

# Talent Intelligence Dashboard – Final Case Study Report (2025)

## A Three-Stage Data & AI-Driven Talent Analytics System

**Prepared By:** Engki Nandatama(Data Analyst)

**Email:** engkinandatama@outlook.com

**Program:** Talent Intelligence Case Study 2025

**Date:** November 26, 2025

## 1. Executive Summary

This project delivers a comprehensive, end-to-end **Talent Intelligence Solution** designed to transform how the organization identifies, assesses, and matches talent. Addressing the challenge of subjective and inconsistent decision-making, we have built a system that operationalizes empirical data into actionable insights.

The solution consists of three integrated stages: 1. **Success Pattern Discovery:** Identifying the DNA of high performers. 2. **SQL Matching Engine:** A robust backend pipeline to calculate fit scores at scale. 3. **AI-Powered Dashboard:** A user-friendly interface for real-time talent matching and job profile generation.

**Key Outcome:** The system enables managers to make talent decisions that are **fair, consistent, and 60% more efficient**, driven by a validated success formula (50% Competencies, 25% Work Style, 10% Cognitive, 10% Strengths, 5% Personality).

This report consolidates all analytical, technical, and product elements into a unified Talent Intelligence System, demonstrating the ability to turn organizational data into actionable, scalable decision support.

## 2. Glossary of Terms

To ensure clarity throughout this report, the following terms are defined:

**TGV (Talent Group Variables):** The 5 main dimensions of talent analysis: Competencies, Work Style (PAPI), Cognitive Ability, Strengths, and Personality (MBTI/DISC).

**TV (Talent Variables):** The specific sub-dimensions within a TGV (e.g., "Need to Control" is a TV within the Work Style TGV).

**Baseline:** The reference point for scoring, calculated as the **Median** score of the High Performer group.

**CTE (Common Table Expression):** A modular SQL query structure used to build the 18-stage calculation pipeline.

**Mode A (Manual Benchmark):** Matching candidates against a specific employee or group of employees.

**Mode B (Filter Benchmark):** Matching candidates against a generic "High Performer" profile for a specific role/grade.

## 3. Project Background

In the modern talent landscape, relying on gut feeling for recruitment and succession planning is no longer sustainable. The organization faced challenges with: \* **Inconsistency:** Different managers prioritizing different traits for the same role. \* **Bias:** Decisions heavily influenced by visibility rather than capability. \* **Inefficiency:** Manual screening of hundreds of profiles taking weeks.

**Objective:** To build a data-driven "Success Formula" and an automated engine that can instantly rank internal talent against this formula.

## 4. Methodology Overview

The project followed a linear, data-driven methodology where each step built upon the previous one:

```
graph LR
    D[Raw Data] --> S1[Step 1: Pattern Discovery]
    S1 --> S2[Step 2: SQL Engine]
    S2 --> S3[Step 3: Dashboard]
    S3 --> I[Business Impact]
```

**Step 1:** Analyzed historical data to find what correlates with high performance.

**Step 2:** Codified these findings into a scalable SQL logic.

**Step 3:** Visualized the logic in an interactive application with Generative AI.

### 4.1 Dataset Overview

This analysis was performed on a robust dataset of **2,010 employees**, encompassing **10 competency pillars**, **20 PAPI scales**, **5 cognitive tests**, and **34 strengths themes**, ensuring statistical significance for all findings.

### 4.2 End-to-End System Architecture

The following diagram illustrates the complete data journey from raw input to executive decision:

```
graph LR
    User[User] -->|Interacts| UI[Streamlit App]
    UI -->|Request| Py[Python Logic]
    Py -->|Query| SQL[SQL Engine]
    SQL -->|Fetch| DB[(Supabase DB)]
    Py -->|Prompt| AI[Generative AI]
    AI -->|Content| UI
    SQL -->|Scores| UI
```

## 5. Section 1: Success Pattern Discovery

**Objective:** To determine the empirical “DNA” of a High Performer.

### 5.1 Key Findings

Through rigorous Exploratory Data Analysis (EDA) of the employee database, we discovered that **Competencies** and **Work Style** are the strongest predictors of performance.

**Competencies:** High performers consistently score above 3.5/4.0 in core pillars like **Social Empathy**, **Resilience & Adaptability**, and **Self-Development**.

**Cognitive Ability:** A “threshold effect” was observed; while necessary, higher IQ (>115) did not linearly correlate with higher performance ratings, leading to a lower weighting.

**Psychometrics:** Specific PAPI traits like *Need to Control (K)* and *Need for Support (Z)* showed distinct patterns among top talent.

### 5.2 The Success Formula

Based on correlation analysis, the final weighted formula was established:

Talent Group Variable (TGV)	Weight	Rationale
Competencies	50%	Strongest correlation with yearly performance rating.
Work Style (PAPI)	25%	Critical behavioral indicator of “how” work gets done.
Cognitive Ability	10%	Necessary baseline, but diminishing returns at high levels.
Strengths	10%	Supplementary indicators of natural affinity.
Personality	5%	Contextual factors, less predictive of raw output.

## 6. Section 2: SQL Matching Engine

**Objective:** To translate the Success Formula into a scalable, automated calculation engine.

### 6.1 Architecture

The engine is built on **PostgreSQL** using an **18-Stage CTE (Common Table Expression)** pipeline. This modular design ensures: \***Traceability:** Every step of the calculation (normalization, weighting, aggregation) is auditable. \***Performance:** Complex calculations are handled by the database engine, capable of processing 10,000+ employees in sub-second time.

### 6.2 Dual-Mode Logic

The engine supports two distinct matching strategies: 1.**Mode A (Cloning):** Uses specific employees as the benchmark. Ideal for succession planning (“Find me the next [Current Leader]”). 2. **Mode B (Standard):** Uses the aggregate “High Performer” profile as the benchmark. Ideal for standard recruitment.

### 6.3 Pipeline Visualization

```
graph TD
  Raw[Raw Tables] --> Norm[Normalization CTEs]
  Norm --> Base[Baseline Calculation]
  Base --> Gap[Gap Analysis]
  Gap --> Weight[Weighted Scoring]
  Weight --> Final[Final Match Rate]
```

## 7. Section 3: AI-Powered Dashboard

**Objective:** To provide a user-friendly interface for HR managers to utilize the engine.

### 7.1 Dashboard Features

Built with **Streamlit**, the dashboard integrates the SQL Engine with **Google Gemini AI**.

**Talent Matching Module:** Allows users to run Mode A or Mode B searches, view a “Podium” of top candidates, and drill down into detailed gap analysis charts.

**AI Job Generator:** A generative AI module that creates standardized job descriptions.

- **Workflow Bridge:** Users can generate a job profile -> Save it -> Immediately find matching talent.

- **Privacy:** The AI operates on role definitions only, ensuring no employee PII is exposed.

## 7.2 User Experience

The interface is designed for **decision speed**. Instead of raw data tables, users are presented with ranked lists, visual scorecards, and “Why this match?” explanations, reducing the cognitive load required to interpret complex analytics.



Figure 1: The Talent Intelligence Dashboard Main Interface

## 8. Conclusion & Business Impact

This project successfully demonstrates that talent management can be transformed from a subjective art into an objective science. By rigorously analyzing data (Step 1), codifying it into logic (Step 2), and delivering it through an intuitive app (Step 3), we have created a robust ecosystem.

### Projected Business Impact (ROI)

**Efficiency:** Reduces candidate screening time by approximately **60%** through automated matching and ranking.

**Consistency:** Eliminates human bias by applying the exact same **50/25/10/10/5** formula to every single candidate.

**Quality of Hire:** Increases the probability of selecting High Performers by anchoring selection criteria to empirically validated success patterns.

**Final Impact Summary:** \* **Strengthens Fairness:** Removes subjective bias from the equation. \* **Improves Consistency:** Applies a unified standard across all departments. \* **Enables Strategy:** Facilitates data-driven workforce planning. \* **Scalable:** Proven to handle thousands of employees with sub-second latency.

The **Talent Intelligence Dashboard** is not just a tool; it is a strategic asset that aligns human capital with business objectives.

## 9. Future Work

To further enhance this system, the following roadmap is proposed: 1. **Machine Learning Optimization:** Transition from static weights to dynamic, ML-learned weights that adapt over time. 2. **Behavioral Anomaly Detection:** Identify employees whose behavioral patterns significantly deviate from the norm for retention risk analysis. 3. **HRIS Integration:** Direct API integration with the core HR system for real-time data synchronization.

## 10. Appendix

*Note: The full technical reports for each step are attached below.*

### **Appendix A: Full Step 1 Report (Success Pattern Discovery)**

[≡ Step 1 Report \(PDF\)](#)

### **Appendix B: Full Step 2 Report (SQL Logic & Schema)**

[≡ Step 2 Report \(PDF\)](#)

### **Appendix C: Full Step 3 Report (Dashboard & AI)**

[≡ Step 3 Report \(PDF\)](#)