

Critical Literature Review

Design and Creative Technologies

Torrens University, Australia

Student: Luis Guilherme de Barros Andrade Faria - A00187785

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Lecturer: Dr. Bushra Naeem

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Table of Contents

1. Introduction	3
2. Research Questions, Aim and Objectives.....	3
2.1. Understanding Emotions in Customer Engagement	Error! Bookmark not defined.
2.2. From Polarity to Fine-Grained Sentiment	Error! Bookmark not defined.
2.3. Patient Experience and Operational Insights	Error! Bookmark not defined.
2.4. Re-evaluating the Net Promoter Score	Error! Bookmark not defined.
2.5. AI Frameworks, Ethics, and Decision Support	Error! Bookmark not defined.
2.6. From Customer Success to Business Growth	Error! Bookmark not defined.
3. Comparative Analysis of Research Methodologies	4
3.1. Research Questions	5
4. Proposed Methodology and Research Methods.....	6
5. Rationale for Method Choice.....	7
6. Ethical Considerations	8
7. Data Analysis Strategies and Tools	8
8. Limitations and Delimitations.....	9
9. Conclusion.....	10
10. References	12

AI Insights from Customer Feedback: Correlating Sentiment Analysis with Business Performance in Healthcare Clinics

1. Introduction

Artificial intelligence (AI) and natural language processing (NLP) now make it possible to analyse unstructured customer feedback at scale, enabling organisations to translate raw opinions into actionable business intelligence. In the healthcare sector, however, the bridge between patient sentiment and measurable business outcomes such as revenue, retention, or referrals remains under-explored.

This project proposes an ICT-driven research framework that leverages fine-grained sentiment analysis and business-intelligence methods to examine whether emotional patterns in patient feedback can predict financial performance in clinical environments. The study builds directly on the literature gaps identified in Assessment 1 and adopts a mixed-methods design to ensure both computational accuracy and contextual validity.

2. Research Questions, Aim and Objectives

Aim: To investigate the predictive relationship between AI-derived sentiment metrics and business KPIs in healthcare clinics.

Research Questions:

- RQ1: To what extent can AI-driven sentiment analysis predict revenue in healthcare clinics?
- RQ2: Can fine-grained emotion classification (anger, fear, satisfaction) be reliably automated from unstructured patient feedback using NLP techniques?
- RQ3: How does aspect-based sentiment analysis compare to traditional NPS as a predictor of clinic-level financial outcomes?

Objectives:

- Develop an NLP pipeline to quantify sentiment and emotion from patient-feedback text.
- Correlate sentiment and emotional intensity with monthly revenue and NPS scores.
- Validate AI outputs through qualitative review and ethical assessment.
- Recommend an ICT framework linking AI insights to healthcare management decisions.

3. Comparative Analysis of Research Methodologies

Methodology	Description	Strenghts	Weakness	Suitability
Qualitative	Explores human meaning through interviews or thematic coding	Rich context and interpretive depth.	Limited generalizability; prone to researcher bias.	Useful to verify how patients express emotions and

				validate UI outputs.
Quantitative	Employs numerical measurement, hypothesis testing, statistical inference.	Objectivity, replicability, scalability.	May overlook linguistic nuance or cultural tone.	Ideal for correlating sentiment scores with revenue (KPIs)
Mixed Methods	Integrate both qualitative and quantitative strands.	Triangulation improves validity; merges AI outputs with human interpretation.	Requires time and data integration skills.	Best suited to AI research involving both algorithms and human review.

Given that this study seeks measurable relationships between NLP-generated sentiment data (quantitative) and their contextual interpretation (qualitative), a pragmatic mixed-methods approach provides the most appropriate balance of rigor and flexibility. This approach aligns with ICT R&D practice, where prototype systems are iteratively tested and validated through empirical evidence.

3.1. Research Questions

Based on the identified gaps, this research proposes to investigate:

- **RQ1:** To what extent can AI-driven sentiment analysis predict revenue in healthcare clinics?
- **RQ2:** Can fine-grained emotion classification (anger, fear, satisfaction) be reliably automated from unstructured patient feedback using NLP techniques?
- **RQ3:** How does aspect-based sentiment analysis compare to traditional NPS as a predictor of clinic-level financial outcomes?

4. Proposed Methodology and Research Methods

4.1.Design Paradigm

Emotions play a pivotal role in shaping customer engagement following negative experiences. Angelis et al. (2024) show that anger can energize corrective engagement, whereas fear leads to disengagement. This is particularly relevant in healthcare, where anger about waiting times may

4.2.Data Collection

Emotions play a pivotal role in shaping customer engagement following negative experiences. Angelis et al. (2024) show that anger can energize corrective engagement, whereas fear leads to disengagement. This is particularly relevant in healthcare, where anger about waiting times may

4.3. Data Processing Timeline

Emotions play a pivotal role in shaping customer engagement following negative experiences. Angelis et al. (2024) show that anger can energize corrective engagement, whereas

fear leads to disengagement. This is particularly relevant in healthcare, where anger about waiting times may

4.4. Quantitative Analysis

Emotions play a pivotal role in shaping customer engagement following negative experiences. Angelis et al. (2024) show that anger can energize corrective engagement, whereas fear leads to disengagement. This is particularly relevant in healthcare, where anger about waiting times may

4.5. Qualitative Validation

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Recent literature on AI-driven sentiment analysis highlights a convergence between emotional theory, computational methods, and managerial decision-making in healthcare. The discussion below integrates insights from multiple domains - ranging from emotion modeling to business intelligence - to show how research has evolved and where key gaps remain.

5. Rationale for Method Choice

This review shows that AI-driven sentiment analysis offers strong technical potential but has yet to bridge the gap between patient experience and business performance in healthcare clinics. Current research demonstrates advances in emotion theory, fine-grained sentiment modeling, and action research for operational improvements, yet consistently fails to correlate sentiment with

revenue or retention outcomes. NPS, while convenient, is insufficient as a standalone metric. AI frameworks from education provide conceptual guidance, but their application in healthcare requires adaptation to protect patient data and ensure transparency. This positions AI-driven sentiment analysis as an ICT innovation pathway, aligning technical progress in NLP with the dual goals of improving patient outcomes and enabling sustainable business growth in healthcare clinics.

6. Ethical Considerations

This review shows that AI-driven sentiment analysis offers strong technical potential but has yet to bridge the gap between patient experience and business performance in healthcare clinics. Current research demonstrates advances in emotion theory, fine-grained sentiment modeling, and action research for operational improvements, yet consistently fails to correlate sentiment with revenue or retention outcomes. NPS, while convenient, is insufficient as a standalone metric. AI frameworks from education provide conceptual guidance, but their application in healthcare requires adaptation to protect patient data and ensure transparency. This positions AI-driven sentiment analysis as an ICT innovation pathway, aligning technical progress in NLP with the dual goals of improving patient outcomes and enabling sustainable business growth in healthcare clinics.

7. Data Analysis Strategies and Tools

Purpose	Tool / Technique	Outputs
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Qualitative	Explores human meaning through interviews or thematic coding	Rich context and interpretive depth.
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8. Limitations and Delimitations

This review shows that AI-driven sentiment analysis offers strong technical potential but has yet to bridge the gap between patient experience and business performance in healthcare clinics. Current research demonstrates advances in emotion theory, fine-grained sentiment modeling, and action research for operational improvements, yet consistently fails to correlate sentiment with revenue or retention outcomes. NPS, while convenient, is insufficient as a standalone metric. AI frameworks from education provide conceptual guidance, but their application in healthcare requires adaptation to protect patient data and ensure transparency. This positions AI-driven sentiment analysis as an ICT innovation pathway, aligning technical progress in NLP with the

dual goals of improving patient outcomes and enabling sustainable business growth in healthcare clinics.

9. Conclusion

This review shows that AI-driven sentiment analysis offers strong technical potential but has yet to bridge the gap between patient experience and business performance in healthcare clinics. Current research demonstrates advances in emotion theory, fine-grained sentiment modeling, and action research for operational improvements, yet consistently fails to correlate sentiment with revenue or retention outcomes. NPS, while convenient, is insufficient as a standalone metric. AI frameworks from education provide conceptual guidance, but their application in healthcare requires adaptation to protect patient data and ensure transparency. This positions AI-driven sentiment analysis as an ICT innovation pathway, aligning technical progress in NLP with the dual goals of improving patient outcomes and enabling sustainable business growth in healthcare clinics.

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 with 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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