DASHBOARD CREATION

FOR PRICING AND SNAPSHOT

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

LIST OF ABBREVIATIONS

BI	Business Intelligence
BRA	Blended Rate Adjustment
CM	Creative Media
CYTD	Calendar Year-to-Date
DAR	Dynamic Allocation Rate
DAX	Data Analysis Expressions
FRC	Financial Reporting Council (UK)
IASB	International Accounting Standards Board
IFRS	International Financial Reporting Standards
UK GAAP	UK Generally Accepted Accounting Principles
YTD	Year-to-Date

I. METHODOLOGY AND APPROACH

1.1. Data Context and Data Preprocessing

1.1.1. Data Source & Data Connection

Two primary sources underpinned the analysis: the WiP system, which provided nine months of project-level financial data with automated refresh, and the Oracle accounting ledgers, which offered 24 months of aggregated costs and revenues but required manual updates. Together, they provided complementary coverage of operational and financial records, though their lack of direct integration limited interoperability.

1.1.2. Data Quality Issues

1.1.2.1. General and Pricing-related Data Quality Issues

Initial exploration revealed material quality issues, such as missing or duplicated project IDs and inconsistent linkage between costs and projects. In line with best practices in data management, records with invalid keys were removed, and project-level costs were reconstructed by linking timesheet records with actual pay rates. This correction prevented reliance on client-facing billing rates and aligned with time-driven activity-based costing principles, ensuring that analysis reflected true resource consumption (Kaplan and Anderson, 2009). Outsourced supplier costs were left at actual rates.

1.1.2.2. Forecasting-related Data Issues

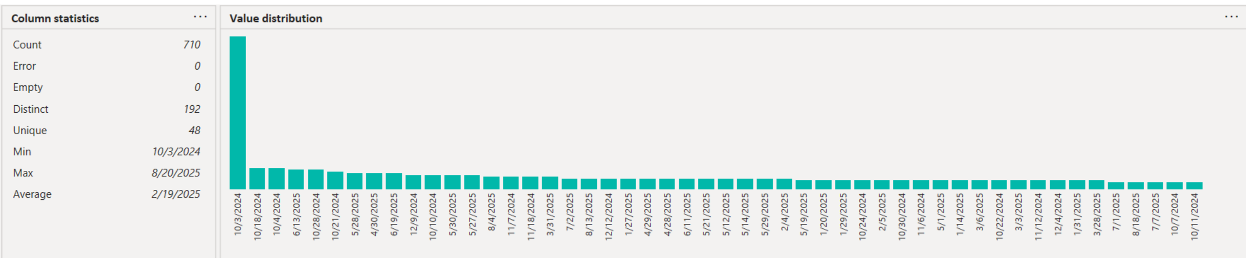

Figure 1: Distribution of Data Entry Count by Date

Forecasting faced additional challenges. Migration into WiP in October 2024 created a one-time spike (Figure 1), while the short history (under 12 months) precluded robust seasonality detection. Oracle ledgers extended the horizon but differed in recognition dates, making them unsuitable for direct integration. Consequently, the model prioritised trend-only forecasting while documenting a transition path to seasonality once sufficient history is accumulated.

Technical implementation steps, including DAX structures, calculated tables, and schema diagrams, are documented in Appendix A to preserve transparency while keeping the main body focused on methodological justification.

1.2. Snapshot Analysis Methodology

The Year-to-Date (YTD) snapshot is designed for monthly governance, showing each month's results while maintaining a cumulative YTD view, enables leaders to track intra-year patterns and overall trajectory, reducing smooth bias and improving decision cadence (Eckerson, 2013). Data are sourced from the WiP via API, cleaned in Power BI with all transformations logged and aggregates reconciled to finance totals. No identifiable data are processed.

Building on this foundation, the first lens of analysis considers **commercial viability**. Revenue, cost, and gross profit establish unit economics, while gross margin offers a scale-free indicator of pricing and cost discipline; this aligns with cost-to-serve thinking that cautions against subsidizing heterogeneous work with uniform rates (Wood et al., 2025). A simple margin status label aids interpretation for non-specialists.

Commercial outcomes, however, cannot be fully understood without linking them to **workload patterns**. Demand is shown by service mix and project counts as a pragmatic proxy for capacity under current data constraints. This reveals where activity is rising or falling but does not measure effort per job. A recommended enhancement is to add estimated/actual hours, utilisation once capture is consistent, to provide a direct view of capacity.

Finally, connecting demand and economics to the client base brings the perspective of **client contribution**. Analysing revenue and project share at the account level reveals both concentration risks and underserved segments.

1.3. Pricing Model and Dashboard Methodology

1.3.1. Overall Pricing Model

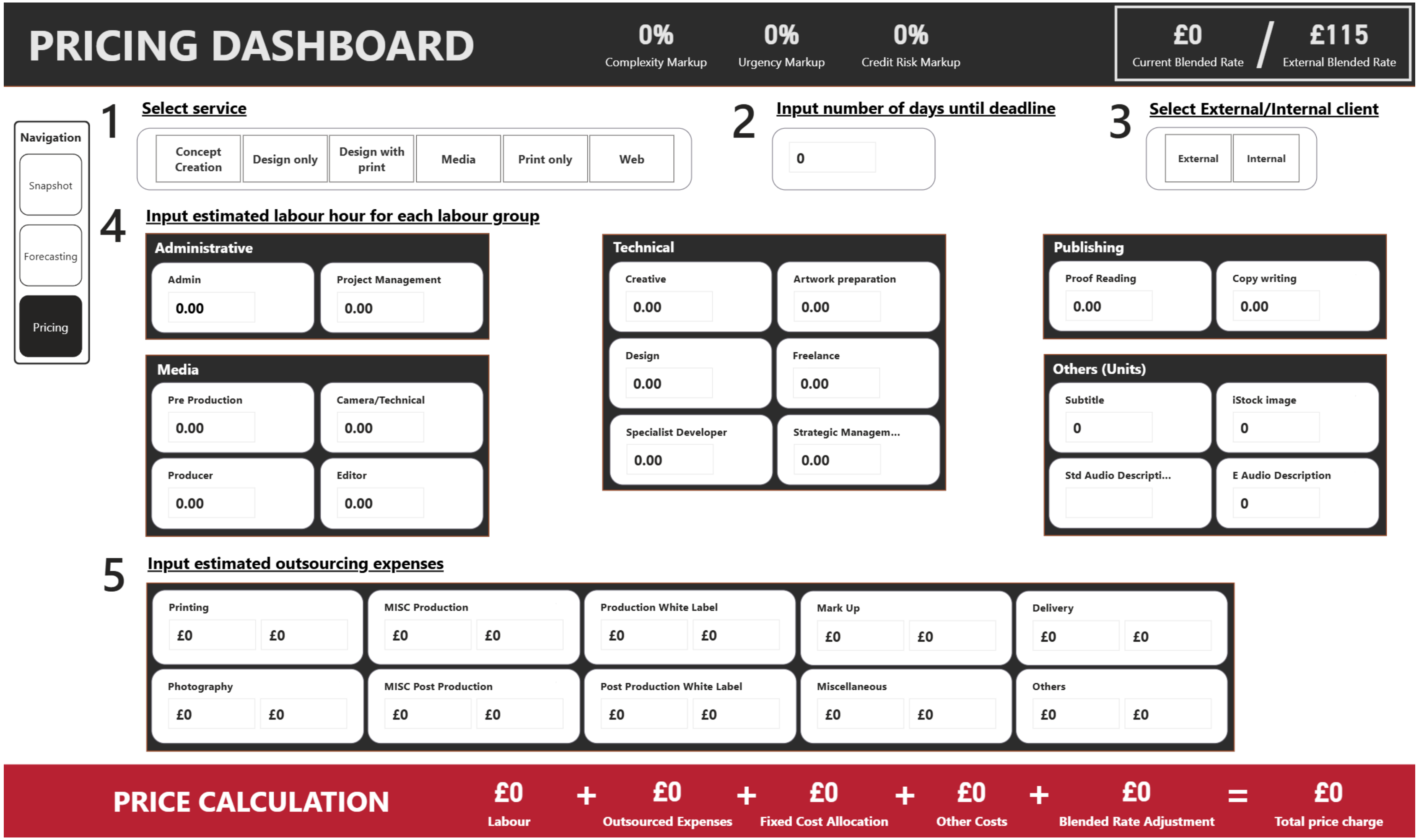

Figure 2: Overall Pricing Dashboard

$$\text{Total Price Charge} \quad = \quad \text{Fixed Cost Allocation} + \text{Marked-up Labour Cost} \pm \text{Blended Rate Adjustment}$$
$$+ \text{Outsourced Expenses} + \text{Other Costs}$$

Equation 1: Overall Pricing Model

The model decomposes the project price into auditable components: (i) recovery of fixed cost at service level, (ii) risk-adjusted labour, (iii) a blended-rate guardrail, and (iv) transparent treatment of outsourced pass-throughs, ensuring that each driver can be evidenced and adjusted without altering the core method.

For outsourced expenses, although Creative Media currently has only one external client with no history of delayed payment, a 10% credit-risk markup on this expense is applied to this category of client as a conservative safeguard since these costs remain outside operational control (Altman and Sabato, 2007). The parameter is implemented in DAX and can be recalibrated should client composition or payment behaviour change, maintaining both flexibility and transparency. “Other Costs” cover minor items such as subtitles and iStock images and follow a simple pass-through mechanism, requiring no further discussion.

1.3.2. Fixed Cost Dynamic Allocation Rate (DAR)

$$DAR = \frac{T \cdot n_i}{\sum_{j \in S} n_j^2}$$

$In\ which$:

T: total fixed cost to be allocated *(Average Annual Subscription Fee + Average Annual Telephone Fee + Average Indirect Labour Annual Salary).*

n_i: number of projects (rolling 12 months) for service i within the allocation scope.

$\sum_{j \in S} n_j^2$: Total squares of n_i (D)

Equation 2: Dynamic Allocation Rate of Fixed Cost

Recovering overheads is essential, since labour markups alone cannot cover indirect expenses such as subscriptions, telephony, and administrative salaries. In line with IFRS and UK GAAP principles, which require indirect costs to be apportioned on a systematic and rational basis (IASB, 2003, 2014; FRC, 2022), the model applies a DAR calculated from rolling 12-month project counts (Equation 3). This approach treats the fixed-cost pool as a capacity charge and ensures allocations flex automatically with service demand, rather than relying on static proportions that quickly become outdated.

1.3.3. Marked-up Labour Cost

1.3.3.1 Overall Formula

$$\text{Marked} - \text{up Labour Cost} = [\text{LC} \cdot (1 + R_C)] \cdot (1 + R_U)$$

$In\ which$:

R_C: $Complexity$ Markup Rate

R_U: $Urgency$ Markup Rate

LC: total $estimated$ labour cost (Estimated hour $\cdot$ Actual Payrate)

Equation 3: Marked-up Labour Cost Formula

Applying the complexity premium (R_C) before the urgency premium (R_U) mirrors cost incidence: technical difficulty sets the baseline variance in hours, and compressed lead-times add incremental disruption via overtime, reprioritisation, and coordination loss. Importantly, recent analyses caution that poorly governed dynamic pricing can erode trust; the present design avoids “surge-like” perceptions by using explainable, parametric multipliers that price distinct risks without opportunism (Bertini and Koenigsberg, 2024). The subsequent section will explain in detail how R_C and R_U are determined.

1.3.3.2. Complexity Markup Rate (R_C)

Project complexity was classified using k-means clustering on *estimated project cost* and *estimated hours*. Using estimated rather than actual inputs is critical, since quoting decisions are ex-ante; relying on actuals would embed scope changes invisible at intake and bias classification (Hinterhuber and Liozu, 2013; Tan and Kumar, 2016). To reduce workflow heterogeneity, models were trained separately by service type. Internal validity was assessed with Silhouette and Davies–Bouldin indices, widely applied for evaluating clustering performance in pricing analytics (Vohra and Krishnamurthi, 2012).

k (Number of Clusters)	Total Ranking Score from Silhouette Score and Davies Bouldin’s Index
2	41
3	**42**
4	36
5	35
6	26

Table 1: K-Means Clustering Performance Result of the Past Project's Complexity

projectNo	servicerequired	projectEstimatedCost	projectEstimatedHours	Complexity_Label
P001	Concept Creation	£1,250.00	12	1
P002	Concept Creation	£6,800.00	95	2
P003	Concept Creation	£10,200.00	148	3
P004	Design only	£500.00	5	1
P005	Design only	£5,600.00	72	2
P006	Design only	£9,900.00	135	3
P007	Design with print	£1,050.00	6	1
P008	Design with print	£9,750.00	126	2
P009	Design with print	£205,000.00	214	3
P010	Media	£2,800.00	35	1
P011	Media	£10,100.00	115	2
P012	Media	£75,500.00	108	3
P013	Print only	£900.00	0	1
P014	Print only	£2,100.00	2	2
P015	Print only	£10,600.00	0	3
P016	Web	£200.00	0	1
P017	Web	£3,250.00	60	2
P018	Web	£15,200.00	230	3

Table 2: Extraction of Complexity Label Clusters

Note: Due to confidentiality, original project data cannot be shared. This repository includes synthetic data that mimics the original structure to demonstrate the clustering methodology.

As shown in Table 2, **k = 3 offered the best balance** between statistical fit and managerial interpretability. Although the score difference from k = 2 was modest, stability checks showed that three clusters produced more consistent separation, and the resulting levels aligned well with service reality. For example, in Table 3, simple “Design only” projects of £75/1h (Label 1) are clearly separated from multi-hundred-hour “Design with print” projects exceeding £200,000 (Label 3). Full validity scores and centroid extractions are reported in Appendix Section 3.

Complexity Level Label	Markup Rate on Labour Cost
1	50%
2	75%
3	100%

Table 3: Complexity labels with the corresponding Markup Rate

Markup rates are applied by label as shown in Table 4. Timesheet data indicate an average labour pay of £30/hour (Figure 10 - Appendix). For the lowest-complexity projects, a 50% markup yields a service charge of £45/hour; however, the per-project fixed-cost allocation weights substantially (Table 5), which means small jobs, for instance, a Design with print with 5 Design hours, already produce a high blended rate of ≈£170/hour. Retaining the Level-1 markup at 50%, therefore, guards against over-charging small jobs whose per-hour total is elevated by fixed costs rather than labour effort. By contrast, higher labels, 75% for projects requiring tens of hours and 100% for 100 to 200 hours, are activated when complexity and coordination rise, helping to stabilize margin while keeping resulting blended rates competitive relative to UK agency benchmarks (average blended ≈ £115/hour; mid-level lower band ≈ £75/hour) (The WOW Company, 2025).

1.3.3.3. Urgency Markup Rate (R_U)

$$R_U = \frac{H}{H_A - H_B}$$

$In\ which:$

$H: total\ estimated\ labour\ hours\ of\ the\ current\ project.$

$H_A: total\ staff\ hours\ available\ in\ the\ next\ X\ days.$

$H_B: hours\ already\ booked\ in\ the\ next\ X\ days.$

Equation 4: Urgency Markup Rate Formula

Estimated Project Hours	Days until deadline					
	1	2	3	5	10	20
5	3.13%	1.02%	0.60%	0.27%	0.06%	0.06%
10	6.25%	2.04%	1.20%	0.54%	0.27%	0.12%
15	9.38%	3.06%	1.79%	0.81%	0.40%	0.18%
20	12.50%	4.08%	2.40%	1.09%	0.53%	0.24%
25	15.63%	5.10%	2.99%	1.36%	0.66%	0.30%
30	18.76%	6.12%	3.59%	1.63%	0.79%	0.36%
35	21.88%	7.15%	4.19%	1.90%	0.93%	0.42%
40	25.01%	8.17%	4.79%	2.17%	1.06%	0.48%
45	28.13%	9.19%	5.39%	2.44%	1.19%	0.54%
50	31.26%	10.21%	5.98%	2.71%	1.32%	0.60%
55	34.38%	11.23%	6.58%	2.98%	1.45%	0.66%
60	37.51%	12.25%	7.18%	3.25%	1.59%	0.72%

In which:

Low urgency

High urgency

Table 4: Simulation of Urgency Markup Rates by Project Hours and Days until Deadline (Conducted on 26 August 2025)

Urgency is modelled as a multiplier on the complexity-adjusted labour cost (Equation 7). The effect is negligible under normal deadlines (10-20 days), but it rises steeply when lead times shorten relative to the workload. For example, a 40-hour project with ten days' lead time adds 1.06%, whereas compressing it to two days raises the surcharge to 8.17% (Table 5).

This design reflects the real cost of urgent delivery, covering overtime and coordination losses. While uplifts can exceed 20% for very large projects under one-to-two-day deadlines, such cases are rare; the function therefore signals stress scenarios while keeping typical projects within modest adjustments (Bertini and Koenigsberg, 2024).

1.3.4. Blended Rate Adjustment (BRA)

$$r_0 = \begin{cases} 0, & H = 0 \text{ or no service selected} \\ \dfrac{P + DAR + E + O}{H}, & \text{Otherwise} \end{cases}$$

$In\ which:$

$P: marked - up\ labour\ cost.$

$DAR: Dynamic\ Allocation\ Rate\ of\ Fixed\ Cost.$

$E: External\ clients'credit\ risk\ markup.$

$O: Other\ costs.$

$H: total\ estimated\ labour\ hours\ of\ the\ current\ project.$

Equation 5: Raw blended rate formula

$$\Delta = \begin{cases} (r_0 - U) \cdot H, & r_0 > U \\ (r_0 - L) \cdot H, & r_0 < L \\ 0, & L \leq r_0 \leq U \end{cases}$$

$In\ which:$

$r_0: raw\ blended\ rate.$

$L:\ lower\ target\ bound\ £75/hour.$

$U: upper\ target\ bound\ £105/hour.$

$H: total\ estimated\ labour\ hours\ of\ the\ current\ project.$

Equation 6: Blended rate adjustment formula

Even after applying fixed-cost allocations and labour markups, the resulting project rate must be validated against external benchmarks. A raw blended rate was therefore calculated by dividing total adjusted cost by estimated hours (Equation 9) and constrained within policy bounds of £75–£105 per hour, reflecting the interquartile range of UK mid-tier agencies (The WOW Company, 2025). The lower bound prevents under-recovery in large jobs, while the upper bound avoids charging above market thresholds. This alignment ensures cost allocations remain systematic and supportable, consistent with accounting guidance that prohibits arbitrary distortion of reported values (IASB, 2014; FRC, 2022).

Projects	Estimated Hour	DAR	Marked-up labour	BRA Suggested bounds	BRA Minus 5 bounds	BRA Plus 5 bounds
Project 1	5	£630	£225	-£330	-£355	-£305
Project 2	10	£630	£450	-£30	-£80	£0
Project 3	15	£630	£675	£0	£0	£0
Project 4	20	£630	£900	£0	£0	£70
Project 5	25	£630	£1125	£120	£0	£245
Project 6	30	£630	£1350	£270	£120	£420
Project 7	35	£630	£1575	£420	£245	£595

Scenarios	Lower bound	Upper bound
Minus 5 bounds	£70/hour	£100/hour
Suggested bounds	£75/hour	£105/hour
Plus 5 bounds	£80/hour	£110/hour

Table 5: Simulation of Blended Rate Adjustments for "Design with Print" Projects under Alternative Benchmark Bounds

As shown in Table 6, sensitivity tests shifting the bounds by ±£5/hour affected only a small share of projects, confirming robustness without being excessively restrictive. Beyond price correction, the guardrail also functions as a governance trigger: any quotation breaching the band is automatically adjusted and flagged for managerial review, with changes logged in DAX for audit. This design prevents cross-subsidy, stabilises client conversations, and demonstrates that final quotations are both data-driven and market-anchored. Full formulas and further simulations are provided in Equation 9.

II. REFERENCES

Altman, E.I. and Sabato, G. (2007) 'Modelling credit risk for smes: Evidence from the U.S. market', *Abacus*, 43(3), pp. 332–357. doi:10.1111/j.1467-6281.2007.00234.x.

Bertini, M. and Koenigsberg, O. (2024) Dynamic Pricing Doesn't Have to Alienate Your Customers. Havard Business Review. Available at: https://hbr.org/2024/05/dynamic-pricing-doesnt-have-to-alienate-your-customers (Accessed: 23 July 2025).

Eckerson, W.W. (2013) *Performance dashboards: Measuring, monitoring, and managing your business*. Hoboken, N.J: Wiley.

FRC (2022) FRS 102: The Financial Reporting Standard applicable in the UK and Republic of Ireland. Financial Reporting Council.

IASB (2003) IAS 2: Inventories. International Accounting Standards Board.

IASB (2014) IFRS 15: Revenue from Contracts with Customers. International Accounting Standards Board.

Inmon, W.H. (2011) *Building the data warehouse*. 4th edn. Indianapolis: Wiley.

Kimball, R. and Ross, M. (2013) *The Data Warehouse Toolkit: The definitive guide to dimensional modeling*. 3rd edn. Hoboken: Wiley.

The WOW Company (2025) State of the agency nation. Available at: https://www.thewowcompany.com/blog/benchpress-2025-introducing-state-of-the-agency-nation (Accessed: 15 August 2025).

Vohra, R.V. and Krishnamurthi, L. (2013) *Principles of pricing: An analytical approach*. Cambridge: Cambridge University Press.

Wood, J., Zellars, S. and Puglia, J. (2025) *Cost to serve: Improve decision-making, competitiveness, and profitability: Our insights: Plante Moran*, *Our Insights | Plante Moran*. Available at: https://www.plantemoran.com/explore-our-thinking/insight/2025/07/cost-to-serve (Accessed: 23 August 2025).

III. APPENDIX

1.1. Data Modelling

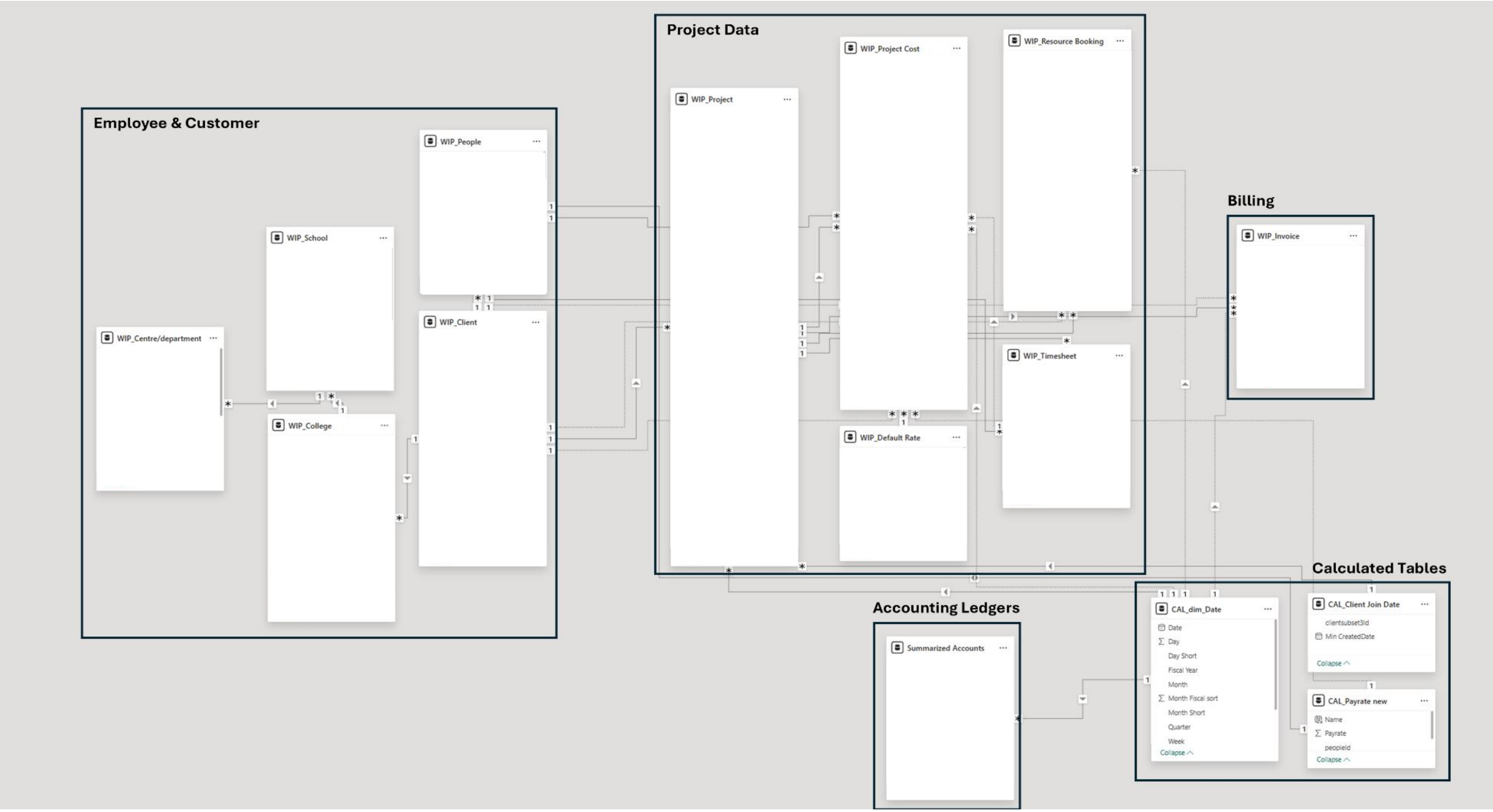

Figure 3: Data Model