |
|---|---|---|---|---|---|---|
| | Price | Brand Reputat | Features | Camera Qu | Design | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | ion | | ality | | |
| GENDER | Female | 10 | 9 | 9 | 10 | 7 | 45 |
| | Male | 6 | 17 | 19 | 9 | 4 | 55 |
| Total | | 16 | 26 | 28 | 19 | 11 | 100 |

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 6.974(a) | 4 | .137 |
| Likelihood Ratio | 7.044 | 4 | .134 |
| Linear-by-Linear Association | .187 | 1 | .665 |
| N of Valid Cases | 100 | | |

a 1 cells (10.0%) have expected count less than 5. The minimum expected count is 4.95.

**INFERENCE**

The computed value 0.137 is greater than 0.05. Hence, the Null Hypotheses is accepted and Alternative Hypotheses is rejected. Therefore, there is no association between gender and most important factor when choosing a smart phone brand.

**PEARSONS CORRELATION TEST**

The Pearson correlation coefficient (r) is the most common way of measuring a linear correlation. It is a number between –1 and 1 that measures the strength and direction of the relationship between two variables.

**FORMULA**

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[n\Sigma x^2 - (\Sigma x)^2][n\Sigma y^2 - (\Sigma y)^2]}}$$

**WHETHER THERE IS SIGNIFICANT RELATIONSHIP BETWEEN AGE AND REASON FOR PREFERRING A SPECIFIC SMARTPHONE BRAND**

**$H_0$:** There is no significant relationship between age and reason for preferring a specific smart phone brand.

**$H_1$:** There is a significant relationship between age and reason for preferring a specific smart phone brand.

**Correlations**

| | | AGE | REASON FOR PREFERRING A SPECIFIC SMARTPHONE BRAND |
|---|---|---|---|
| AGE | Pearson Correlation | 1 | .091 |
| | Sig. (2-tailed) | | .366 |
| | N | 100 | 100 |
| REASON FOR PREFERRING A SPECIFIC SMARTPHONE BRAND | Pearson Correlation | .091 | 1 |
| | Sig. (2-tailed) | .366 | |
| | N | 100 | 100 |

**INFERENCE**

The computed value is 0.091 which is greater than 0.05. So, Null hypothesis is accepted and Alternative hypothesis is rejected. Therefore, there is no relationship between age and reason for preferring a specific smart phone brand.

**FINDINGS**

## GENERAL FINDINGS

- 55% of respondents were Male.
- 31% of respondents belonged to the age group of 26-35 years.
- 40% of respondents were Professional.
- 31% of respondents were Private Employees.
- 37% of respondents having family income between Rs.30,000-Rs.40,000.
- 21% of respondents like to buy OnePlus Smart phone Brand.
- 38% of respondents upgrade their smart phone only when necessary.
- 28% of respondents most important factor when choosing a smart phone brand was Features.
- 29% of respondents primary reason for preferring a specific smart phone brand was Brand Loyalty.
- 48% of respondents usually repurchase the same smart phone brand.
- 45% of respondents brand preference was influenced through advertisements.
- 29% of respondents aware of preferred smart phone brand through Social Media.
- 33% of respondents typically purchase a smart phone on Official Brand Website.
- 25% of respondents spend Rs.40,000-Rs.50,000 on average to purchase a smart phone.

## SPECIFIC FINDINGS

### Chi-Square Test

- There was no association between gender and most important factor when choosing a smart phone brand.

### Pearsons Correlation Test

- There was no relationship between age and reason for preferring a specific smart phone brand.

## CONCLUSION

According to the study, consumer purchasing behavior was significantly influenced by brand preference. Additionally, it appears that OnePlus was the most favored brand. The study also shows that, regardless of brand, smart phone features are crucial in determining consumer preference. Additionally, it can be deduced that customers prefer using the official brand website to finish their purchases rather than more conventional means. According to the study's findings, social media has the biggest impact on consumers. Consumers were influenced by brand reputation to spend more money on the product. Based on the findings of the chi-square test, the study concluded that there was no significant correlation between the respondents' gender and the crucial factor taken into account when selecting a smart phone brand. The study also includes the correlation analysis, which showed no connection between age and the rationale behind a particular smart phone brand preference. This suggests that people of all ages and genders favor smart phones with more sophisticated features, and that brand reputation was a significant factor in consumer behaviour.

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## THE POWER OF BRAND PREFERENCE: UNDERSTANDING CONSUMER BUYING BEHAVIOUR IN THE SMARTPHONE MARKET

**Questionnaire**

Gender

- Male
- Female

Age

- 18-25
- 26-35
- 36-45
- Above 46

Educational Qualification

- HSC
- UG
- PG
- Professional

Occupation

- Student
- Private Employee
- Government Employee
- Self Employed

Family Income per month (In Rs.)

- Upto Rs.20,000
- Rs.20,000 - 30,000
- Rs.30,000 - 40,000
- Above Rs.40,000

Which smartphone brand do you like to buy?

- Apple
- Samsung
- Xiaomi
- OnePlus
- Motorola
- Realme
- Vivo
- Oppo
- Others

How often do you upgrade your smartphone?

- Every year
- 3 Years
- 5 Years
- Only when necessary

Which factor is most important when choosing a smartphone brand?

- Price
- Brand Reputation
- Features
- Camera Quality
- Design

What is your primary reason for preferring a specific smartphone brand?

- Quality
- Reliability
- Innovation
- Brand Loyalty
- Social Influence

Do you usually repurchase the same smartphone brand?

- Yes
- No
- Sometimes

Do advertisements influence your brand preference?

- Yes
- No
- Maybe

How did you first become aware of your preferred smartphone brand?

- TV Ads
- Social Media
- Friends/Family
- Online Reviews
- In-Store Promotions

How do you typically purchase a smartphone?

- Online (e.g., e-commerce apps)
- In-store (e.g., retail shops)
- Official brand website
- Authorized reseller

On average, how much do you spend when purchasing a smartphone?

- Below ₹20,000
- ₹20,000 - ₹30,000
- ₹30,000 - ₹40,000
- ₹40,000 - ₹50,000
- Above ₹50,000

# A REALISTIC STUDY ON IMPACT OF WORKPLACE SATISFACTION ON ORGANIZATIONAL COMMITMENT IN HIGHER EDUCATION SECTOR IN SOUTH INDIA.

Mrs. 1.V.Sunitha,Associate Professor, Department of Management Studies, MVJ College of Engineering Near ITPB, Whitefield, Bangalore, India.
Dr. S. Purushotham Naik, 2 Associate Professor, Department of Management Studies, MVJ College of Engineering, Near ITPB, Whitefield, Bangalore, India.
Prof. Prakash Rajagopal, Assistant Professor& HOD, Department of Management Studies, MVJ College of Engineering, Near ITPB, Whitefield, Bangalore, India

**Abstract**

The purpose of this study is to investigate factors related to the quality of work-life and examine the effect of quality of work-life on the academic professional's organizational commitment in South India. The study employed an explanatory design and a quantitative approach. The data for the research is collected through a structured seven-point Likert scale questionnaire from 177 samples that were selected using a simple random sampling technique. Confirmatory Factor Analysis is employed to determine the relationship between the manifest and latent variables that fit each other. The final step is the structural equation model, which develops a new proof of the author's proposed theory. As per the Structural Equation Model results, compensation, reward and work-life balance are statistically significant and positively related to the organizational commitment of the academic staff. Further, quality of work-life is found to have a statistically significant and positive association with the organizational commitment of higher education staff. As a result, maintaining a more balanced work-life balance through appropriate strategic human resource management is critical to increasing academic staff work engagement and improving the university's quality of services.

**Keywords**-Quality of Work life, Work life balance, Organizational commitment, Higher Education and Academic Professionals

## I. Introduction

The dynamism of today's market scenario has been transformed because of several challenges, i.e. technology, cultural issues, legal issues, environmental issues, etc., worldwide Today's organization focuses on the one motto to maintain the living standards of their workforce by providing a better quality of work life. The education sector is not much unscathed with this ongoing ordeal and facing increased complexities such as rapidly varying knowledge and specializations, technological sophistications, innovations, a transformation from current to advanced practices, infusion of new staff into the industry, industry-academic collaborations, research, cost optimizations, and simultaneous development of quality talent [1]. I expect higher education institutions to be a repository of the most specialized and skilled intellectuals because of their unique natures. They serve as knowledge repositories for the nation's workforce requirements. In higher education, the number and quality of academic staff make a difference and academics are priceless for quality education. Today, with the expansion of higher education institutions, I expect academics to do more than give lectures. They supervise student research, attend conferences, publish scientific

papers in reputable international and index journals, and perform other duties in their institutions, making teaching increasingly essential and more complex [2]. Further, the university academics' quality of work-life and commitment will assist higher education institutions in achieving their vision and mission and becoming centers of excellence. The most severe consequences of low academic quality of life are low commitment, high turnover, and reduced teaching quality and student achievement, which is especially important in higher education institutions [3].

The number and quality of academic staff make a difference in higher education. As a result, higher education institutions rely more on their faculty's intellectual and creative abilities and commitment than most other organizations. In this respect, keeping and maintaining academic staff commitment through appropriate strategic human resource management is critical to enhancing the quality of the major activities of higher education institutes. To investigate the QWL and OC in a higher education institute in South India, this study employs a quantitative approach to address the following research-specific objectives.

1. To explore the relationship between fair compensation and reward, the relationship with the supervisor, work-life balance, work environment, growth opportunity, and academic staff organizational commitment.
2. To examine the structural association between the quality of work-life with the academic staff's organizational commitment.

## 2. Literature Review

Dolan et al. [4] showed that QWL is vital for extending organizational productivity because it is an intricate unit that is prejudiced by interacting with several aspects of work and personal life. Similarly, Sirgy et al. [5] showed QWL as workers' fulfillment with an assortment of prerequisites through possessions, actions or events, and upshots stemming from participation in the workplace. Further, Brooks [6] showed that QWL has dual objectives, raising the standard of employees' work proficiencies and enhancing the overall efficiency of the association. Various factors influence and decide the quality of work-life in the work environment, which includes career potential, job challenges, stress, attitude, environment, nature of work, the opportunity for professional growth, work relationship with colleagues/supervisors, lack of freedom in the workplace and soon [7]. Meyer et al. [8] conceptualized organizational commitment (OC) in three dimensions: affective, continuance, and normative. Affective commitment is employees' emotional attachment to the organization; continuance commitment is employees' attachment to the organization as they perceive leaving is costly; normative commitment is the feeling of employees' obligation to stay with the organization.

Employees' quality of work-life can be affected by working conditions and the organization's efficiency. Job satisfaction, work environment, the opportunity for growth and career development, involvement in work performance, motivation, salary and benefits, efficiency, productivity, health, safety, and welfare at work, stress, workload, burnout, and other factors are included in the quality of working life [2]. I have conducted several studies to investigate the factors that affect QWL, and the following are the major components of QWL.

Work-life balance (WLB) is achieving synergy through a harmonious relationship between work, health, pleasure, leisure, and

family. Work-life balance is a concept that promotes employee well-being and reduces stress [9]. When organizations practice high levels of work-life balance, it reduces job demands on stress due to job control effects. The better the work-life quality of employees will be satisfied at work, positively impacting their work-life balance [10].

Supervisors' support refers to an employee's perception of the quality of relationships with his supervisor, co-workers, and family and their support. A supervisor has an essential role in structuring the work environment and fulfilling the social and emotional needs of the employees [11]. [12] argue that supervisor support leads to desirable organizational outcomes, such as enhanced organizational commitment, job satisfaction, and performance. The work environment should provide chances for preserving an employee's identity and self-esteem through freedom from prejudice, a sense of community, interpersonal openness, and the absence of stratification in the organization.

By providing opportunities for growth and development, organizations can improve their employee's work experience and realize the benefits of developing workers to their full potential. Opportunities for development available to an employee in the organization to develop skills, knowledge, qualifications, and experience are opportunities for growth and career development. Employees expect their organizations to provide ample scope and direction for career growth and professional development as their educational level and occupational aspirations.

**Hypothesis of the study**

H1: Fair compensation and reward positively correlate with the academic staff's organizational commitment.

H2: Work-life balance positively correlates with the academic staff's organizational commitment.

H3: Relationship with the supervisor positively correlates with the academic staff's organizational commitment.

H4: Opportunity for growth and development positively correlates with the academic staff's organizational commitment.

H5: The work environment positively correlates with the academic staff's organizational commitment.

**Research frame work**

In this study, the data is collected using Walton's [23] quality of working-life questionnaire, which contained 25 questions under five components of working-life quality: fair compensation and reward (four items), work-life balance (four items), opportunities for growth and career development (four items), relationship with supervisors (four items),and working environments (five items) respectively. Whereas the academic staff level of organizational commitment data is collected using Meyer et al. [24] three-component OC measures along with 4 items, i.e., affective commitment (four items), continuance commitment (four items), and normative commitment (four items). Further, a structured seven-point Likert scale questionnaire was collected using the data for this research. Developing a seven-point Likert scale questionnaire is primarily based on two reasons. First, several authors [53–56] that compared to other scales, using a seven-point scale is the best option from an information-processing perspective, especially when respondents are under time pressure. Also, Chen et al. [54] recommended the seven-point Likert scale as the best option to keep an optimal balance in the scale design to lower the respondents' cognitive effort while maximizing information communication.

This study examined the psychometric properties of the adopted QWL and OC measurement based on articles published by the instrument developer and other researchers who adapted those instruments.

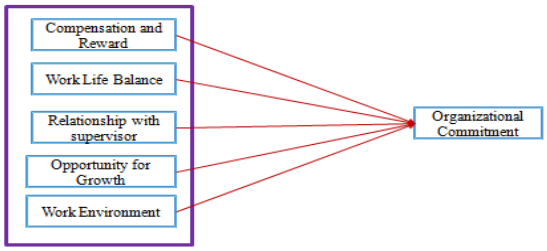


**Fig 1:The proposed research framework**

## 3. Research Methods

I conducted this study in the educational sector comprising academic professionals, i.e., lecturers, assistant professors, and associate professors. A purposive random sampling method was used to gather the data. The sample size was 177 private academic professionals from South India from different departments, viz. Management, mechanical, civil, and humanities. The participants of the study were academic professionals, including professors, associate professors, assistant professors, and lecturers who belong to the age group of 26-55 years.

**Data and sample size**

Researcher distributed the questionnaire to 210 respondents, where 184 questionnaires were returned which 7 were incomplete. So, the total number of respondents was 177 out of 210 academic professionals for further analysis.

After a review of the literature, items from the QWL survey were selected. The questionnaire comprises 17 questions which are prepared in an easy-to-understand format along with necessary instructions, and address the issue effectively and in a less time-consuming manner.

Researcher asked respondents to show their level of disagreement or agreement in a format of Likert scale which ranged as Highly strongly disagree, strongly disagree, agree, neither agree nor disagree, agree, and strongly disagree, highly strongly disagree. It allocated the survey questionnaire into three sections; the first section covered the demographic and background information of the respondents; the second section covered the variables or dimensions of quality of work life and the third section represented the organizational commitment.

## 4. Findings and hypothesis testing

**Demographic profile**

Respondent's details are given in the **Table 1** which showed 177 academic professionals participated in the study. Percentage was used to describing the level of participation, with male participation at 69.2% and female at 32.8%.Regarding the respondents age category, 39% respondents were between 30 and 40 yearsand the following higher groups were between the ages of below 30 years, representing 29.3%. Regarding designation of respondent's Assistant professors 34%, Associate professors 31%, Professors 22%, Lecturers 11% considered for the study. The fourth group of respondents were above40 years 31.2% respectively. Further, concerning the number of years that employees worked in the educational institution, the finding revealed that 43% of respondents have 0-5 years of experience in the university, 25.4% respondents have 5-10 years of experience in the university, 20% and 11.6% of respondents are served the university aboveten years respectively.

**Table 1**
**Respondents demographic characteristics**

| | Frequency | Percentage |
|---|---|---|
| **Gender** | | |
| Male | 119 | 67.2 |
| Female | 58 | 32.8 |
| Total | 177 | 100 |

| | | |
|---|---|---|
| **Age (years)** | | |
| Up to 30 | 52 | 29.3 |
| 30-40 | 70 | 39.5 |
| Above 40 | 55 | 31.2 |
| Total | 177 | 100 |
| **Designation** | | |
| Lecturer | 23 | 13.0 |
| Assistant Professor | 61 | 34.0 |
| Associate Professor | 55 | 31.0 |
| Professor | 39 | 22.0 |
| Total | 177 | 100 |
| **Experience** | | |
| 0-5yrs | 76 | 43.0 |
| 5-10yrs | 45 | 25.4 |
| 10-15yrs | 35 | 20.0 |
| 15 &above | 21 | 11.6 |
| Total | 177 | 100 |

**Confirmatory factor analysis (CFA)**

In this study, confirmatory factor analyses (CFA) were carried out for five dimensions of quality of work life and three dimensions of organizational commitment to ensure the measurement models construct reliability and validity.

**Table 2**

**Reliability and convergence validity**

| S.No | Construct | Reliability Values of Initial stage | Dimension | Loadings | Reliability Values | CR | AVE | No. of dimensions |
|---|---|---|---|---|---|---|---|---|
| 1 | Compensation and Reward | 0.826 | CR1 | 0.690 | 0.826 | 0.843 | 0.647 | 4 |
| | | | CR2 | 0.738 | | | | |
| | | | CR3 | 0.729 | | | | |
| | | | CR4 | 0.563 | | | | |
| 2 | Work life balance | 0.897 | WL1 | 0.773 | 0.897 | 0.886 | 0.565 | 4 |
| | | | WL2 | 0.761 | | | | |
| | | | WL3 | 0.817 | | | | |
| | | | WL4 | 0.737 | | | | |
| 3 | Relationship with supervisor | 0.889 | RS1 | 0.836 | 0.889 | 0.861 | 0.689 | 4 |
| | | | RS2 | 0.764 | | | | |
| | | | RS3 | 0.708 | | | | |
| | | | RS4 | 0.780 | | | | |
| 4 | Opportunity for growth | 0.904 | OG1 | 0.849 | 0.904 | 0.899 | 0.685 | 4 |
| | | | OG2 | 0.797 | | | | |
| | | | OG3 | 0.686 | | | | |
| | | | OG4 | 0.840 | | | | |
| 5 | Work environment | 0.898 | WE1 | 0.688 | 0.898 | 0.812 | 0.739 | 5 |
| | | | WE2 | 0.836 | | | | |
| | | | WE3 | 0.693 | | | | |
| | | | WE4 | 0.706 | | | | |
| | | | WE5 | 0.820 | | | | |
| 6 | Organizational Commitment | 0.752 | OC1 | 0.523 | 0.752 | 0.793 | 0.592 | 4 |
| | | | OC2 | 0.678 | | | | |
| | | | OC3 | 0.461 | | | | |
| | | | OC4 | 0.641 | | | | |
| | **Total number of Dimensions** | | | | | | | 25 |

**Construct reliability**

Reliability refers to the degree to which the measure of a construct is consistent or dependable [13]. It was calculated for the developed and adopted scale items employing Cronbach's Alpha. The Cronbach's alpha coefficient of all six variables was between 0.752 and 0.904**(Table 2),** which is relatively greater than the required value of 0.7 [14, 15]. Further, the composite reliability (CR) results using the CFA were calculated for six variables and found between 0.793 and 0.899**(Table 2),** which is well above the minimum recommended value of 0.6 [16, 17]. Therefore, the scales adapted were found valid and consistent.

**Convergent validity**

Convergent validity is the degree to which multiple items to measure the same concepts agree. Therefore, if the factor loadings for all items exceeded 0.6, composite reliability values were above 0.7, and the average variance extracted (AVE) value was greater than 0.5, convergent validity is no problem [17]. Table 2 shows that all items factor loadings are between

0.641 and 0.849, above the recommended value of 0.6. The composite reliability values of safe work environment, opportunity for growth, relationship with supervisors, work-life balance, fair compensation and compensation, organizational commitmentare found between 0.843 and 0.944, which is well above the recommended value of 0.7. Further, all variables' average variance extracted values are 0.647, 0.565, 0.689, 0.685, 0.739, 0.739, and 0.592above the recommended value of 0.5 **(Table 2)**. Therefore this result indicates that there are no problems with convergence validity**.**

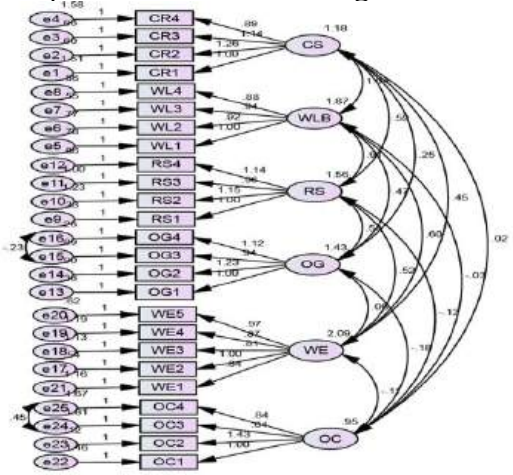


**Fig. 2.Path diagram of Final Measurement Model**

**Discriminant validity**

The discriminant validity measures the degree to which items differentiate among constructs or measure distinct concepts and examines the correlations between constructs and the square root of the average variance extracted for that construct [71,72]. The average variance extracted (the diagonal values) was higher than the correlation values in the row and the column, indicating adequate discriminant validity **(Table 3).** Therefore, the measurement model demonstrated no problem with discriminant validity.

**Table 3**
**Discriminant validity**

| | **WE** | **CS** | **WLB** | **RS** | **OG** | **OC** |
|---|---|---|---|---|---|---|
| **WE** | **0.804** | | | | | |
| **CS** | 0.285 | **0.752** | | | | |
| **WLB** | 0.304 | 0.703 | **0.830** | | | |
| **RS** | 0.286 | 0.433 | 0.534 | **0.828** | | |
| **OG** | 0.033 | 0.194 | 0.287 | 0.354 | **0.859** | |
| **OC** | 0.075 | 0.017 | 0.021 | 0.110 | 0.153 | **0.670** |

According to Barclay et al., [18], discriminant validity referred as "the degree to which any given construct is different from others".

It can be viewed that the discriminant validity values of the factors in the model. All these values are greater than identical correlation coefficients of the select factors. So, all the factors of the study can satisfy the validity constructs. Therefore, the present measurement model is transferred into structural model.

**Structural Equation Modeling**

This segment displays the values of regression coefficients of SEM for testing the hypotheses of the present study. Using the select fit indices like CFI, GFI and RMSEA the structural model is tested for its fitness and results are shown in table 4

**Table 4 Fit indices values of structural model**

| | **$\chi$2(df)** | **$\chi$2/df** | **CFI** | **GFI** | **RMSEA** |
|---|---|---|---|---|---|
| Model results | 9.310(6) | 1.551 | 0.984 | 0.884 | 0.030 |

The assessed values of fit indices for the model are at acceptable range. So, the structural model fit is good. The path diagram of structural model and its regression coefficients are displayed as fig 4.10.

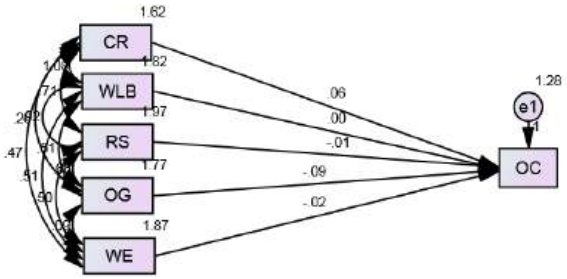


**Figure 2: Structural model (from AMOS Software)**

Based on various studies conducted by**[19, 20 21],** and it was suggested that if the Index value is more significant than 0.9 and if RMSEA values are less than 0.05 it indicates the model is fit and accepted.

In this study, the academic staff's quality of work-life was examined using five factors. Overall, five hypotheses were developed. The five hypotheses were developed to explore the direct causal association between compensation and Reward, work-life balance, relationship with supervisor, the opportunity for growth, and a work environment with the organizational commitment of the academic staff. The five hypothesis deals with the influence of the academic staff's quality of work-life on organizational commitment. All the hypotheses were checked using by Structural Equation Model (SEM) with maximum likelihood criteria.

**Table 5**
**Regression weight of the Model**

| Hypotheses | Path Direction | Estimate | S.E. | CR | P | Decision |
|---|---|---|---|---|---|---|
| H1 | OC <-- CR | 0.218 | 0.039 | 5.553 | *** | Supported |
| | OC <--- WLB | 0.203 | 0.031 | 6.522 | *** | Supported |
| H3 | OC <--- RS | 0.072 | 0.029 | 2.512 | 0.012 | Not Supported |
| H4 | OC <--- OG | 0.226 | 0.039 | 5.777 | *** | Supported |
| H5 | OC <--- WE | 0.385 | 0.037 | 8.325 | *** | Supported |

**Source: Output from AMOS Software**

Where: OC=Organizational Commitment, CR=Compensation and Reward, WLB=Work Life Balance, RS = Relationship with Supervisors, OG=Opportunity for Growth, WE=Work Environment

Table 5 discloses the results of the standardized regression weight and critical ratio for CR and OC is 0.218 and 5.553 respectively, suggesting that this path is statistically significant at the p= 0.001. The results support for hypothesis H1 indicates that the Compensation and reward has significant influence on Organizational commitment. Increase conduct of compensation practices in educational organization will result in increase of commitment of employees. Normala [3] conducted quantitative research in Malaysia, indicating that pay and benefits significantly affect employees' organizational commitment. The Work life balance and Organizational commitment regression weight and critical ratio are 0.203 and 6.522.Chigeda et al. [22], from a

survey conducted on 212 workers of private schools in Zimbabwe, found a significant positive relationship between work-life balance support and organizational continuance commitment. Hence, having sound work-life balance policies and systems is important to support work and personal life, minimizing the work-to-family and family-to-work interference due to high course load at the same time to improve the organizational commitment of employees.The relationship with supervisor and organizational commitmentregression weight and critical ratio are 0.072 and 2.512.The results of the SEM path analysis related to the relationship with supervisor and organizational commitment were found insignificant.For instance, Agarwala et al. [12] indicated that supervisor support enhances organizational commitment and reduces work-family conflictHence, H3 is not supported. The opportunity for growth and organizational commitment regression weight and critical ratio are 0.226 and 5.777. The results support for hypothesis H4 indicates that the opportunity for growth has significant influence on organizational commitment.Several prior studies on the topic are also per this finding [35, 36, 39], where the opportunity for personal growth and career development positively and significantly correlated with organizational commitment. The work environment and organizational commitment regression weight and critical ratio are 0.385 and 8.325. The results support for hypothesis H5 indicates that the work environment has significant influence on organizational commitment.

## 6. Conclusions

The study findings indicated that compensation and benefits are strongly related to the academic staff's commitment to the university. The academic staff needs to be paid a fair and reasonable salary and additional fringe benefits to improve their commitment to the university. Also, compensation and benefits and the work-life quality of the academic staff have a strong significant positive linear relationship. Hence, having an adequate compensation and reward system for the academic staff to improve the quality of work-life could be put in place by the university. Several findings in the literature point out that compared to other QWL factors, a high salary level can bring a high level of organizational commitment. An employee with a high salary may consider himself more valuable and important to the organization. Also, the result indicated that work-life balance had a statistically significant relationship with organizational commitment among the academic staff at the university. Further, quality of work life was found to have a statistically significant and positive effect on the organizational commitment of the academic staff at the university. Furthermore, as indicated in the descriptive mean result, the university's working environment was medium, and the academics were partially satisfied with the overall working conditions. However, a good work environment is crucial to boost employees' morale to discharge their responsibilities. Therefore, top management should encourage a good organizational climate and a healthy work environment to facilitate high productivity through the academic staff's improved quality of work life. Therefore the educational institutions human resource department should develop an appropriate strategy for improving the academic staff's professional career development. Thus, this provides direction for future researchers to conduct studies on the same issue by employing a longitudinal survey design involving more higher education institutes and other service-providing organizations. The other limitation of this study is that the

effect of any moderating variable on the relationship between hypothesized variables considered in the model has not been examined. Further, financial incentives were found to be a key factor influencing the relationship between quality of work-life and organizational commitment. Therefore, researchers in the field may incorporate financial incentives and other factors such as; corporate culture, organizational ownership, turnover intention, and the like as moderators while addressing the issue raised by this study. Furthermore, one of the limitations of this study is the small sample size of female participants, i.e., 32.8%. The prevalence of gender in the study is due to the small number of female faculty members in the university. However, with such a small number of female participants, it may not be easy to generalize the study's findings to the broader women population. Therefore, future research should aim to replicate these findings in larger samples of female participants to increase the generalizability of the results.

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# A STUDY ON THE EFFECTIVENESS OF STORES MANAGEMENT AT TAPCO PNEUMATICS PVT LTD

Ms. J.JAIASHI[1] ,Assisstant Professor,Dept.of MBA[1] Velammal Engineering College, Chennai[1] . jaiashij1998@gmail.com

## ABSTRACT

The study is based on the efficiency of Stores Management in Tapco Pneumatics Pvt Ltd. Stores Management is a crucial aspect of managing a company successfully. An efficient inventory management ensures continuous production by maintaining inventory at a satisfactory level. Efficient and Effective Store Management goes a long way in successful running and survival of business firm. In general administration of stores is to make sure that all activities involved in stock control and employees in the stores carryout stores keeping, store control and stock handling efficiently and economically taking interval. The study will also help to solve the problems faced in setting up periodic stock taking and various activities involve. The study will reduce the incidence of financial losses characterized by inefficient stores management.

## INTRODUCTION

Store management involves the comprehensive supervision and coordination of all activities within a retail establishment to ensure its smooth functioning and success. This multifaceted role encompasses a wide array of responsibilities, including but not limited to, strategic planning, inventory control, staffing, customer service, sales monitoring, marketing, and financial management. It involves the comprehensive supervision and coordination of all activities within a retail establishment to ensure its smooth functioning and success.

This multifaceted role encompasses a wide array of responsibilities, including but not limited to, strategic planning, inventory control, staffing, customer service, sales monitoring, marketing, and financial management. replenishment processes, and minimizing shrinkage through effective loss prevention measures. Staffing is another critical aspect of store management, encompassing hiring, training, scheduling, and performance management to ensure a skilled and motivated workforce. Providing exceptional customer service is paramount, requiring ongoing training and support for employees to meet and exceed customer expectations.

Sales analysis plays a pivotal role in store management, involving the tracking of key performance indicators, identifying trends, and making data-driven decisions to drive revenue growth. Marketing strategies are employed to promote the store, attract customers, and enhance brand visibility. Financial management involves budgeting, expense control, and profit optimization to ensure the store operates within its financial means while maximizing profitability. Overall, effective store management requires strong leadership, attention to detail, and the ability to adapt to changing market conditions to drive success and profitability in the retail sector. Current technology for store management includes Point of Sale (POS) systems, inventory management software, and Customer Relationship Management (CRM) platforms. These tools streamline sales transactions, track stock levels, and manage customer interactions, respectively. Retail analytics tools provide insights into sales trends and store performance metrics. Mobile applications enable managers to access real-time data and communicate with staff remotely. Digital signage technology enhances in-store marketing and promotions.

RFID technology automates inventory tracking, improving accuracy and efficiency. These technologies collectively optimize operations, enhance customer experiences, and drive business growth in the competitive retail landscape

## 2. OBJECTIVES OF THE STUDY

- To determine the appropriate systematic process in Maintenance of raw materials & stocks
- To determine a proper communication with the material control department.
- To prevent the loss of materials against the improper stores management system

## 3. SCOPE OF THE STUDY

The study is focused on managing stores based on systemized approach instead of a manual inventory management. With the help of this study dependency on man power get reduced and day to day stock will be explored in systematic way. Systematic software helps in reducing the human error, improve employee productivity and effectiveness will be improved

## 4. RESEARCH METHODOLOGY

A research methodology is the specification of methods and procedures for acquiring the information needed to structure or to solve problems. Descriptive Research method is used in this study because it includes, facts, and findings, enquire of different kind. Area studies are interdisciplinary fields of research and scholarship pertaining to particular geographical,

national/federal, or cultural regions. The sample size is 110 and sample are selected from a group of people. The sampling method is used for the research is a convenience sampling method. As survey or structured questionnaire is best suited for data collection of descriptive research so the research conducted directly for individual respondents through questionnaire methods.

## 5. REVIEW OF LITERATURE

**Srinivas Rao Kasisomayajula(2014)**, An analytical study was conducted on" Inventory Management in Commercial Vehicle Industry In India". A sample of five companies' was selected for study. The study concluded that all the units in the commercial vehicle industry have significant relationship between Inventory and Sales. Proper management of inventory is important to maintain and improve the health of an organization. Efficient management of inventories will improve the profitability of the organization.

**Panigrahi (2013),** Undertook an in-depth study of inventory management practices followed by Indian cement companies and its affect on working capital efficiency. The study also investigated the relationship between profitability and inventory conversion days. The study, using a sample of the top five cement companies of India over a period of 10 years from 2001 to 2010, concluded that a considerable inverse linear relationship existed between inventory conversion period and profitability.

**Sahari, Tinggi and Kadri (2012),** Empirically analysed the relationship between inventory management and firm performance along with capital intensity. For the purpose they took a sample of 82 construction firms in Malaysia for the period 2006–2010. Using the regression and correlation analysis methods, they deduced that inventory management is positively correlated with firm performance. In addition, the results indicate that there is a positive link between inventory management and capital intensity.

**Gaur and Bhattacharya (2011),** The study revealed that finished goods inventory as inversely associated with business

performance while raw material inventory and work in progress did not have much effect on same. They emphasized that instead of focusing on total inventory, an attempt should be made to concentrate on individual components of inventory so as to adequately manage the same. They concluded that managers not paying heed to inventory performance may become weak in combating competitors.

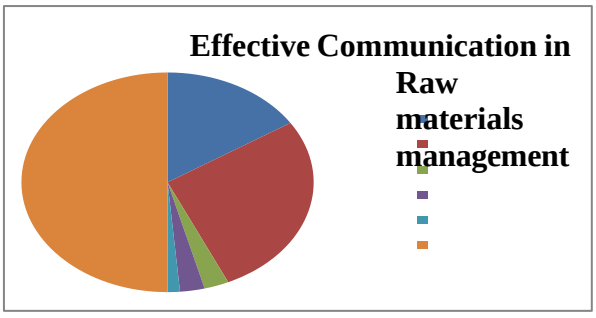
## 6. DATA ANALYSIS AND INTERPRETATIONTABLE 6.1

**Effective Communication Ensures Efficient Use In The Organization.**

| S.No | Particulars | Frequency | Percentage |
|---|---|---|---|
| | Strongly Agree | 35 | 32% |
| | Agree | 60 | 55% |
| | Neutral | 6 | 5% |
| | Disagree | 6 | 5% |
| | Strongly Disagree | 3 | 3% |
| | Total | 110 | 100% |

**Source:** Primary Data

**CHART 6.1**



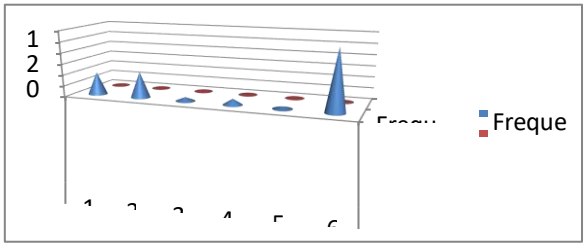

**INFERENCE:** The above table shows that 55% of the respondents agree, 32% of the respondents Strongly agree, 5% of the respondents are neutral, 5% of the respondents disagree and 3% of the respondents strongly disagree. Most of the respondents agree on their satisfactory level

## TABLE 6.2

**Wastages Of Materials Leads To Financial Problems For An Organization.**

| S.No | Particulars | Frequency | Percentage |
|---|---|---|---|
| 1 | Strongly Agree | 41 | 37% |
| 2 | Agree | 47 | 43% |
| 3 | Neutral | 7 | 6% |
| 4 | Disagree | 11 | 10% |
| 5 | Strongly Disagree | 4 | 4% |
| 6 | Total | 110 | 100% |

**Source:** Primary Data




## CHART 6.2

**INFERENCE:**

The above table shows that 43% of the respondents agree, 37% of the respondents Strongly agree, 6% of the respondents are neutral, 10% of the respondents disagree and 4% of the respondents strongly disagree. Most of the respondents agree on their satisfactory level

**Information Technology in Stores Management**

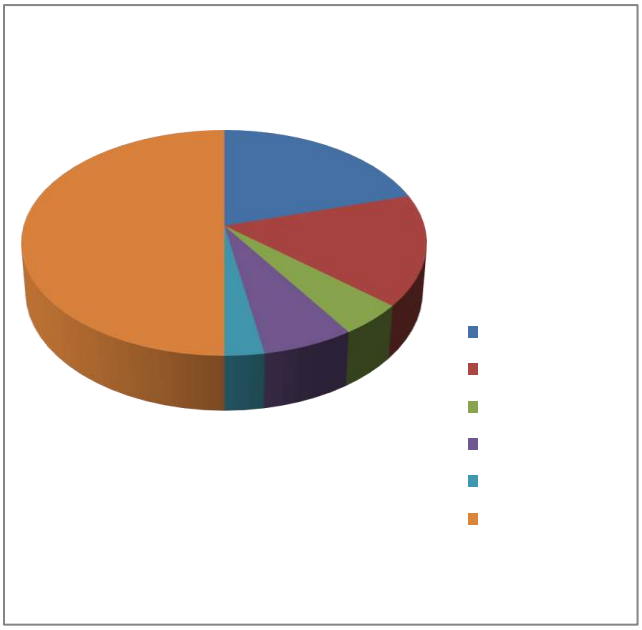


**TABLE 6.3**
**Information Technology in Stores Management is Constantly Improving**

| S.No | Particulars | Frequency | Percentage |
|---|---|---|---|
| 1 | Strongly Agree | 45 | 41% |
| 2 | Agree | 35 | 32% |
| 3 | Neutral | 10 | 9% |
| 4 | Disagree | 14 | 13% |
| 5 | Strongly Disagree | 6 | 5% |
| 6 | Total | 110 | 100% |

**Source:** Primary Data

## CHART 6.3

**INFERENCE:**

The above table shows that 32% of the respondents agree, 41% of the respondents Strongly agree, 9% of the respondents are neutral, 13% of the respondents disagree and 5% of the respondents strongly disagree. Most of the respondents strongly agree on their satisfactory level

changing market trends, and ultimately thrive in competitive environments

## 7. CONCLUSION

"Stores Management System" is to be implemented to replace the manual system effectively. It can eliminate the human errors, which are likely to creep in the kind of working with bulk quantity of data, and typical calculation has to be processed. The System reduces the Clerical work and result in retrieval of information, which is very vital for the progress of an organization. Cost is minimized in the case of the stationary and man power. Burden of Manual work is reduced whenever transaction takes places, where there is no need for recording it many places manually. The report can be taken easily. The System provides accurate updating, data validation and integrity is observed in the system. By implementing sound management strategies, stores can optimize resources, minimize waste, adapt to

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