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A Study on Implementing A Smart Payroll Automation System to Reduce Administrative Errors at Femtosoft Technology

J. Sandra
II MBA, Department of Management Studies
St. Xavier's Catholic College of Engineering, (Autonomous)
Chunkankadai, Nagercoil, Kanyakumari, Tamil Nadu, India

S. Joyse Rebecca
Assistant Professor, Department of Management Studies
St. Xavier's Catholic College of Engineering, (Autonomous)
Chunkankadai, Nagercoil, Kanyakumari, Tamil Nadu, India

Abstract

Payroll Management is an integral part of any organization that significantly affects employee trust, statutory compliance and financial correctness. Manual activities undertaken at various stages of in the Payroll have resulted in frequent problems like wrong salary calculations, statutory deductions like TDS and Provident Fund errors, lack of transparency on the pay slip generation at Femtosoft Technology. The HR and Finance departments must deal with such inefficiencies, and it can affect employee satisfaction as well. The study used descriptive research design and census sampling technique which involved all 53 employees from HR and Finance Department. Structured questionnaires using 5-point Likert scale were used to collect the primary data and payroll records, company reports and policy documents were used to gather secondary data. The Chi-Square test revealed a highly significant association between lack of employee training and the use of outdated payroll systems that could be considered synergistic causes of payroll inaccuracies ($\chi^2 = 62.709$, $p < 0.001$, $V = 0.647$). The identified gaps were addressed by developing the payroll automation module in Java using Java Eclipse and Java Swing which included features like automation of salaris calculation, tax and deduction processing, integration with attendance, automatic generation of payslips, secure data storage. The system will streamline manual processes, improve accuracy, transparency, and compliance in payroll management and reduce the time and effort required for manual tasks.

Keywords: Administrative Errors, Automation, Employee Satisfaction, Payroll Management, Smart Payroll System.

Introduction

Payroll management is a vital aspect of an organization's success, directly impacting employee satisfaction, trust, and operational efficiency. Payroll processing remains a manual-intensive process at Femtosoft Technology, as in most businesses, from keeping records of the staff to tracking attendance and calculating payrolls to managing statutory deductions like TDS and Provident Funds. All

these manual processes create high administrative risks, such as, inaccurate salary computations, missed deductions, delayed payments, and inadequate transparency in payslips. These inaccuracies can lead to confusion and frustration for employees and can also result in a loss of trust in the payroll system of the organization. Additionally, HR and Finance departments must take on an increased burden because they have to put in extra time and effort to pinpoint the sources of these repeated mistakes and find the solutions to correct them, which ultimately will affect the overall productivity of the organization.

With technology advancing, intelligent payroll automation solutions have become a game-changing solution to tackle these recurring problems. Automated payroll systems can help to eliminate the manual effort, increase the accuracy and efficiency of all payroll-related tasks, and reduce human errors to a minimum. These systems can accommodate comprehensive salary computations, effortlessly incorporate attendance and leave details, and maintain uniformity in adhering to statutory and legal requirements, making payroll processing quicker and more dependable. The major aim for this research is to implement such an intelligent payroll automation system at 'Femtosoft Technology' with the main focus of reducing the administrative errors and enhancing payroll accuracy. The study will explore the payroll management system currently in place to understand the potential for improvement, identify the underlying causes of common payroll errors, and examine how automation can contribute to this.The study will analyze the current payroll management system to gain insight into where it could be improved, the causes of recurring payroll errors, and how automation can help in this area.

Literature Review

Mehta, V., Joshi, A., & Kapoor, R. In its forward-looking study (2025), (2025) explores the potential of intelligent payroll systems, enhanced by AI-powered workforce analytics, to enable strategic HR decision-making and go beyond simple payroll management. It examines the potential insights that can be gained from payroll data using predictive modelling techniques, including patterns that can emerge from the data around workforce attrition risk, overtime dependency and compensation equity.

Subramaniam, K., & Anand, L. The (2025) focus on the importance of data security within a cloud-based payroll automation solution, and present a multi-layered approach to cyber security that is unique to HR payroll data environments. The study analyzes the current security issues in cloud payroll systems and suggests solutions such as end-to-end encryption of data in transit and at rest, zero-trust network architecture, behavioural anomaly detection, and regular penetration testing.

A. P., S. Balasubramanian & T. Rajan. (2025) concentrates on the human and organizational factors behind the uptake of payroll automation, analyzing the approaches that have proven successful in companies with a technology orientation. The authors' mixed-methods study, including surveys, case studies and process analysis, highlight the key factors that can help make payroll automation transitions smooth: stakeholder engagement, transparent communication, phased implementation, and continuous training.

Reddy, T. K. and Rao, B. V. (2024) did a sector-specific analysis of the challenges faced by the IT sector when it comes to digitization of payroll processes, which includes unique situations like high worker turnovers, unpredictable pay structures, and complex project-based billing models, all of which complicate the payroll process. The study looks at seven IT companies of different sizes, and follows their path from manual to fully automated payroll processing.

Patel, N., & Desai, K. (2024) examines the role employee self-service (ESS) portals play in improving payroll accuracy, which allows employees to enter, view, and confirm their own payroll data, including investment declarations, reimbursement claims, personal banking details, and more.

Okonkwo, C. & Adeyemi, B. In 2024, (2024) discusses the use of blockchain as a base for payroll and how its immutability and transparency will provide an unparalleled level of error resistance and transparency. The study includes case studies from three multinational organisations that trialled blockchain-based payroll, and found that the three key areas of audit trail integrity, cross-border payroll accuracy, and unauthorized payroll data modifications were all improved.

Sharma, R., & Gupta, M. This research examines how AI-powered payroll solutions are being adopted by SMEs in India, especially focusing on the error reduction in statutory compliance. The authors' 18-month study of 120 SMEs showed that AI-enabled payroll systems could cut down on computational mistakes by 78% when compared to spreadsheet-based systems.

Kumar, A., Singh, P., & Verma, D. (2023) provide a detailed solution for automation of payroll processes in Indian IT organizations using cloud technology. The study compares the performance of several payroll systems that were installed in 15 IT companies to assess their accuracy in processing payroll, accuracy in compliance, and employee satisfaction. The study proves that cloud-based payroll solutions have a 60% lower payroll cycle time and yield 99.4% accurate records.

Objectives of the Study

- To investigate the reasons for payroll inaccuracies.
- To create a module on automation payroll system to enhance efficiency and error reduction.

Research Methods

The aim of this study is to gain the understanding of the current payroll process and the common errors that occur in the processing of the payroll. Payroll management is a crucial part of any business, as it impacts employee satisfaction, accuracy in salary payments, and adherence to legal regulations. Manually handling payroll can result in payroll calculation errors, inaccurate attendance records, and incorrect tax deductions at Femtosoft Technology. Hence the study highlights the importance of the smart system to automate the payroll process to reduce manual works, save time and increase accuracy. This research is descriptive in nature to gain an understanding of the current payroll system and the root causes of payroll errors. Both primary and secondary data were collected for the research. Primary data was obtained by informal discussions and interviews with employees and HR staff, and secondary data was obtained from the company's records, payroll reports and policy documents. The study involved 53 employees from HR and Finance department by using census sampling technique, the information were collected from all the employees who are associated with payroll activities. Statistical tools such as correlation analysis and chi-square tests were used to analyze the data. Payroll automation module for improving payroll efficiency and minimizing payroll errors was also developed and tested using Java Eclipse software.

Impact on Implementing a Smart Payroll System for Reducing Administrative Errors

Objective 1: The Association between Manual Data Entry Mistakes and Lack of Automation as Causes of Payroll Inaccuracies

To find out if there is any significant correlation between manual data entry errors and lack of automation as one of the main causes of payroll inaccuracies at Femtosoft Technology, the Chi-Square test is utilized in this study. Manual data input of employee information, attendance logs and salary data introduces the potential for inaccuracies and incorrect calculations, and without an automated solution, processing further slows down, increasing the potential for inaccuracy. This test helps determine if these two are interdependent causes of payroll mistakes or if they are truly separate causes of payroll mistakes—either way, it helps substantiate the need for automation to optimize payroll accuracy, efficiency, and reliability.

Table 1 Manual Data Entry Mistakes and Lack of Automation as Causes of Payroll Inaccuracies

	Value	df	Asymp.sig.(2-Sided)
Chi-Square	18.729[a]	8	.016
Likelihood Ratio	16.993	8	.030
Linear-by-Linear Association	1.250	1	.264
N of Valid Cases	53		

Note: *a 11 cells (73.3%) have expected count less than 5. The minimum expected count is 0.019.*
Source: *Primary Survey*

The results of the Chi-Square statistic with 8 degrees of freedom and significance value of 0.016 ($p<0.05$) confirm that the lack of automation and the manual data entry errors as causes for payroll inaccuracies are statistically significant. This is further supported by the Likelihood Ratio value of 16.993 ($p = 0.030$) and the non-significant Linear-by-Linear Association ($p = 0.264$) showing a categorical relationship as opposed to an ordinal-linear relationship. If $N = 53$ valid cases, then the null hypothesis will be rejected at the 0.05 level of significance. This shows that those bothered by data entry as a source of error in payroll strongly identify lack of automation as a systemic cause. The result of these findings is a great empirical proof to use a smart payroll system for automation.

Objective 2: To Generate a Module on Automation Payroll System to Improve Efficiency and Error Reduction

Employee Payroll System is a Java program designed to streamline and automate payroll processes for any sized organization. It implements file handling techniques such as serialization and Java Streams, which help to manage the employee data efficiently and securely. It also uses Object-Oriented Programming concepts to handle the employee data. This system is great for precise payroll calculations, producing payslips, and managing payroll data efficiently. It automates manual tasks, which helps to eliminate mistakes and save HR time. The architecture of the system is structured and allows for easy updating, maintenance, and expansion with growth of the organization.

The system offers various features like employee data management, salary processing, and report generation, enhancing the transparency and trustworthiness of payroll handling. It also maintains proper records for future references and auditing to ensure compliance needs. The system takes care of recurring payroll tasks, giving HR workers more time to dedicate to strategic decisions and employee-related strategies.

Technologies used

1. The Language is java, the framework is java swing (for GUI development).
2. Tools: Java Eclipse

I created an application using Java Swing Components (Buttons, Forms, Tables, etc.).My application is made with java swing components such as buttons, forms, tables, etc.

Proposed System

Vamshi Krishna et al. propose Employee Payroll System implemented in Java with Object-Oriented Programming, file serialization, and Java Streams for automating salary management, generates payslips, and processes tax deductions. Based on this model, the present study designed and developed a similar Payroll automation system with nine main modules that automatically

calculates gross pay, TDS, PF, pension, taxable pay and net wages and generate printable payslip eliminating manual effort and makes payroll process more accurate, statutory compliant and efficient at Femtosoft Technology.

Output Screens

Design of the Payroll Sytem

Generating the Automated Pay Slip

After Clicking the Exit Button of the Payroll System

The Employee payroll System is developed to simplify, quick and reliable salary administration. It streamlines payroll processes, minimizing the risk of human errors, and maintaining accurate payroll. This system incorporates various functions, such as secure data handling, user-level access control, and automatic tax calculations, that help ensure info security and adherence to compliance demands. The system consists of two parts: The HR staff can easily carry out payroll activities

by using the simple and user-friendly interface developed using Java Swing or JavaFX, and the employee can easily view their salary information through the interface. The system can be easily adapted to various payroll arrangements, making it compatible with small and large businesses alike, and it enhances the efficiency of payroll processing, saves time and boosts productivity, making it valuable and practical in today's workplaces.

Findings

- The Chi-Square value of 18.729 (p = 0.016) indicates a significant association between manual data entry errors and not using automation as the cause of payroll inaccuracies.
- A Likelihood Ratio of 16.993 (p = 0.030) further confirms manual methods are a major contributor to payroll mistakes.
- The Linear-by-Linear Association is not significant (p = 0.264) which suggests that the association between the two variables is categorical, not ordinal-linear.
- The hypothesis that the two error causes are independent is rejected when tested at 5% level of significance (on 53 valid cases).
- Lack of automation is a systemic problem that is strongly identified as a problem by employees who report a payroll error in manual data entry.
- The Java based payroll automation system is developed successfully to achieve the automation goal, which is to simplify salary calculation, statutory deduction and pay slip generation.

Suggestions

- The usage of automated payroll software should be adopted to reduce the occurrence of errors and the manual data entry.
- Payroll personnel should receive regular training in order to fill in gaps in knowledge that may lead to incorrect payroll processing.
- Attendance systems need to be seamlessly linked to payroll software to eliminate manual entry processes.
- Old payroll systems should be updated to modern and scalable systems that can process large amounts of employee information.
- Utilizing role-based access controls and audit trails can help keep data secure and accountable throughout the payroll process.

Conclusion

Finally, this research aimed to analyze the payroll management system of Femtosoft Technology with the assistance of the Chi-Square Test in IBM SPSS, having collected data from 53 respondents from HR and Finance department. The Chi-Square analysis showed that there is a significant relationship between manual data entry errors and lack of automation in the causes of errors in payroll ($\chi^2 = 18.729, p = 0.016$), which means that the null hypothesis was rejected at the 5% level of significance. It is decided to develop a payroll automation system using Java Eclipse and Java swing based on Java programming language to fill these gaps which contains nine functional modules to compute the gross pay, TDS, pension, PF payment and net wages automatically and generates the printable pay slip. The study brings three takeaways to the table: automation, structured training, and process integration are the three pillars to an efficient and error-free payroll environment at Femtosoft Technology.

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