

Research Proposal

Design and Creative Technologies

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Exploring the Relationship between Net Promoter Score and Revenue Growth in Healthcare Clinics

1. Abstract

This study investigates whether the Net Promoter Score (NPS) is statistically correlated with revenue growth in healthcare clinics. While NPS is widely used as a measure of patient satisfaction and loyalty, limited empirical research validates its direct financial impact in the healthcare context. Adopting a quantitative correlational design within a pragmatic-positivist paradigm, this research will analyze a three-year dataset (2022–2025) from Pro-Corpo Estética, a network of Brazilian clinics. Monthly NPS and revenue data will be examined using descriptive statistics, Pearson correlation, and linear regression to determine the strength and direction of their relationship.

By establishing empirical evidence on how patient experience metrics align with business outcomes, the research will contribute actionable insights for healthcare managers. The project also aligns with Torrens University's "Here for Good" ethos, promoting responsible data-driven innovation that supports both patient care quality and sustainable business performance. Findings will provide healthcare managers with empirical evidence to justify investment in NPS tracking systems or, alternatively, guide the design of more sophisticated AI-enabled sentiment analysis tools tailored to clinical contexts.

2. Introduction

In an era where healthcare organizations face mounting pressure to balance patient-centered care with financial sustainability, analytics play a pivotal role in uncovering hidden relationships between satisfaction metrics and operational outcomes (Press Ganey, 2023). The Net Promoter Score (NPS), a single-question metric gauging customers' likelihood to recommend a service on a 0-10 scale (Reichheld, 2003), has gained traction as a proxy for loyalty. However, in healthcare clinics, the link between NPS and tangible business results like revenue growth remains underexplored, often overshadowed by qualitative patient feedback or anecdotal evidence. This gap hinders evidence-based decision-making, particularly for AI-enabled systems that could automate NPS analysis to predict revenue trends. Understanding this relationship could guide managerial strategies, such as targeted interventions to boost patient retention and referrals, ultimately fostering sustainable growth.

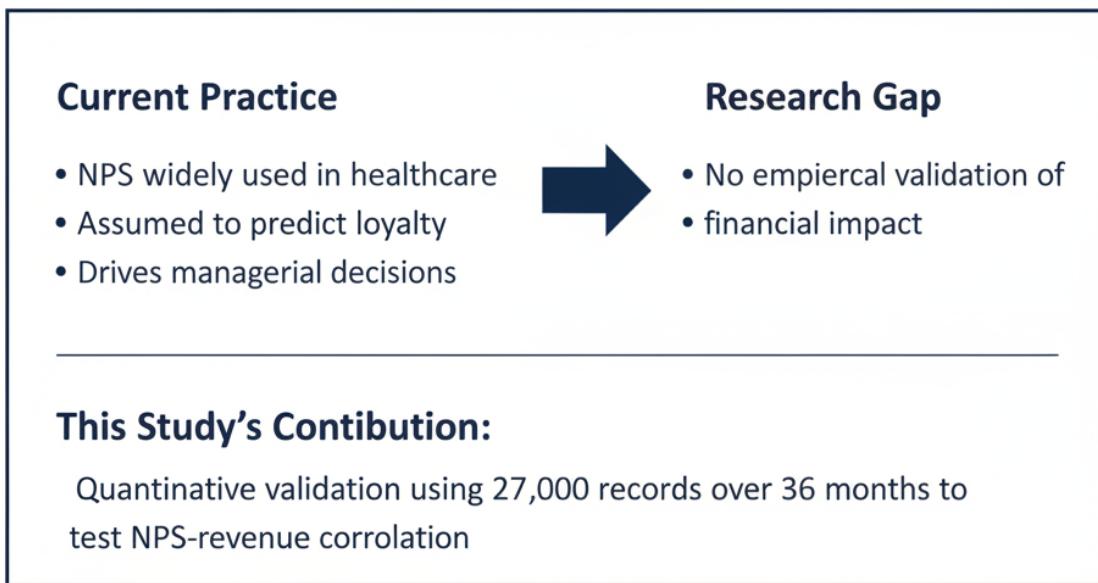


Figure 1 – The gap between NPS adoption and empirical validation in healthcare settings. This study bridges operational metrics with financial performance measurement.

This project proposes an ICT-driven framework leveraging data analytics and business intelligence tools to examine NPS trends against financial performance in clinical settings. The research questions are: (1) To what extent is NPS correlated with revenue growth in healthcare clinics? (2) What is the direction and strength of this relationship? The aim is to investigate the statistical association between NPS and revenue growth, with objectives including developing a correlational ICT model, analyzing historical data, and deriving actionable insights for stakeholders. Hypothesis: H1 – There is a positive and significant correlation between NPS and revenue growth ($r > 0.3$, $p < 0.05$). This aligns with Torrens University's "Here for Good" ethos by promoting ethical, data-informed innovations that enhance patient well-being while supporting equitable and sustainable healthcare practices, ensuring societal benefits through responsible R&D.

3. Literature Review

3.1. Patient Experience as a Business Driver

Across service industries, patient or customer experience has become a measurable business asset. Godovskykh and Pizam (2023) emphasise that in healthcare, experience extends beyond satisfaction—it encompasses emotional safety, empathy, and trust. Positive encounters build loyalty, which in turn drives repeat visits and referrals, translating indirectly into revenue stability. Their work positions experience management as a strategic investment rather than a marketing accessory.

Shankar and Yip (2024) complement this view by demonstrating how natural language processing (NLP) can convert qualitative feedback into operational insights. Using large-

scale patient comments, their model identified themes affecting satisfaction (e.g., waiting time, staff tone) and provided managers with actionable dashboards. However, both studies stop at operational improvement—neither tests whether these experiential gains actually correlate with financial growth.

This missing bridge between experience analytics and business performance motivates the present study. By applying statistical correlation between NPS and revenue, it provides the quantitative validation that connects loyalty outcomes with financial reality—an essential step before building predictive or AI-enhanced models.

3.2. The Net Promoter Score Debate

Since Reichheld (2003) introduced the Net Promoter Score (NPS), it has become a near-universal loyalty metric. Dawes (2024) critiques its simplicity, noting that it measures intention to recommend rather than actual behaviour and may suffer cultural bias—promoters in one region may rate lower in another due to response norms. Nevertheless, NPS persists because executives value its clarity and benchmarking power.

Scholars remain divided. Proponents argue that high NPS correlates with retention and word-of-mouth; detractors caution that context, culture, and income level moderate outcomes. Within healthcare, where emotions and trust dominate, these biases may distort interpretation.

This research aligns with Dawes's call for empirical validation by testing whether NPS predicts objective financial performance in clinics. By doing so, it shifts discussion from

perceptual satisfaction to quantifiable business impact—grounding managerial reliance on NPS in evidence rather than assumption.

3.3. AI-Enabled Sentiment Analysis

The rise of artificial intelligence has expanded how patient feedback can be mined for meaning. Alkhnbashi, Mohammad and Hammoudeh (2024) demonstrate aspect-based sentiment analysis using large language models to classify emotions (e.g., anger, gratitude) within healthcare reviews. Similarly, Xiao et al. (2022) propose fine-grained sentiment pipelines for lean automation, linking textual cues to perceived customer value. Both show that AI can technically extract deep sentiment layers faster and more accurately than manual coding.

Yet a consistent limitation remains: these AI frameworks seldom validate whether sentiment intensity relates to measurable business outcomes. They assume that improved sentiment equals improved performance without testing the link.

The current study addresses that foundational step. By correlating NPS—an existing, structured proxy for sentiment—with revenue, it establishes a quantitative baseline on which future AI models can build. Confirming or refuting the strength of this relationship is essential before scaling predictive algorithms that inform marketing or operational decisions in healthcare.

3.4. Emotions and Customer Engagement

Angelis et al. (2024) examine emotional reactions after data-breach incidents and conclude that anger drives proactive engagement more than fear. While conducted outside healthcare, their findings highlight how discrete emotions shape loyalty and advocacy behaviors. In clinical contexts, patient anger may lead to complaint escalation, whereas satisfaction or relief fosters referral behaviors—the essence of NPS promotion.

Understanding these emotional undercurrents is crucial because healthcare interactions evoke vulnerability and trust dynamics uncommon in retail settings. Future research, including a potential Phase 2 of this project, could integrate textual NPS comments to classify emotions, extending quantitative correlation into emotion-based segmentation. This aligns with ICT R&D principles of iterative experimentation—validating numeric trends before layering affective analytics.

3.5. Identified Knowledge Gap and Research Contribution

Three converging gaps define this study's contribution:

1. **Metric Validation Gap:** NPS is widely adopted in healthcare yet lacks empirical testing as a predictor of clinic-level financial performance (Dawes, 2024).
2. **Healthcare–Business Intelligence Gap:** Studies such as Shankar and Yip (2024) demonstrate operational gains from feedback analytics but do not link sentiment changes to revenue or profitability metrics.

3. ICT Foundation Gap: AI-enabled sentiment systems (Alkhnbashi et al., 2024)

rely on presumed correlations between sentiment and business results that have never been statistically verified.

This research directly addresses these gaps through quantitative correlation analysis between monthly NPS scores and clinic-level revenue across a longitudinal dataset of 27,000 records (2022–2025). Unlike prior work constrained to perception or technology domains, it integrates business performance validation within an ICT research design—where establishing empirical evidence precedes complex system building.

The unique access to Pro-Corpo Estética’s anonymized dataset allows testing these relationships in an emerging-market healthcare context rarely represented in literature. Findings will inform both academic and managerial audiences: scholars gain validated constructs for AI model training, and managers gain confidence in using NPS as a strategic key-performance indicator. Thus, the study situates itself within the broader movement toward ethical, data-driven healthcare innovation aligned with Torrens University’s Here for Good mission.

From a business intelligence perspective, growth-focused organizations increasingly rely on customer feedback as a leading indicator of revenue trends (Chen, 2023). Mar and Armaly (2023) emphasize that proactive customer success monitoring—tracking satisfaction metrics like NPS alongside financial outcomes—enables organizations to identify at-risk revenue streams before churn occurs. While these practitioner-oriented frameworks are influential in shaping managerial practice, they lack empirical validation in healthcare contexts. This study

bridges that gap by testing whether the assumed NPS-revenue relationship holds when subjected to statistical scrutiny using longitudinal clinic data.

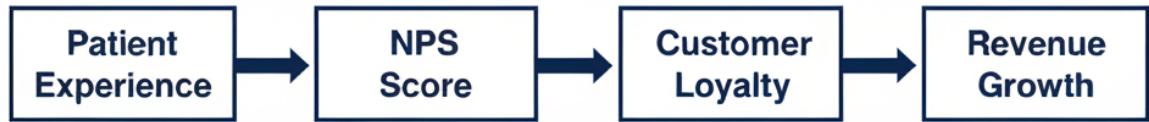


Figure 1 – Conceptual Model of the Relationship Between Patient Experience, NPS, and Revenue Growth

4. Methodology and Methods

4.1. Research Design and Philosophical Orientation

This research adopts a quantitative correlational design under a pragmatic–positivist paradigm (Morgan, 2014). The aim is to test whether Net Promoter Score (NPS) statistically correlates with revenue growth in healthcare clinics. The design focuses on what works to generate actionable knowledge, combining business intelligence with empirical validation.

Quantitative analysis is justified because the research questions are relational rather than exploratory. It allows statistical testing of two hypotheses:

- H₀: No significant correlation exists between NPS and revenue.
- H₁: NPS is positively correlated with revenue.

The pragmatic stance recognizes that understanding this link is essential before introducing advanced AI feedback systems, thus aligning with ICT research-and-development principles of incremental validation (Wohlin & Runeson, 2021).

4.2.Data Sources and Sampling

The study uses secondary data from Pro-Corpo Estética, a healthcare group with multiple clinic branches across Brazil. The dataset contains approximately 27,000 aggregated NPS survey responses collected between 2022–2025. Each record includes:

- Clinic ID / Store name
- Month & Year
- Average NPS score (0–10 scale)
- Monthly revenue (BRL)
- Number of responses per month

Because the population of available data is finite and fully accessible, no sampling technique is required. Instead, the full dataset is analyzed (a population study) to ensure statistical power and eliminate sampling bias (Cohen, 1988).

4.3.Data Preparation

Data cleaning follows best practices in quantitative analytics (Field, 2018):

1. Duplicate removal based on timestamp and clinic ID.
2. Handling missing values:
 - a. Missing NPS → excluded (non-imputable).
 - b. Missing revenue → interpolated only for isolated gaps.
3. Outlier analysis: Revenue outliers >3 SD are flagged and compared against prior months for validation.

4. Transformation:
 - a. NPS aggregated by month per clinic.
 - b. Derived variables: Revenue Growth %, Lagged NPS (t-1, t-2) for temporal testing.
5. Integration: Merged on (clinic_id + month + year) ensuring chronological consistency.

All operations are executed in Python (Pandas, NumPy) with transparent logging for reproducibility.

4.4. Analytical Procedures

To address **RQ1** (“To what extent is NPS correlated with monthly revenue growth?”), **Pearson and Spearman** correlation tests will be applied to quantify strength and direction.

For **RQ2** (“Can NPS trends predict short-term revenue changes?”), **simple linear regression** will assess predictive capacity using lagged variables.

Analysis workflow:

1. Descriptive statistics (mean, median, SD, min, max).
2. Visualization: scatterplots, heatmaps, line trends (Matplotlib/Streamlit).
3. Normality and assumption tests (Shapiro-Wilk, homoscedasticity).
4. Correlation & Regression Analysis.
5. Cross-validation: Run sub-analyses by clinic and year to test stability.

This structured process triangulates statistical robustness through temporal, spatial, and methodological dimensions.

4.5. Ethical Considerations

All data are anonymised and aggregated at the clinic-month level, removing personally identifiable information.

- Informed Institutional Consent: Pro-Corpo authorised academic use through a signed approval letter.
- Legal Compliance: Adheres to the Australian Privacy Act (1988), GDPR, and Brazil's LGPD (Lei Geral de Proteção de Dados).
- Data Storage: Encrypted and accessed only via password-protected drives.
- Researcher Reflexivity: As a former collaborator, I will maintain objectivity by documenting analysis steps and separating personal insights from interpretation.

Ethical reflection shaped the methodology by limiting the study to anonymized, quantitative data—preventing exposure of sensitive health or identity information.

4.6. Reliability, Validity and Limitations

- Reliability: Automated processing (Python scripts) ensures repeatable results.
- Construct Validity: NPS and revenue are directly measurable business metrics representing patient loyalty and financial performance.
- Internal Validity: Although correlation does not imply causation, temporal lags help infer potential directionality.

- External Validity: Findings are generalisable to similar healthcare service models but not beyond service-based industries.
- Limitations:
 - Restricted to one organisation (Pro-Corpo).
 - Omitted qualitative feedback (text) that could contextualise numeric trends.
 - Confounding variables (seasonality, marketing campaigns) may influence outcomes.

Nevertheless, these limitations are mitigated through transparency, full-population analysis, and triangulation across time and location.

4.7. Software Design Flow (ICT Framework Overview)



Figure 2 – Data Analytics Workflow for NPS–Revenue Correlation Study

This ICT pipeline reflects evidence-based system design—a foundational principle of software engineering research (Wohlin et al., 2012).

5. Conclusion

This research proposal outlines a quantitative, correlational investigation into whether the Net Promoter Score (NPS) serves as a reliable predictor of revenue growth in healthcare clinics. Guided by the research questions: (1) To what extent is NPS correlated with clinic-level revenue? and (2) Can NPS trends predict short-term financial performance? – the study employs secondary data from Pro-Corpo Estética, comprising 27,000 monthly observations across multiple branches from 2022 to 2025. A pragmatic–positivist methodology underpins the design, using statistical correlation and regression analysis to test relationships between NPS and revenue over time. This approach provides empirical validation of a widely used managerial metric but also establishes a foundational evidence base for future AI-enhanced patient feedback systems. By linking patient loyalty measures to tangible business outcomes, the study advances both academic understanding and practical decision-making in healthcare service management.



Figure 3 – Prototype Dashboard for NPS and Revenue Monitoring (Concept for Future Work)

6. Proposed Timeline

The proposed study will be conducted over a twelve-week period, reflecting a structured and iterative approach to quantitative research. The timeline follows a logical flow, beginning with conceptual refinement and ethical compliance, moving into data preparation and statistical analysis, and concluding with synthesis, validation, and dissemination. Each phase is intentionally sequenced to ensure the study progresses from theoretical grounding to empirical results while maintaining data integrity and ethical governance.

Phase/Task	Description
1 - Literature Refinement & Problem Definition	Consolidate prior studies on NPS, revenue correlation, and patient-experience metrics. Confirm research gap & finalise RQs.
2 - Data Acquisition & Ethics Clearance	Obtain signed consent letter from Pro-Corpo; verify anonymisation and data-use boundaries.
3 - Data Cleaning & Preparation	Remove duplicates, handle missing values, compute monthly averages, merge NPS + revenue tables.
4 - Descriptive & Correlation Analysis	Run Pearson / Spearman tests, generate scatterplots, and check temporal lags.
5 - Regression Modelling & Validation	Build regression model, test assumptions, interpret coefficients, cross-validate by clinic/year.
6 - Results Interpretation & Draft Writing	Integrate findings with theoretical implications; draft report chapters and visualizations.
7 - Final Editing & Presentation Prep	Review structure, apply feedback, edit references (APA 7th), design slides, rehearse presentation.

This schedule ensures that analytical tasks are interleaved with reflection and validation, minimizing risks of data misinterpretation and ensuring that findings are actionable and reproducible. By Week 12, both the written report and the presentation materials will be complete, demonstrating a clear, ethical, and technically sound workflow from research conception to dissemination.

TODO

Figure 4 – 12-Week Project Timeline (Gantt Chart)

7. Appendices

7.1.Appendix A – Company Consent Letter

Signed authorization from Pro-Corpo Estética granting permission to use anonymized data for academic purposes.

7.2.Appendix B – Data Preparation Code Excerpt

Snippet of Python workflow showing cleaning and correlation analysis.

TODO

Figure 5 – Python Code Excerpt for Data Cleaning and Correlation Analysis

7.3.Appendix C – Ethics Statement

Compliance declaration aligned with Torrens University and data governance frameworks.

End of Appendix Section

Statement of Acknowledgment

I acknowledge that I have used the following AI tool(s) in the creation of this report:

- OpenAI ChatGPT (GPT-5): Used to assist with outlining, refining structure, improving clarity of academic language, and supporting APA 7th referencing conventions.

I confirm that the use of the AI tool has been in accordance with the Torrens University Australia Academic Integrity Policy and TUA, Think and MDS's Position Paper on the Use of AI. I confirm that the final output is authored by me and represents my own critical thinking, analysis, and synthesis of sources. I take full responsibility for the final content of this report.

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