

Optimal Consulting Report

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23rd April 2026

1 Introduction

OptiConsult is a mid-size consulting company operating across a diverse array of industries. As a organization, *OptiConsult* also requires optimized resource allocation strategies to reconcile client service demands with established business rules. Through LP modelling analysis, this report identifies efficiency-maximizing consultant allocations and delivers actionable insights for performance improvement.

2 Background and Goals

OptiConsult operates with five consultant levels—from Senior Consulting Manager (Level-1) to Junior Consultant (Level-5)—distributed across three branches: London, Scotland, and North England. Currently, the company must allocate 292 consultants to 13 concurrent projects across four regions (London, North England, Scotland, and Ireland), each lasting six months (20 working days per month).

The company’s goal is maximize the total profit taking into account staff salaries, consultant daily rate, travel costs, etc. While the first two will be different with different consultant level, and the last one depends on the regions.

The company’s goal is to maximize

$$\text{Total Profit} = \text{Total Revenue} - \text{Total Costs}$$

where Total Revenue depends on consultant levels and locations, and Total Costs consists of level-dependent salaries and travel costs.

To achieve this, *OptiConsult* must satisfy the following business rules and assumptions:

- **Exclusive Project Assignment:** Each consultant is assigned to a single project at a time and stays until the completion of the project.
- **Location Priority:** Preference is given to assigning consultants to projects at their current location.
- **One-time Travel Cost:** Travel cost is incurred once if a consultant is allocated to a non-local project.
- **Work Level Constraints:** Consultants can work at or below their own level, but not above.
- **Bench Policy:** Unassigned consultants remain employed, continuing to receive their full salaries.
- **Bench Capacity Limit:** A maximum of 50% applies to benched consultants except Junior Consultants.
- **Unmet Demand Allowance:** Unfulfilled project demand is allowed.

3 Stage 1: Key Outcomes and Analytical Insights

3.1 Project Allocation Summary

The thorough staff allocation pattern in Table 1 demonstrates that the firm properly matches the individual requirement of each client. Clients in economically advanced regions, such as London and Scotland, often demand a higher volume of consultants, particularly those with specialized senior-level expertise.

3.2 Workforce

The rows of *Total Demand in Consultants* and *Total Consultants in the Firm* in Table 1 indicate that the supply of consultants exceeds the demand, leading to the inevitable benching. While most consultant are based in Scotland, London and North England, detailed data on this distribution can be found in Table 2.

Table 2 further reveals specific anomalies, with unusual data points highlighted for clarity. Notably, the benched rate presented in Table 2 corresponds to each consultant level within each location. Thus, it is acceptable for consultants above level-5 to have a benched rate exceeding 50% here. One critical observation is the 71.74% standby rate for level-4 consultants in North England, which is highlighted in blue. This figure indicates a potential inefficiency in the

allocation of employees. To optimize resource utilization and reduce operational costs, the firm may need to reassess level-4 staffing in this region, potentially through workforce adjustments or reallocation.

Further details on the benched rate for each consultant level are provided in Table 3 of Appendix [7]. This confirms that the observed rates in the current consultant allocation are consistent with *Assumption 6* in Section 2.

Additionally, while utilization and benched rates are theoretically capped at 100%, some data points (highlighted in red) exceed this threshold. This discrepancy occurs due to the operational flexibility, which allows consultants to work at lower levels when necessary, inadvertently inflating certain rates.

3.3 Cross Level

Table 4 provides a detailed breakdown of high-level consultant performing the lower level tasks. This section primarily addresses the unusual assignment of Level-2 consultants in North England.

As shown in the two blue-highlighted rows in Table 4, we observe that for each Projects 9 and 10 in North England, five Consulting Managers (Level-2) are assigned to tasks usually performed by Level-3 consultants. Consequently, ten additional consultants are engaged in Level-3 tasks in this region. A similar situation is also observed for Level-4 tasks in Scotland.

3.4 Travel Cost Analysis

Table 5 summarizes the distribution of consultants dispatched to the Republic of Ireland, along with the associated travel costs. There were 54 consultants sent to Ireland, including 10 from Scotland and 44 from North England.

Since all other regions (London, Scotland, North England) had sufficient local consultants to meet their own project demands, only Ireland required external dispatches.

North England contributed 83.3% to the total travel cost (£11,000), reflecting a heavy reliance on this region. The company should think about dividing upcoming deployments more fairly throughout accessible locations in order to reduce this dependency and expense concentration.

Table 6 shows the dispatch distribution by consultant level. A significant proportion of dispatched consultants — nearly 89% — were assigned to mid-level roles (Level-2 to 4), indicating a strong reliance on this consultant tier. This indicates that the Irish projects are heavily dependent on mid-tier talent, particularly from North England. It is also important to note that Scotland exclusively provided the participation of Level-5 (Junior consultants), while the participation of Level-1 (Senior Consulting Manager) remained minimal.

Thus, to improve cost efficiency and operational resilience, it is recommended that the firm diversifies its consultant dispatch strategy to reduce over-reliance on North England. Even if their travel expenses are a little greater, idle consultants from other areas, especially London, should be considered for deployment. In addition, assigning suitable tasks to junior-level staff can help reduce both salary and travel expenses, contributing to overall cost savings.

3.5 Financial Performance Overview

The final allocation plan resulted in a total profit of £5,383,920, generated from £16,040,640 in revenue. Salary expenses amounted to £10,643,520, the majority of which (£8,932,320) was attributed to project assignments, while the remaining £1,711,200 came from benched consultants who were not assigned. Travel expenditures were tightly controlled at £13,200—well below the £80,000 budget cap. These figures reflect strong overall financial performance, demonstrating effective cost containment and optimal use of staffing resources.

4 Stage 2: Key Outcomes and Analytical Insights

4.1 Model Assumptions and Business Rules for Strategic Scenario Modelling

In Stage 2, both fixed and variable parameters were included to reflect real-world complexity in resource planning and project execution.

Fixed parameters include:

- **Consultant Preferences:** Senior consultants are assumed to be more flexible in terms of travel, while junior consultants may be less willing to relocate—particularly to higher-cost areas (London).
- **Outsourcing Costs:** Outsourcing fees increase with consultant seniority, as replacing higher-level staff with external contractors typically incurs a higher premium.
- **Client Satisfaction Penalties:** The penalty for leaving roles unfilled grows with the seniority of the role, reflecting their greater impact on project quality.

Variable parameters include:

- **Demand Variability (20%):** Demand is allowed to fluctuate by plus or minus 20% to simulate real-world uncertainty across projects.

- **Remote Work Penalty:** The penalty rate (a percentage of daily revenue per consultant) reflects a slight decline in client satisfaction, as some clients perceive remote consulting as less personal and less effective. For example, Spacestor Healthcare [1] notes that the perceived lack of immediacy in virtual formats can contribute to this dissatisfaction.
- **Maximum proportion of remote workers (as a percentage of total project demand):** A cap is set on the share of demand that can be fulfilled via remote work, typically influenced by client policy or contract terms.

To ensure feasibility in staffing plans, **all personnel-related variables—such as remote capacity and demand variability—are rounded up** to the nearest whole number, ensuring demand is never underestimated and capacity constraints are realistically met.

4.2 Sensitivity Analysis Setup

In the following analysis, we examine each variable individually. During the discussion of each variable, the initial parameter values are summarized in Table 7 which includes the demand penalty and outsourcing cost across five consultant levels. The other two variables are held constant at the following baseline values:

- **Demand Variability** = 0%
- **Remote Work Penalty Rate of Daily Revenue (%) generated by the consultant** = 0.5%
- **Maximum proportion of remote workers (as a percentage of total project demand)** = 10%

4.3 Comparison Between Stage 1 and Stage 2

As shown in Table 8 and the assumptions outlined in Section 4.2, Stage 2 achieves a higher total profit than Stage 1. This improvement is primarily attributed to the adoption of remote work, which significantly reduces travel cost by more than half. Although remote work incurs a remote satisfaction penalty of £888, this is outweighed by the £7,250 savings in travel cost. As a result, the net financial impact of Stage 2 is positive, contributing to a total profit increase of £6,362.

4.4 Impact of Demand Variability

As depicted in Figure 1, a 5% decrease in consultant demand leaves all financial values unchanged. This stability likely due to the minor demand change and our assumption of rounding up the consultant numbers, which preserve financials similar to the baseline demand conditions.

Conversely, a 5% increase in demand leads to a surge in total profit. Table 9 highlights a significant reduction in total benched salary—approximately two-thirds—indicating enhanced workforce utilization.

Total salaries remain constant until demand raises by 15%, at which point the firm begins adjusting staffing levels. Interestingly, outsourcing is not considered until demand reaches 115% of its original level, with a Level-3 consultant outsourced in Ireland. This suggests that the firm’s current consultant pool is sufficient enough to handle small demand fluctuations, even though 20 consultants remain unassigned (2 at Level-4 and 18 at Level-5).

Given this situation, we propose three suggestions. First, strategically reduce underutilized Level-5 consultants; second, reallocate high-potential Level-5 consultants to the Irish subsidiary; and third, provide targeted training programs to help Level-5 consultants transition into higher level. All of these options would help optimize staffing and align resources with demand fluctuations, ultimately maximizing profitability while maintaining operational flexibility. However, if demand increases by 20%, outsourcing requirements will rise to 9 consultants, necessitating additional budget allocation.

Moreover, the firm appears committed to meeting consumer demand at all levels to maximize total profit, regardless of how demand fluctuates.

4.5 Irish-Specific Remote Work Strategy and Risks

Based on earlier demand variability analysis results, we confirm that all demand can be fully met even when project demand. Remote work was only observed in projects based in the Republic of Ireland, as other regions — London, North England, and Scotland — had sufficient local consultants to fulfil their needs. Since the total demand in Ireland amounts to 50 consultants, this section focuses on how remote work parameters and regional risk affect the composition and stability of the company’s total profit.

4.5.1 Effect of Remote Work Penalty Rate (of Daily Revenue (%) generated by the consultant)

Figure 3 illustrates how profitability changes with different remote work penalty rates (measured as a percentage of a consultant’s daily revenue). This scenario assumes fixed demand (0% variability and a 10% cap on remote staffing).

Table 10 presents the number of remote consultants assigned to Ireland under different remote work penalty rates.

As shown in the graph, total profit drops significantly as the penalty rate increases from 0.1% to 0.9%, but stabilizes beyond 1.0%, indicating that the amount of profit lost due to remote penalties is capped.

Combined with Table 10, we observe that low penalty rates enable optimal use of remote resources. When the penalty rate is below 0.5%, 29 out of 50 consultants work remotely while 21 are dispatched on-site—indicating a cost-efficient staffing structure. When the penalty is between 0.6 and 0.8, the company adopts a hybrid approach: 17 consultants work remotely, while 33 are dispatched to Ireland, balancing flexibility and cost. When the penalty reaches 0.9 or higher, remote work is nearly abandoned (only 4 remote consultants), and most personnel are physically assigned. Profit stabilizes at this point, showing limited further sensitivity to penalty rates.

This non-linear shift—from moderate to high penalties—suggests a threshold around 0.8, beyond which remote work becomes economically inefficient. From a strategic standpoint, when penalty rates are negotiable across clients, the company should prioritize contracts with lower remote work penalties, as they offer greater flexibility and profitability. When penalty rates are uniformly high (e.g., penalty rate ≥ 0.9), their influence on profit becomes negligible, and operational focus should shift toward optimizing physical deployment.

4.5.2 Effect of Maximum proportion of remote workers (as a percentage of total project demand)

The Figure 2 shows how profit responds to changes in the maximum proportion of remote workers.

The graph shows that when the limit is increased from 10% to around 15%, profit increases significantly. Beyond 15%, the curve flattens, indicating minimal additional gain.

We recommend negotiating with clients to raise the maximum remote work threshold as close to 15% as possible, as this level maximizes flexibility and cost-effectiveness. Further increases beyond this point yield negligible returns.

4.5.3 Special Cases-Impact of Irish Transport Disruption

Under the same fixed parameters, we examine a scenario where extreme weather causes a complete transportation shutdown to Ireland. In this case, travel-based deployment becomes impossible. Only a few remote consultants and local outsourced staff remain available. Although full project demand is still met, the alternative arrangements increased the costs. As a result, the company’s profit drops from £5,386,298 to £4,685,436, a 13.01% reduction.

This highlights the risk of over-reliance on cross-regional deployment. We recommend building a small local team in Ireland to improve resilience and reduce cost unstableness during disruptions.

5 Recommendations

5.1 Stage 2 Recommendations

1. **Establish a Small Local Team in Ireland:** While the current total consultant pool is sufficient to meet demand across all four regions, the company heavily relies on dispatching staff to Ireland. A small-scale local branch can reduce this dependency. By selectively recruiting local consultants and leveraging remote workers from existing offices, the company can avoid excessive benching, enhance operational stability, and improve long-term profitability.
2. **Reduce On-site Deployment to Ireland through Remote Work:** Due to the significant gap between consultant availability and project demand in Ireland, the company should prioritize remote work to reduce travel costs and enhance flexibility.
3. **Optimize Remote Work Parameters:** When remote work is viable, aim to negotiate higher remote work allowances—ideally around 15% of total project demand—as returns plateau beyond this point. Similarly, prioritize contracts with remote penalty rates below 0.9%, as higher rates have limited additional impact on profitability.
4. **Optimize Consultant Structure:** Under the variability of demand $\pm 20\%$, all project needs can be met without outsourcing. Outsourcing becomes necessary only when demand increases by more than 15%, indicating that current staff levels are adequate for moderate growth. However, as demand rarely exceeds capacity, the company should consider downsizing consultants significantly exceeding demand—especially at Level-5—to reduce unnecessary staffing costs and improve overall efficiency.

6 Conclusion

In conclusion, this report has demonstrated how *OptiConsult* can maximize its profits while responding to multi-project demands. It systematically explores optimization strategies for improving the efficiency of consultant allocation. By considering different project demand, consultant levels, and geographic distributions, we identify three core challenges in resource management: cost control, workforce utilization, and the financial impact of travel expenses.

We use linear optimization models with *Xpress* in both stages to support our strategic decisions. The Stage 1 uses a simplified model to uncover inefficiencies in scheduling and cross-level allocation. Building on this, Stage 2 introduces real-world constraints to create a more practical and constraint-aware framework, resulting in produce effective allocation strategies and suggestions.

Through optimization modeling, *OptiConsult* can improve operational efficiency, reduce travel costs, and maintain financial stability. The recommendations also support better staffing decisions and help the firm prioritize clients with higher long-term value.

These findings highlight the importance of data-driven decision-making and provide *OptiConsult* with a practical framework for continuous improvement and strategic planning.

References

- [1] Spacestor Healthcare. *6 Challenges of Virtual Consultancy and How to Overcome Them*. <https://www.spacestorhealthcare.com/post/6-challenges-of-virtual-consultancy-and-how-to-overcome-them>. Accessed: 2025-04-02. n.d.

7 Appendix

Project Number ID	Consultants Level									
	1- Senior Consulting Manager		2- Consulting Manager		3- Senior Consultant		4- Consultant		5- Junior Consultant	
	Demand	Real	Demand	Real	Demand	Real	Demand	Real	Demand	Real
1	0	0	6	6	10	10	15	15	1	1
2	0	0	13	13	5	5	13	13	0	0
3	0	0	13	13	5	5	9	9	0	0
4	0	0	15	15	1	1	10	10	0	0
5	2	2	13	13	9	9	5	5	2	2
6	0	0	7	7	8	8	12	12	0	0
7	0	0	7	7	6	6	11	11	0	0
8	0	0	3	3	3	3	3	3	0	0
9	0	0	4	4	5	5	3	3	0	0
10	0	0	10	10	5	5	4	4	0	0
11	1	1	2	2	10	10	2	2	1	1
12	1	1	3	3	10	10	5	5	2	2
13	0	0	4	4	6	6	6	6	1	1
Total Demand in Consultants	4	4	100	100	83	83	98	98	13	13
Total Consultants in the firm	8		120		100		120		30	
Total Revenue (£)	324,000		6,376,440		4,604,400		4,560,000		175,800	

Table 1: Consultant demand, actual allocation by project and level, and firm revenue by consultant level

Office	Level	Total Consultants	Benched	Assigned	Utilization	Benched Rate
London	1	6	1	2	33.33%	16.67%
	2	48	6	45	93.75%	12.50%
	3	43	0	27	62.79%	0.00%
	4	43	16	41	95.35%	37.21%
	5	9	9	2	22.22%	100%
North England	1	1	0	1	100.00%	0.00%
	2	40	0	23	57.50%	0.00%
	3	26	5	31	119.23%	19.23%
	4	46	33	20	43.48%	71.74%
	5	13	13	0	0.00%	100%
Scotland	1	1	0	1	100.00%	0.00%
	2	32	0	32	100.00%	0.00%
	3	31	0	25	80.65%	0.00%
	4	31	0	37	119.35%	0.00%
	5	8	3	5	62.50%	37.50%

Table 2: Number of benched and assigned consultants by office and level

Consultant Level	Total Consultant	No. Benched	No. Assigned	Benched Rate
1	8	1	7	12.50%
2	120	6	114	5.00%
3	100	5	95	5.00%
4	120	49	71	40.83%
5	30	25	5	83.33%

Table 3: Benched rate for each level of consultant

Project Number ID	Original Level	Work Level	No. Consultants	Salary Difference (£)
3	2	2	13	0
	3	3	5	0
	3	4	6	57,600
	4	4	3	0
5	1	1	2	0
	2	2	13	0
	3	3	9	0
	3	4	5	48,000
	3	5	2	36,960
7	2	2	7	0
	3	3	6	0
	3	4	6	57,600
	4	4	5	0
8	1	2	3	44,640
	3	3	3	0
	3	4	3	28,800
9	2	2	4	0
	2	3	5	34,800
	3	4	3	28,800
10	2	2	10	0
	2	3	5	34,800
	3	4	4	38,400
12	1	1	1	0
	2	2	3	0
	2	3	7	48,720
	3	3	3	0
	4	4	5	0
	5	5	2	0

Table 4: High-Level Consultant Substitution for Low-Level Tasks

Original Level	1	2	3	4	5	Total	Unit Cost (£)	Total Cost (£)
Scotland	1	0	5	0	4	10	220	2,200
North England	1	16	14	13	0	44	250	11,000
Total	2	16	19	13	4	54	—	13,200

Table 5: Travel cost by region and original level

Consultant Level	Count	Main Source Region	% of Total Dispatch
Level 1	2	Scotland, North England	3.7%
Level 2	16	North England	29.6%
Level 3	19	North England, Scotland	35.2%
Level 4	13	North England	24.1%
Level 5	4	Scotland	7.4%
Total	54	—	100%

Table 6: Distribution of Dispatched Consultants to the Republic of Ireland by Level and Source Region

Original Level	1	2	3	4	5
Demand Penalty(£)	500	420	360	240	120
Outsourcing Cost(%) ($1.X \times DailyRate$)	8	6	4	2	1

Table 7: Stage 2 initial parameters value

Financials	Stage 1	Stage 2
Total Profit	£5,383,920	£5,390,282
Total Income	£16,040,640	£16,040,640
- Basic Income	-	£14,618,640
- Remote Income	-	£1,422,000
- Outsourcing Income	-	£0
Total Salary	£10,643,520	£10,643,520
- Bench Salary	£1,711,200	£1,826,640
- Assigned Salary	£8,932,320	£7,969,680
- Remote Salary	-	£847,200
- Outsourcing Salary	-	£0
Total Travel Cost	£13,200	£5,950
Travel Budget	£80,000	£80,000
Travel Budget Utilization	16.50%	7.44%
Total Satisfaction Penalty	-	£888
- Demand Satisfaction Penalty	-	£0
- Remote Satisfaction Penalty	-	£888

Table 8: Financials comparison between Stage 1 and Stage 2

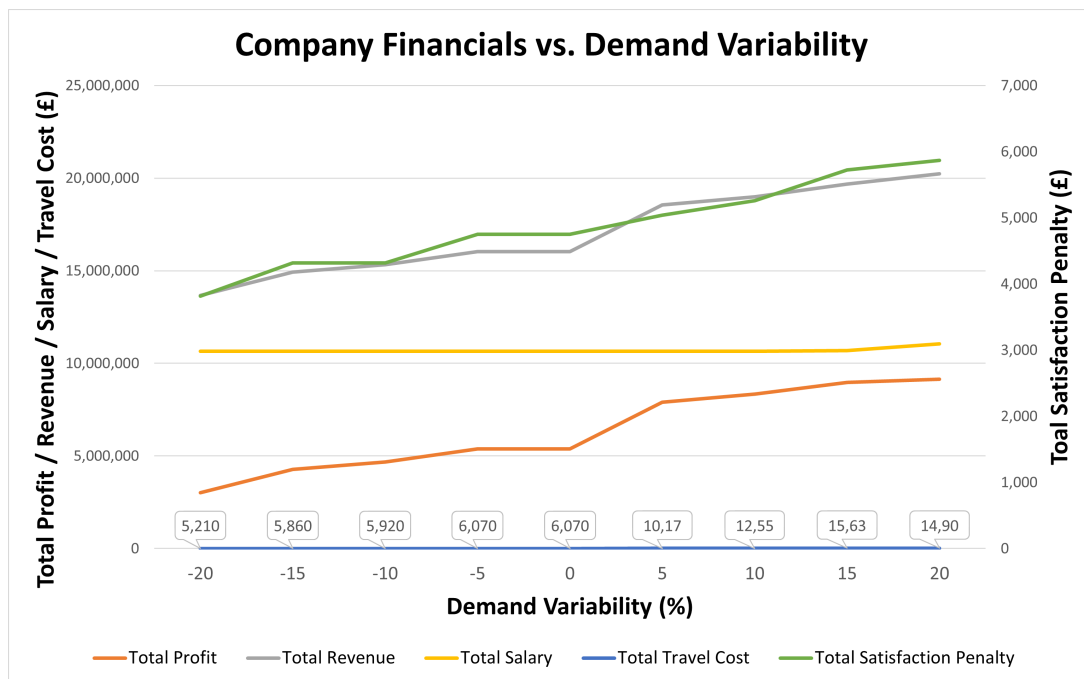


Figure 1: Impact of Demand Variability on Company Financial Performance

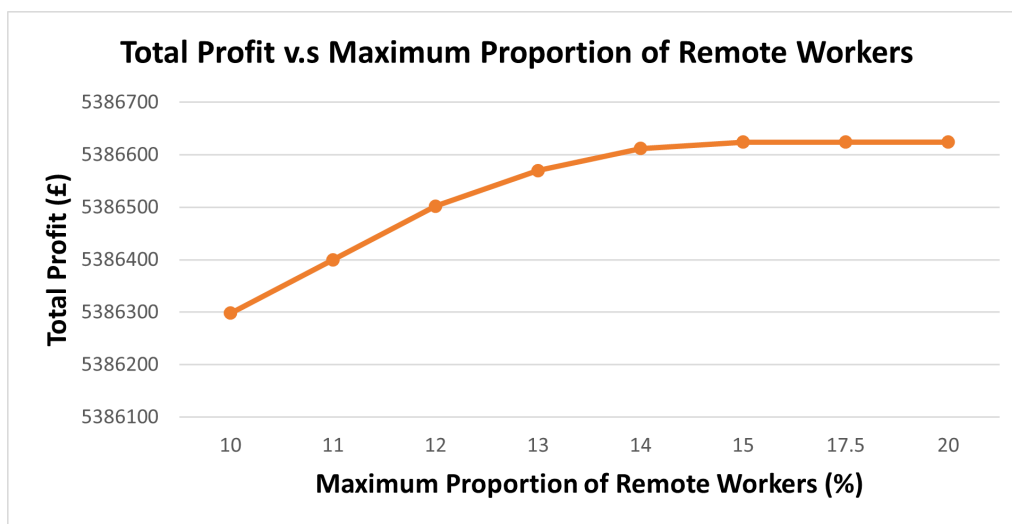


Figure 2: Impact of Maximum Remote Work Percentage on Client Satisfaction for Remote Work

Demand Variability (%)	Basic Revenue	Remote Revenue	Outsourcing Revenue	Bench Salary	Assign Salary	Remote Salary	Outsourcing Salary	Demand Penalty	Remote Penalty
-20	£12,619,440	£1,054,800	£0	£3,020,640	£6,875,040	£747,840	£0	£0	£3,816
-15	£13,723,200	£1,196,400	£0	£2,356,800	£7,619,040	£667,680	£0	£0	£4,320
-10	£14,130,000	£1,196,400	£0	£2,161,440	£7,813,200	£668,880	£0	£0	£4,320
-5	£14,738,640	£1,302,000	£0	£1,709,280	£8,189,040	£745,200	£0	£0	£4,752
0	£14,738,640	£1,302,000	£0	£1,709,280	£8,189,040	£745,200	£0	£0	£4,752
5	£17,123,040	£1,431,360	£0	£626,880	£9,282,480	£734,160	£0	£0	£5,040
10	£17,478,240	£1,519,200	£0	£472,560	£9,407,040	£763,920	£0	£0	£5,256
15	£17,970,240	£1,652,400	£52,800	£248,160	£9,561,360	£834,000	£42,000	£0	£5,724
20	£18,025,440	£1,692,240	£507,120	£207,360	£9,581,760	£854,400	£411,504	£0	£5,868

Table 9: Detailed financials for impact of demand variability ranges from -20% to 20%

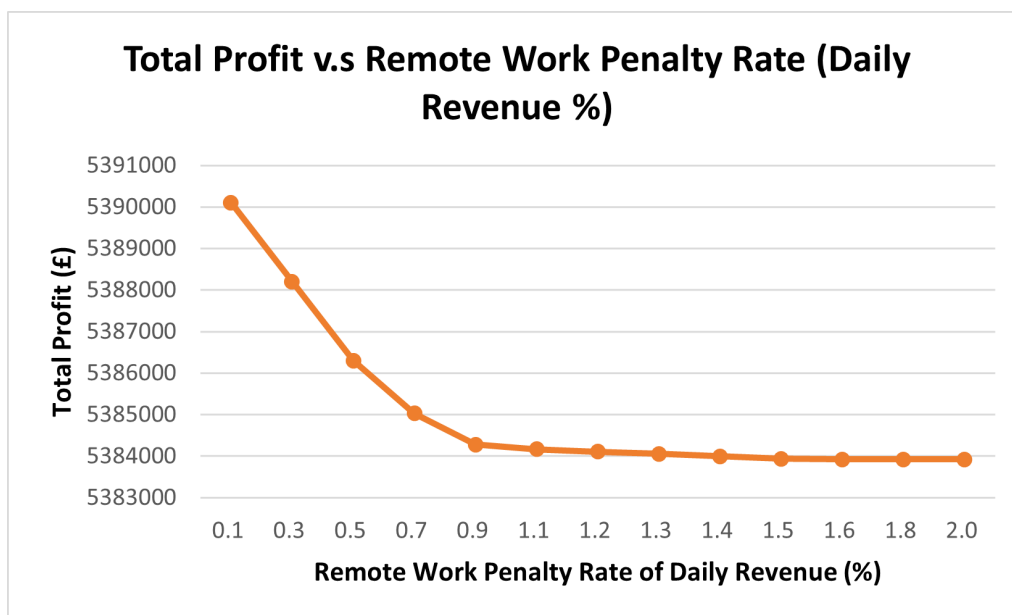


Figure 3: Impact of Remote Work Penalty Rate on Profitability

Remote Penalty Rate(%)	Ireland (No. of Remote Consultants)
0.1	29
0.3	29
0.5	29
0.6	17
0.7	17
0.8	17
0.9	4

Table 10: Number of Remote Consultants Assigned to Ireland under Different Penalty Rates