

Business Analyst Internship – Week 3 Assignment

Case Study: Hospital Appointment Scheduling Optimisation

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1. Problem Summary

A large metropolitan hospital is facing significant inefficiencies in its appointment scheduling system. Due to the manual and fragmented process, the hospital experiences frequent overbooking, no-shows, and idle consultant hours. These challenges have resulted in revenue losses and poor patient satisfaction

- Average waiting time for specialist consultation = 21 days.
- No-show rate = 12% of appointments.
- Average doctor utilisation rate = 68% (target = 85%).
- Patient satisfaction = 72%.
- Annual number of appointments = 500,000.
- Average revenue per appointment = £100.
- Average cost of an unutilised doctor appointment slot = £80.

Annual Quantitative Impact of Current System:

- Lost revenue due to no-shows = $500,000 \times 12\% \times £100 = £6.0\text{m}$.
- Cost of under-utilisation (17% gap from target utilisation) = $500,000 \times 17\% \times £80 = £6.8\text{m}$.
- Total avoidable loss per year = £12.8m.

2. Options Evaluation (with ROI & Savings)

Savings and ROI are calculated against the quantified baseline (£12.8m/yr). Assumptions are conservative and year-1 focused.

Assumptions:

- Option A (Process Optimisation): reduce no-shows 20%; utilisation gap 20%.
- Option B (AI Scheduling Platform): reduce no-shows 40%; utilisation gap 50%.
- Option C (Self-Scheduling App): reduce no-shows 30%; utilisation gap 30%.
- Year-0/1 costs include implementation + training + first-year run.

Savings per year:

- Option A = $(0.20 \times £6.0m) + (0.20 \times £6.8m) = £2.56m$.
- Option B = $(0.40 \times £6.0m) + (0.50 \times £6.8m) = £5.80m$.
- Option C = $(0.30 \times £6.0m) + (0.30 \times £6.8m) = £3.84m$.

Estimated costs: A=£0.15m; B=£0.90m; C=£0.60m.

3-year ROI (approx):

- $A \approx (3 \times 2.56 - 0.15) / 0.15 \approx 50\times$
- $B \approx (3 \times 5.80 - 0.90) / 0.90 \approx 18.3\times$
- $C \approx (3 \times 3.84 - 0.60) / 0.60 \approx 18.2\times$

3. MoSCoW Requirements Table

The MoSCoW prioritization method was applied to categorise requirements into Must, Should, Could, and Won't-have for this release cycle.

Priority	Requirement	Business Value	Notes
Must	AI engine for slot optimisation & overbooking prevention	High	Targets £12.8m loss drivers
Must	Bi-directional EMR/ERP integration	High	Real-time availability & data consistency
Must	SMS/Email reminders & confirmations	High	Primary lever to reduce no-shows
Should	Patient self-service portal/app	Medium	CX & admin load reduction
Should	Utilisation/no-show analytics dashboard	Medium	CX & admin load reduction
Could	Predictive no-show risk scoring	Medium	Targeted reminders & rules
Could	Multilingual chatbot/voice assistant	Low	Accessibility enhancement
Won't	Cross-network scheduling (Phase 2)	Low	Out of initial scope

4. SWOT – Recommended Option (AI Scheduling Platform)

Strengths:

- Largest absolute savings (£5.8m/yr).
- Predictive reminders & dynamic slotting.
- Scalable and dashboard-governed.

Weaknesses:

- Higher upfront cost & integration complexity.
- Requires change management and training.

Opportunities:

- Foundation for capacity forecasting and staffing optimisation.
- Shorter waits improve satisfaction & reputation.

Threats:

- Vendor lock-in; legacy integration risks.
- Data privacy/cybersecurity under NHS/GDPR.

5. Recommendation + Roadmap with KPIs

Recommendation: Implement the AI-Driven Scheduling Platform (Option B) with phased rollout, starting in high-volume outpatients.

Roadmap:

- Phase 1 (0–6 months): Vendor selection; EMR/ERP integration; pilot; training; KPI baseline.
- Phase 2 (6–18 months): Scale hospital-wide; predictive risk scoring; self-service portal.
- Phase 3 (18–36 months): Optimise overbooking rules; expand analytics; evaluate voice/chatbot.

KPIs (12–18 months):

- No-shows: 12% → ≤8%.
- Utilisation: 68% → ≥82%.
- Waiting time: 21 → 14 days.
- Patient satisfaction: 72% → ≥85%.
- Annual savings: ≥ £5m; ROI ≤ 30 months.

6. Conclusion

The AI-Driven Appointment Scheduling Platform offers a transformative solution for hospital operations. By integrating intelligent automation, predictive analytics, and real-time data, it addresses both operational inefficiencies and patient satisfaction challenges. The phased roadmap ensures manageable implementation and sustainable performance improvements.

Through strategic investment and focused execution, the hospital can expect measurable gains in resource utilisation, patient engagement, and financial performance, positioning it as a leader in healthcare innovation.