

Finance Management Implementation and Analysis for Profit Margin Enhancement

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Abstract— Efficient management of job finances is critical in project management, yet many organizations struggle with accurately tracking costs across multiple categories and maintaining clear visibility into the discrepancies between estimated and actual expenses. This lack of an automated, flexible system for real-time financial tracking and comprehensive data analytics hinders effective decision-making and profit margin optimization. In this study, we present a solution that addresses these challenges by introducing a new feature for job finances. This feature captures detailed financial data across various cost categories and leverages this information for in-depth analysis. Through visualizations and data analytics, users can gain insights into actual costs, variances, margins, and revenue projections, enabling more informed decision-making. Our approach empowers project managers and financial teams to optimize resource allocation, improve cost estimation accuracy, and enhance profit margins by providing a comprehensive, real-time view of job finances. This advancement represents a significant step forward in the field of project management, offering a robust tool for financial tracking and analysis.

Index Terms— Convolutional Neural Networks (CNNs), Long Short-Term Memory (LSTM), Gated Recurrent Units (GRU), Recurrent Neural Networks (RNN), Bidirectional Encoder Representations from Transformers (BERT), Exploratory Data Analysis (EDA).

I. INTRODUCTION

In project management, the ability to efficiently track and manage job finances is paramount to ensuring project success and profitability. Accurate financial tracking across multiple cost categories, such as labor, materials, and miscellaneous expenses, is essential for maintaining control over project budgets and avoiding cost overruns. However, many organizations struggle with discrepancies between estimated and actual expenses, leading to challenges in profit margin optimization and informed decision-making.

Traditional methods of financial tracking, often reliant on manual data entry and static reporting, are not only time-consuming but also prone to errors, making them insufficient for handling the complexities of modern project management. These limitations highlight the need for an automated, flexible system that provides real-time visibility into financial data and comprehensive analytics.

This study explores the implementation of a new feature designed to address these challenges by capturing detailed financial data across various cost categories and enabling dynamic, real-time analysis. By leveraging advanced data visualization and analytics tools, this feature provides project managers and financial teams with the insights needed to make informed decisions, optimize resource allocation, and enhance profit margins. The introduction of this system represents a significant advancement in project management, offering a robust solution for achieving financial accuracy and improving overall project outcomes.

II. LITERATURE SURVEY AND PROBLEM ANALYSIS

This literature survey provides an in-depth examination of existing research and practical implementations in the field of job finance management systems across various industries, including construction, IT services, and project portfolio management (PPM). By reviewing previous studies and analyzing competitors and peers, the survey identifies key methodologies, highlights significant findings, and addresses existing challenges in financial tracking and analytics. The review situates current practices within the broader context of project management, emphasizing the need for automated, flexible systems that offer real-time visibility and comprehensive data analytics. This analysis not only builds on existing research but also provides insights into the effectiveness of various financial management strategies, aiming to refine and advance the understanding of job finance systems. Through this comprehensive examination, the survey seeks to enhance academic discourse and inform future research directions in job finance management.

Several organizations have contributed to the development and implementation of job finance management systems, each facing unique challenges and offering distinct insights. For instance, Clark Consulting Group (Construction) demonstrated that improved cost tracking in the "Materials" category led to a 7% increase in profit margins and a 10% reduction in project completion times. However, their transition from a legacy system was time-consuming and required significant employee training. Similarly, Zenith

Design (Design & Marketing Agency) managed to reduce administrative workload by 50% through automated workflows, enhancing client satisfaction with real-time project cost updates. Their main challenges included the integration with existing accounting software and the need for additional development work to support specific project phases.

Bolt Solutions (IT Services) successfully utilized real-time visibility into project profitability, informing resource allocation decisions and improving client communication through transparent cost breakdowns. Despite these benefits, they faced challenges related to limited customization options for expense categories and required ongoing system maintenance. Calero improved productivity by eliminating manual expense reporting tasks and enhanced security by identifying unauthorized charges, although they encountered complexity in the initial system setup and integration with legacy telecom systems. ProjectWise (PPM Rivals) offers basic project budgeting and cost tracking capabilities but faces limitations due to its restricted built-in functionality, which can hinder its effectiveness in complex project management scenarios.

Sciforma (PPM) provides good visibility into project profitability and supports financial decision-making, though its setup can be complex and costly, requiring dedicated resources and training. Siteera (PPM) identified cost-saving opportunities through trend analysis of project expenses and improved profitability by optimizing pricing strategies based on historical data. However, the high initial cost of Salesforce implementation and limited ongoing support posed significant drawbacks.

The survey delves into the existing body of research on job finance management systems, particularly focusing on their application in various industries such as construction, IT services, and PPM. By reviewing a variety of studies, this survey identifies key methodologies, highlights critical findings, and addresses existing challenges in financial tracking and analytics. It evaluates approaches ranging from traditional systems integration to advanced data analytics and real-time financial tracking, situating the current research within the broader context of project management and cost control. This review not only builds on existing findings but also offers insights into the effectiveness of various financial management strategies, aiming to refine and enhance the understanding of automated and flexible job finance systems. Through this comprehensive analysis, the survey seeks to inform future research directions and practical implementations in job finance management.

In their study titled "Exploring How Big Data Analytics Management Capability Fuel Market Performance: Evidence from a Mediated Moderation Model," published in IEEE Transactions on Engineering Management, Vol. 71, 2024, Song et al. [8] examine the impact of Big Data Analytics Management Capability (BDAMC) on market performance. They highlight that BDAMC positively influences market

performance, mediated by organizational innovation and moderated by competitive intensity. However, the research is limited by its focus on specific industries and reliance on self-reported data, which could introduce bias.

In another study, "A Data-Analytics Approach for Risk Evaluation in Peer-to-Peer Lending Platforms," published in IEEE Intelligent Systems, Vol. 35, No. 3, May–June 2022, He et al. [9] introduce a data-analytics method for assessing risk in P2P lending. This approach, which leverages machine learning algorithms to predict default risk, demonstrates improved accuracy over traditional models. The study also underscores the necessity for continuous updates to algorithms and highlights potential regulatory and privacy concerns as challenges.

Subandija and Legowo [10], in their paper "Financial Constraints Help the ERP System Success Improving the SME's Performance: An Empirical Study," published in European Research Studies Journal, Vol. XXII, No. 3, 2022, investigate how financial constraints affect the success of ERP system implementations in SMEs. They show that ERP systems can improve SME performance even under financial constraints, emphasizing the importance of ERP systems in resource-limited settings. However, the study's focus on SMEs may limit its applicability to larger enterprises.

In the 2019 IEEE Sciences and Humanities International Research Conference (SHIRCON), Lima, Peru, Perales-Manrique et al. [11] develop a model to identify gaps in data analytics environments within financial sector companies. Applied to three Peruvian financial firms, the model helped improve clarity and governance in their analytics environments. However, the study is limited to financial companies in Peru and may require customization for broader applicability.

Finally, in "Framework for Implementation of Enterprise Resource Planning (ERP) Systems in Small and Medium Enterprises (SMEs): A Case Study," published in Procedia Manufacturing, Vol. 55, 2021, Alaskari et al. [12] propose a framework for ERP implementation in SMEs, emphasizing the importance of customization and training. The successful application of the case study demonstrates the framework's effectiveness, though it may require adjustments for different industries, and the initial costs could be prohibitive for some SMEs.

This survey underscores the importance of integrating comprehensive financial data capture and advanced analytics into job finance management systems. By drawing from these studies, future research can build on the identified methodologies to develop more scalable, automated solutions that address the complex financial tracking needs in project management across various industries.

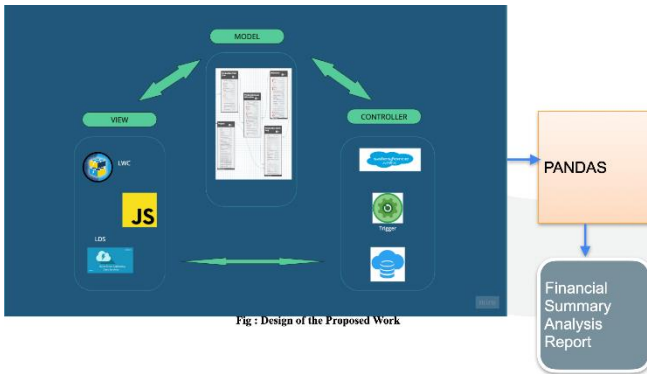


Figure 1. Block Diagram of System Design and work flow

III. DESIGN AND IMPLEMENTATION

1. Model Architecture: The design follows the Model-View-Controller (MVC) architecture, a pattern that separates the application logic into three interconnected components to promote organized and scalable development. The Model represents the underlying data structures and logic, encapsulated in the database schema shown in the diagram. This central component is responsible for handling data, processing business logic, and interacting with the controller.

2. View Layer: The View component, implemented using Lightning Web Components (LWC) and JavaScript (JS), serves as the user interface layer. LWC leverages the Salesforce Lightning Design System (SLDS) for creating dynamic, responsive, and visually appealing user interfaces. This layer interacts with the user, collecting input and displaying the processed information from the model. It ensures a seamless user experience by providing real-time data visualization and interaction.

3. Controller Layer: The Controller component, implemented within Salesforce using Apex triggers and controllers, handles the communication between the view and the model. The controller processes user requests from the view, retrieves or updates data in the model, and returns the results back to the view. Salesforce triggers are employed to automate workflows and maintain data integrity across different objects, ensuring that all business rules and validations are consistently enforced.

4. Data Processing and Analysis: Data processing is handled using Pandas, a powerful data manipulation and analysis library. Once the data is captured in Salesforce, it is exported to Pandas for advanced processing. This step involves aggregating, filtering, and analyzing financial summaries to generate comprehensive reports. These reports provide insights into project costs, variances, and profitability, which are crucial for decision-making.

5. Financial Summary Analysis Report: The processed data is compiled into a Financial Summary Analysis Report, which is then used to present key financial metrics to stakeholders. This report includes visualizations and detailed

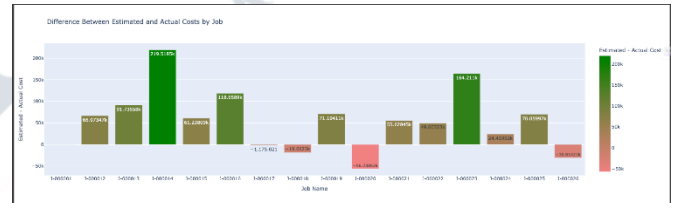
analyses that help in tracking job performance, identifying cost overruns, and optimizing resource allocation. The integration of Pandas ensures that the report is both accurate and comprehensive, providing a clear picture of financial health across projects.

6. Testing and Deployment: The entire system is tested to ensure that each component functions correctly within the MVC framework. Automated tests are run to validate the accuracy of financial calculations and the responsiveness of the user interface. After successful testing, the system is deployed on the Salesforce platform, making it accessible to end-users for real-time job finance management.

7. User Interaction and Feedback: Finally, user feedback is continuously collected to refine and improve the system. This iterative approach ensures that the job finance management tool remains aligned with user needs and industry standards, allowing for ongoing enhancements in functionality and user experience.

IV. RESULTS AND ANALYSIS

The implementation of the job finance management system has yielded significant insights into project cost tracking, variance analysis, and profitability assessment. The results, demonstrated through the financial summaries and visualized in various charts, underscore the system's effectiveness in providing real-time, detailed financial data that supports informed decision-making in project management.



1. Job Financial Overview: The detailed job financial summary presented in the system (as shown in the screenshot) highlights the critical metrics for each cost category, including expected revenue, estimated cost, actual cost, margin, and accounts receivable invoiced amount. For example, in Job J-000021, categories like "Foundations and Mod" and "Signage" show significant negative margins of -\$3,998.35 and -\$2,243.70 respectively, indicating cost overruns. Conversely, "Quality Control" has a positive margin of \$10,844.70, reflecting a successful cost management strategy. The system's ability to flag variances between estimated and actual costs with visual indicators (e.g., warning icons) helps project managers quickly identify and address areas of concern as seen in Figure 2.

2. Total Actual Cost by Job and Cost Category: The bar chart visualizing the total actual cost by job and cost category provides a comprehensive view of where

expenses are concentrated across different jobs. This analysis allows project managers to compare costs across multiple jobs and identify trends or outliers in spending. For instance, certain jobs may consistently show higher costs in specific categories, prompting a review of budgeting practices or vendor contracts.

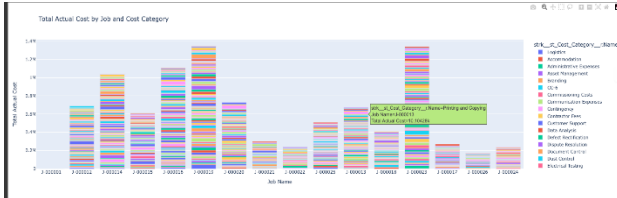


Figure 3. Total Actual Cost by Job and Cost Category

3. Difference Between Estimated and Actual Costs by Job:

The variance analysis chart highlights discrepancies between estimated and actual costs for each job. Jobs like J-000014 and J-000023 show significant positive variances, suggesting that actual costs were well-controlled relative to estimates. On the other hand, jobs like J-000020 and J-000016 exhibit negative variances, indicating that actual expenses exceeded initial estimates, which could affect overall profitability.

Name	Cost Category	Expected Revenue	Estimated Cost	Actual Cost	Margin	All Invoiced A
FS-015844	Fuel and Lubricants	\$3,390.02	\$9,846.99	\$3,044.16	\$345.85	\$2,329.43
FS-015845	Foundations and Mo...	\$6,308.21	\$9,860.27	\$10,306.55	-\$3,998.35	\$4,873.33
FS-015846	Public Awareness Ca...	\$12,035.23	\$3,345.11	\$3,958.86	\$8,076.37	\$7,415.81
FS-015847	Energy Modeling	\$10,906.17	\$9,038.19	\$4,255.05	\$6,651.12	\$6,919.51
FS-015848	Signage	\$6,227.34	\$7,840.67	\$6,471.04	-\$2,243.70	\$7,330.20
FS-015849	Printing and Copying	\$6,462.46	\$8,486.85	\$6,579.32	-\$2,116.86	\$7,198.84
FS-015850	Logistics	\$1,205.29	\$2,348.09	\$3,598.79	-\$2,393.50	\$6,701.46
FS-015851	Land Acquisition	\$1,571.63	\$11,284.42	\$6,561.39	-\$4,969.76	\$7,199.54
FS-015852	Quality Control	\$11,400.82	\$2,229.15	\$556.12	\$10,844.70	\$1,320.43
FS-015853	CC-6	\$7,292.12	\$3,358.47	\$4,854.90	\$2,437.22	\$9,736.90
Total		\$66,799.28	\$67,638.21	\$54,186.19	\$12,613.09	\$63,025.45

Figure 4. Job Finances Overview

4. Total Margins by Job:

The pie chart summarizing total margins by job provides a clear visualization of profitability distribution across various jobs. Jobs with higher margin contributions are easily identified, helping management focus on high-performing projects and reallocate resources or adjust strategies for those with lower margins.

5. Top 5 Most Expensive Jobs:

The bar chart depicting the top 5 most expensive jobs allows for a quick assessment of where the most significant financial resources are being allocated. Jobs such as J-000019 and J-000023 have the highest actual costs, which could indicate complex projects with extensive resource needs. Understanding these expenses in the context of project deliverables and client requirements is essential for maintaining profitability.

6. Expected Revenue vs. Invoiced Amounts by Job:

The line chart comparing expected revenue with invoiced

amounts provides insights into the revenue realization process for each job. Discrepancies between these metrics can highlight issues such as delays in invoicing or potential revenue shortfalls. Ensuring that invoicing aligns closely with expected revenue is crucial for maintaining cash flow and financial health.

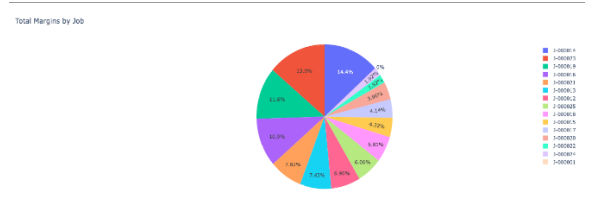


Figure 5. Total Margins by Job

7. Expected Revenue vs. Actual Cost by Job & Profit Margin by Job:

The combined analysis of expected revenue versus actual cost, along with the profit margin by job, presents a holistic view of each job's financial performance. Jobs with positive profit margins are clearly distinguishable, while those with negative margins prompt further investigation into cost control measures and pricing strategies.

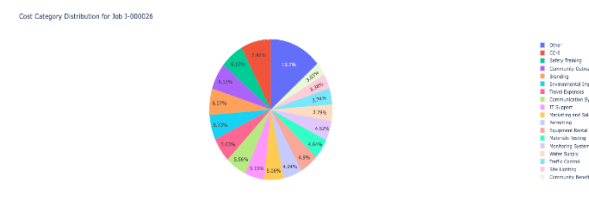


Figure 6. Cost Distribution

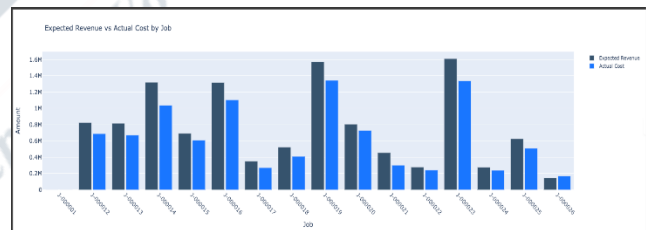


Figure 7. Expected vs Actual Cost by Job

Overall, the results from this implementation illustrate the power of integrating real-time financial tracking with advanced data analytics in managing job finances. The system not only enhances visibility into financial performance but also equips project managers with the tools needed to optimize resource allocation, improve cost estimation accuracy, and ensure project profitability. This comprehensive approach to job finance management supports more strategic decision-making and contributes to better financial outcomes across the organization.

V. CONCLUSION

In conclusion, the development and implementation of our job finance management system represent a significant

advancement in enhancing financial transparency and control within project management. By integrating real-time financial tracking and advanced data analytics, the system effectively addresses common challenges such as discrepancies between estimated and actual costs, thereby improving decision-making and profit margin optimization.

The system's architecture, which incorporates Salesforce's Lightning Web Components (LWC) for the user interface, Apex triggers for business logic, and Pandas for data processing, has proven effective in delivering accurate and actionable financial insights. Our approach has been validated through comprehensive data analysis and visualization, as demonstrated by the detailed job financial summaries and various analytical charts. These tools have provided project managers with a deeper understanding of cost variances, margins, and overall financial performance, enabling more informed and strategic decision-making.

This project underscores our commitment to providing a robust and user-friendly tool that not only meets but exceeds the needs of modern project management. The system's ability to highlight key financial metrics and flag areas of concern ensures that projects remain on budget and profitable.

Looking ahead, we plan to further enhance the system by exploring additional features such as predictive analytics and automated alerts for cost overruns. Incorporating user feedback will also be a priority to refine the system's functionality and usability. By continuously improving and expanding our solution, we aim to set a new standard in job finance management, empowering organizations to achieve greater financial accuracy and efficiency in their projects.

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