Business Analytics Solution for Investigating Third-Party Motor Insurance Claims: A Case Study of a Private Investigation Firm

A Proposal report for the BDM capstone Project

Submitted by

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Declaration Statement

I am working on a Project Title " Business Analytics Solution for Investigating Third-Party Motor Insurance Claims: A Case Study of a Private Investigation Firm". I extend my appreciation to Right View Investigators Company, for providing the necessary resources that enabled me to conduct my project.

I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered through primary sources and carefully analyzed to assure its reliability.

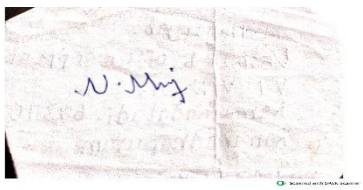
Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through thorough analytical procedures.

I am dedicated to adhering to the information of academic honesty and integrity, and I am receptive to any additional examination or validation of the data contained in this project report.

I understand that the execution of this project is intended for individual completion and is not to be undertaken collectively. I thus affirm that I am not engaged in any form of collaboration with other individuals, and that all the work undertaken has been solely conducted by me. In the event that plagiarism is detected in the report at any stage of the project's completion, I am fully aware and prepared to accept disciplinary measures imposed by the relevant authority.

I agree that all the recommendations are business-specific and limited to this project exclusively, and cannot be utilized for any other purpose with an IIT Madras tag. I understand that IIT Madras does not endorse this.

Signature of Candidate



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Date:12.06.2025

1. Executive Summary and Title (200 Words)

This project is based on a private investigation firm that collaborates with various general insurance companies to investigate third-party motor accident claims since 2017. Their current operations rely on manually updated Excel files containing details such as Claim Numbers, Insurance Company, Case Status, Dispatch Information, and Fee Receipt Records.

However, the business is facing critical operational bottlenecks due to lack of automation, inconsistency in updates,difficulty in tracking claim status, and absence of business intelligence reporting.

This project aims to leverage data analytics to enhance the claim verification process, reduce investigation time, and identify fraud trends through predictive modeling and statistical techniques. By analysing historical claim data from 2017 onward, the goal is to develop an evidence-based approach for improving operational efficiency and financial performance.This will be achieved using a combination of tools such as Python (for data ingestion and cleaning), MongoDB or PostgreSQL (for storage), and Power BI or Tableau for visualization.

The outcome will be a dynamic decision support system that enables faster investigations, better financial tracking, and informed decision-makin helping the firm scale efficiently.

2. Organization Background (150 Words)

Right View Investigators is a sole proprietorship private investigation firm headquartered in Madurai, Tamil Nadu. Established in 2017, the firm specializes in investigating third-party motor accident claims for all major general insurance companies operating in India. With a client base spread across the insurance sector, the firm has built a reputation for accuracy, timely reporting, and integrity in its operations.

The firm operates from its main office located at Shop No. 5, First Floor, Senthil Complex, Thaimoogambigai Nagar Main Road, Subashini Nagar, K. Pudur, Madurai – 625007. It currently has a single branch and employs fewer than 50 staff, including field investigators, administrative support, and claim analysts.

Right View Investigators plays a vital role in helping insurance companies validate claims, detect fraud, and manage risk. Over the years, the firm has accumulated a rich database of road

accident claim records, which now presents a valuable opportunity for data-driven business analysis and insight generation.

3. Problem Statement (Listed as objectives) (50-75 Words)

3.1 Problem 1: Manual Excel-based tracking leads to inconsistent, delayed, and error-prone claim processing.

3.2 Problem 2: The firm cannot track overdue claims or pending fees in real-time due to lack of centralized dashboards.

3.3 Problem 3: There are no analytics to identify trends, bottlenecks, or fraud patterns in claims data.

4. Background of the Problem (200 Words)

Since 2017, the firm has handled thousands of insurance claims. Initially, tracking was manageable through Excel. However, as the volume increased, issues emerged: duplicate entries, missing data, difficulty filtering or sorting claims, and no visual overview of workload or pending payments.

Each claim's lifecycle involves multiple stages :submission, investigation, dispatch of reports, and payment. When tracked manually, it becomes difficult to monitor turnaround times, overdue claims, or unpaid cases. Furthermore, with multiple clients (insurance companies), each with different formats and timelines, it becomes nearly impossible to generate comparative performance metrics.

Lack of insights means the firm misses business opportunities (e.g., identifying clients with chronic delays) or cannot detect irregular patterns (e.g., unusually high number of claims from specificregions).

The firm requires a digital data solution to convert this operational data into a decision-making asset through structured storage, visualization, and predictive analytics.

5. Problem Solving Approach (400 Words)

To address the business challenges faced by Right View Investigators, this project adopts a structured business analytics approach. The aim is to convert operational data into actionable

insights that support informed decision-making. The following methodology is inspired by proven problem-solving techniques from business and data science frameworks.

Step 1: Problem Identification through Stakeholder Interviews

The project begins by engaging with key stakeholders to understand the business context, workflows, and expectations. This step ensures the problem is correctly scoped — focusing on the lack of insight into claims progress, overdue fee tracking, and client-wise performance.

Step 2: Data Acquisition and Preparation

The firm maintains its records in Excel sheets. These files will be collected, cleaned, and standardized using Python. This includes:

- Handling missing values, date formatting, and duplicate entries
- Creating unified columns for claim status, dispatch, and fee details

This step transforms raw, fragmented data into a structured format suitable for analysis.

Step 3: Exploratory Data Analysis (EDA)

Using libraries like pandas and matplotlib, the cleaned dataset will undergo EDA to identify trends and relationships. Visual summaries will uncover:

- Claim status distributions (submitted, completed)
- Payment delays per company
- Turnaround times for dispatches

This step helps frame the right business questions and guides the design of KPIs.

Step 4: Insight Generation via Business Dashboards

Interactive dashboards will be developed using Power BI or Tableau. These dashboards will allow:

- Filtering by company, date range, claim status
- Monitoring of pending fees, dispatch delays, and workload distribution
- Identifying high-volume clients or recurring delays

The dashboards enable management to explore data in real-time and support operational planning.

Step 5: Recommendations and Strategic Decision Support

Based on dashboard findings and statistical analysis, recommendations will be made on:

- Prioritizing overdue claims for follow-up
- Identifying insurance clients with persistent delays
- Streamlining investigator assignments

These are business-specific actions aimed at improving efficiency and client servicing.

Step 6: Feedback and Iteration

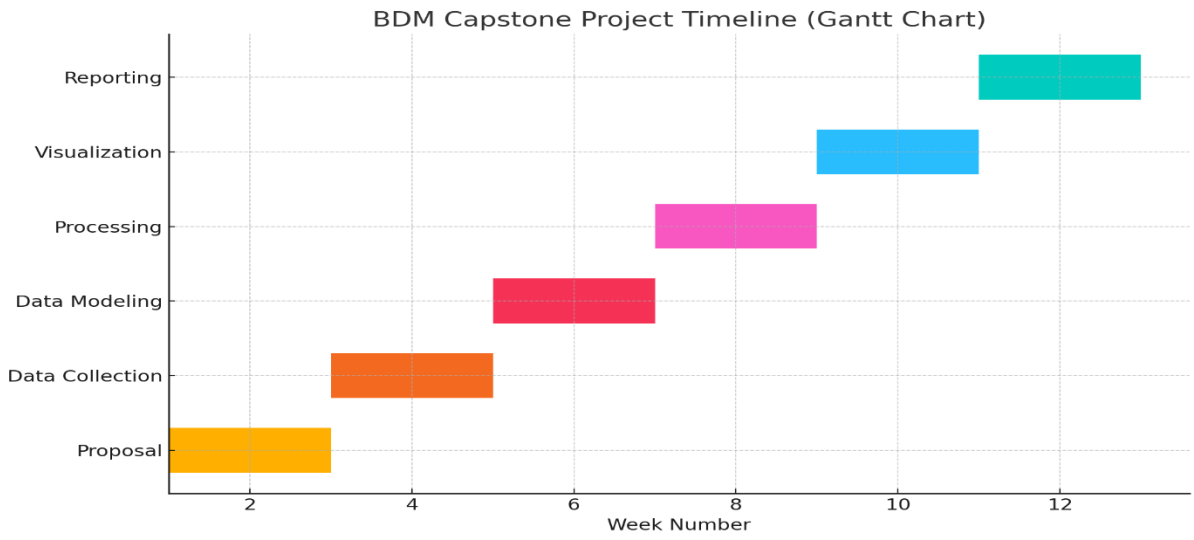
A final review with stakeholders will help validate insights and gather feedback. If necessary, additional dashboards or KPIs may be added.

This methodology not only solves the existing reporting gap but empowers the organization to become data-driven — moving from intuition-based decisions to insight-backed operations.

The proposed solution will involve the following steps:

6. Expected Timeline

6.1 Work Breakdown Structure



Fiqure 1:Expected timeline to complete this project

6.2 Gantt chart

	Name	Start date	Due date	Predecessors
1	PROJECT GANTT CHART			
2	Project Initiation & Plar	05/05/2025	12/05/2025	
3	Stakeholder Interviews	14/05/2025	16/05/2025	
4	Scope Definition	19/05/2025	21/05/2025	
5	Data Collection & Clear	12/05/2025	26/05/2025	
6	Excel Data Collection	19/05/2025	22/05/2025	
7	Data Cleaning (Python)	26/05/2025	12/06/2025	
8	Exploratory Data Analys	03/06/2025	24/06/2025	
9	Statistical Analysis	23/06/2025	25/06/2025	
10	Pattern Recognition	27/06/2025	01/07/2025	
11	Reporting	07/07/2025	10/07/2025	
+	Item			

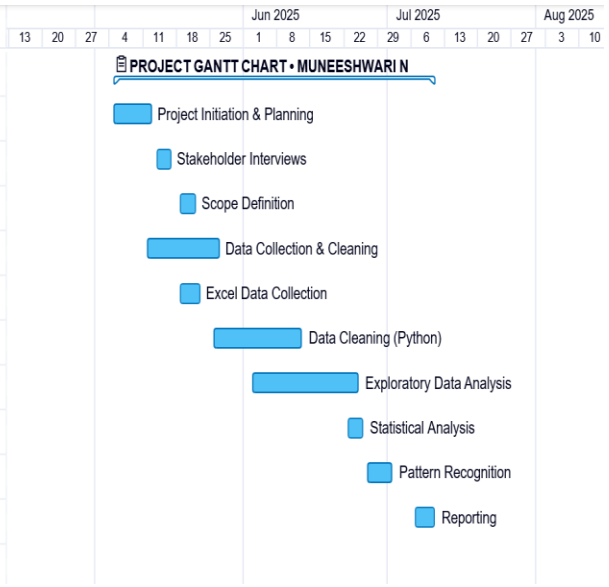


Figure 2:Work flow with timeline to complete this project

7. Expected Outcome (150–200 Words)

This project aims to deliver meaningful business insights that improve the firm's operational and financial decision-making processes. The expected outcomes include:

7.1 Real-time visibility into the status of all third-party claims — categorized by insurance company, investigation stage (submitted, completed), and region.

7.2 Clear identification of overdue claims and unpaid fee collections, enabling faster follow-ups and improved cash flow tracking.

7.3 Dashboards to visualize trends in client behavior, such as frequent delays or high-volume claim submissions, to guide relationship management strategies.

7.4 Insight into investigator workload distribution and turnaround time, helping with resource optimization and better case allocation.

7.5 Foundation for predictive analytics — including early detection of potentially fraudulent or unusually delayed claims.

7.6 A transition from manual Excel-based reporting to a centralized, structured, and scalable decision support system using data dashboards.

These outcomes will support the organization in making data-backed decisions, enhancing transparency, and scaling its investigation processes with improved accuracy and efficiency.