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DISSERTATION

“Technology-Enabled Service Innovation and Relationship Marketing in
Healthcare Equipment Provision: An Empirical Study in the Greek
Healthcare Context”

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Patras, June, 2026

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**“Technology-Enabled Service Innovation and Relationship
Marketing in Healthcare Equipment Provision: An Empirical Study
in the Greek Healthcare Context”**

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“I wish to express my heartfelt thanks to my supervisor, Dr. George Spais, for his exceptional guidance and steadfast support throughout this research. His professionalism, constant encouragement, and rigorous, constructive feedback greatly strengthened this dissertation, and I am truly grateful for his invaluable supervision.”

Abstract

With customer engagement as the primary mechanism, this dissertation uses Service-Dominant Logic, Social Exchange Theory, and Moral Foundations Theory to explain how customer orientation and relationship marketing orientation affect patient satisfaction and customer value co-creation behavior in healthcare equipment provision. The study adopts a deductive, quantitative design and uses an online SAQ questionnaire (14 questions across 9 sections) administered to a convenience sample of 459 adult patients in Greece who had used medical equipment in a hospital, clinic, or diagnostic center within the prior 6 months. Confirmatory factor analysis using the DWLS estimator supports the measurement model, with reliability ranging from satisfactory to excellent. Customer engagement is retained as a composite score for hypothesis testing because the full latent specification is unstable. Spearman's rho is used to test direct hypotheses, bootstrapped mediation (5,000 resamples) is used to evaluate indirect effects, and interaction-based regression models are used to investigate moderation. Results support the direct links among customer orientation and technology-enabled service innovation, relationship marketing orientation and engagement, engagement and both outcomes, and service innovation and satisfaction. Customer engagement partially mediates the effects of relationship marketing orientation on value co-creation and satisfaction, and of service innovation on satisfaction; moral reasoning does not significantly moderate the relational effects. The study contributes by validating an integrated model in Greek healthcare and by outlining theoretical, research, and practical implications for Services and Healthcare Marketing, highlighting engagement's bridging role and offering guidance on investing in integrable innovations and trust-based engagement practices to enhance satisfaction and co-creation outcomes.

Keywords

Service-Dominant Logic, Social Exchange Theory, Moral Foundations Theory, technology-enabled service innovation, relationship marketing orientation, customer engagement, patient satisfaction, value co-creation, moral reasoning, Greek healthcare

ΔΙΠΛΩΜΑΤΙΚΗ ΕΡΓΑΣΙΑ

«Καινοτομία Υπηρεσιών με Τεχνολογική Υποστήριξη και Μάρκετινγκ Σχέσεων στην Παροχή Ιατροτεχνολογικού Εξοπλισμού: Μια Εμπειρική Μελέτη στο Πλαίσιο της Ελληνικής Υγειονομικής Περίθαλψης»

Μάριος Μιχαήλ

Περίληψη

Με την εμπλοκή των πελατών ως τον κύριο μηχανισμό, η παρούσα διατριβή χρησιμοποιεί την Υπηρεσιοκεντρική Λογική, τη Θεωρία Κοινωνικής Ανταλλαγής και τη Θεωρία Ηθικών Θεμελίων για να εξηγήσει πώς ο προσανατολισμός στον πελάτη και ο προσανατολισμός στο μάρκετινγκ σχέσεων επηρεάζουν την ικανοποίηση των ασθενών και τη συμπεριφορά συνδημιουργίας αξίας για τους πελάτες στην παροχή ιατροτεχνολογικού εξοπλισμού. Η μελέτη υιοθετεί έναν επαγωγικό, ποσοτικό σχεδιασμό και χρησιμοποιεί ένα διαδικτυακό, αυτοσυμπληρούμενο ερωτηματολόγιο (14 ερωτήσεις σε 9 ενότητες) που χορηγήθηκε σε ένα ικανοποιητικό δείγμα 459 ενήλικων ασθενών στην Ελλάδα που είχαν χρησιμοποιήσει ιατροτεχνολογικό εξοπλισμό σε νοσοκομείο, κλινική ή διαγνωστικό κέντρο τους προηγούμενους 6 μήνες. Η επιβεβαιωτική παραγοντική ανάλυση χρησιμοποιώντας τον εκτιμητή DWLS υποστηρίζει το μοντέλο μέτρησης, με αξιοπιστία που κυμαίνεται από ικανοποιητική έως εξαιρετική. Η δέσμευση πελατών διατηρήθηκε ως σύνθετος δείκτης για τον έλεγχο των υποθέσεων, καθώς η πλήρης λανθάνουσα προδιαγραφή του μοντέλου παρουσίαζε αστάθεια. Ο συντελεστής συσχέτισης rho του Spearman χρησιμοποιήθηκε για τον έλεγχο των άμεσων υποθέσεων, η ανάλυση διαμεσολάβησης με τη μέθοδο bootstrap (5.000 επαναδειγματοληψίες) χρησιμοποιήθηκε για την αξιολόγηση των έμμεσων επιδράσεων, ενώ μοντέλα παλινδρόμησης βασισμένα σε όρους αλληλεπίδρασης χρησιμοποιήθηκαν για τη διερεύνηση της τροποποιητικής επίδρασης. Τα αποτελέσματα υποστηρίζουν τις άμεσες σχέσεις μεταξύ του προσανατολισμού στον πελάτη και της τεχνολογικά υποστηριζόμενης καινοτομίας υπηρεσιών, μεταξύ του προσανατολισμού μάρκετινγκ σχέσεων και της δέσμευσης, μεταξύ της δέσμευσης και των δύο εκβάσεων, καθώς και μεταξύ της καινοτομίας υπηρεσιών και της ικανοποίησης. Η δέσμευση πελατών διαμεσολαβεί μερικώς στις επιδράσεις του προσανατολισμού μάρκετινγκ σχέσεων στη συνδημιουργία αξίας και στην ικανοποίηση, καθώς και στις επιδράσεις της καινοτομίας υπηρεσιών στην ικανοποίηση· αντίθετα, η ηθική συλλογιστική δεν φαίνεται να τροποποιεί σημαντικά τις σχεσιακές επιδράσεις. Η μελέτη συμβάλλει επικυρώνοντας ένα ολοκληρωμένο μοντέλο στην ελληνική υγειονομική περίθαλψη και περιγράφει θεωρητικές, ερευνητικές και πρακτικές επιπτώσεις για τις Υπηρεσίες και το Μάρκετινγκ Υγειονομικής Περίθαλψης, επισημαίνοντας τον γεφυρωτικό ρόλο της εμπλοκής και προσφέροντας καθοδήγηση σχετικά με την επένδυση σε ενσωματώσιμες καινοτομίες και πρακτικές

εμπλοκής που βασίζονται στην εμπιστοσύνη για την ενίσχυση της ικανοποίησης και των αποτελεσμάτων συνδημιουργίας.

Λέξεις – Κλειδιά

Υπηρεσιοκεντρική Λογική , Θεωρία της Κοινωνικής Ανταλλαγής, Θεωρία των Ηθικών Θεμελίων, τεχνολογικά υποστηριζόμενη καινοτομία υπηρεσιών, προσανατολισμός στο μάρκετινγκ σχέσεων, εμπλοκή πελατών, ικανοποίηση ασθενών, συν-δημιουργία αξίας, ηθική συλλογιστική, Ελληνικό σύστημα υγείας

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List of Abbreviations & Acronyms

AI:	Artificial Intelligence
ANOVA:	Analysis of Variance
CE:	Customer Engagement
CFA:	Confirmatory Factor Analysis
CFI:	Comparative Fit Index
CO:	Customer Orientation
CVCB:	Customer Value Co-Creation Behavior
DWLS:	Diagonally Weighted Least Squares
ESY:	National Health System – Ethniko Systima Ygeias
EU:	European Union
EUDAMED:	European Database on Medical Devices
HER:	Electronic Health Records
IFI:	Bollen Incremental Fit Index
JASP:	Jeffreys's Amazing Statistics Program
MDR:	Medical Device Regulation
MFT:	Moral Foundation Theory
MR:	Moral Reasoning
NNFI:	Bentler-Bonett Non-normed Fit Index
OECD:	Organisation for Economic Co-operation and Development
OOP:	Out of Pocket
PCB:	Patient Citizenship Behavior
PCC:	Patient-centered Care
PMCF:	Post-Market Clinical Follow-up
PS:	Patient Satisfaction
RMO:	Relationship Marketing Orientation
RMSEA:	Root Mean Square Error of Approximation
RNI:	Relative Noncentrality Index
SAQ:	Self-administered Questionnaire
SD:	Self-administered Questionnaire
SDL:	Service-Dominant Logic

SET:	Social Exchange Theory
SI:	Service Innovation
SRMR:	Standardized Root Mean Square Residual
TESI:	Technology-Enabled Service Innovation
TLI:	Tucker-Lewis Index
UDI:	Unique Device Identifier
WHO:	World Health Organization

Chapter 1 – Introduction

1.1 Research aim and research problem

Despite improvements in digital solutions and medical equipment, it remains difficult to establish a direct link between service innovation and patient satisfaction (Yeboah & Amponsah, 2025). Customer orientation promotes service innovation but has no discernible impact on patient satisfaction (Joensuu-Salo et al., 2021). Along with raising important issues regarding how patients' perceptions of their outcomes are affected by technological advancements (e.g., Endalamaw et al., 2025), it questions the notion that better experiences are a direct consequence of technological improvements (e.g., Aytekin et al., 2025).

It is still unclear how Relationship Marketing Orientation (RMO) and Technology-Enabled Service Innovation (TESI) affect Value Co-Creation (CVCB) and Patient Satisfaction (PS) in the medical equipment sector (e.g., Marín García et al., 2025), particularly in the context of Greek healthcare. ESI may have a negligible or non-significant effect on PS, despite prior research showing a positive correlation between CO and TESI. On the other hand, moral reasoning moderates the strong influence of RMO on CVCB. These factors have not been combined, though, to elucidate how they affect behavioral (CVCB) and attitudinal (PS) outcomes in the supply of medical equipment. Particularly in Greece, where ethical issues and the caliber of relationships may be vital, there is still a lack of clarity regarding how investments in technology and patient relationships lead to meaningful patient outcomes.

To theoretically and empirically examine how Customer Orientation (CO) and Relationship Marketing Orientation (RMO) in medical equipment companies influence Patient Satisfaction (PS) and Customer Value Co-Creation Behavior (CVCB) through the mediating mechanisms of Technology-Enabled Service Innovation (TESI) and Customer

Engagement (CE), by sequentially integrating Service-Dominant Logic (SDL) and Social Exchange Theory (SET), while accounting for the moderating effect of patients' Moral Reasoning (MR) in a convenience sample of hospital patients in Greece. Our research intention is to examine and validate an integrated model (based on CFA) that connects customer-oriented equipment provision practices, technology-enabled service innovations, relationship marketing strategies, patient engagement, and behavioral outcomes (satisfaction and co-creation behaviors) within the Greek healthcare context.

1.2 Research objectives and initial assumptions

The research objectives of this dissertation have been determined based on critical works by Arefin et al. (2025) and Yeboah and Amponsah (2025).

First, we investigate the impact and the nature (strength and direction) between Customer Orientation and Technology-Enabled Service Innovation in Greek medical equipment provision as perceived by hospital patients.

Second, we investigate the impact and the nature (strength and direction) among Relationship Marketing Orientation and Customer Engagement, Customer Engagement and Customer Value Co-Creation Behavior, and Customer Engagement and Patient Satisfaction in Greek healthcare settings.

Third, we investigate the mediating effect of Customer Engagement in the relationships between Relationship Marketing Orientation and both Customer Value Co-Creation Behavior and Patient Satisfaction, as well as between Technology-Enabled Service Innovation and Patient Satisfaction.

Fourth, we investigate the moderating role of Moral Reasoning on the relationships between Relationship Marketing Orientation and both Customer Value Co-Creation Behavior and Patient Satisfaction.

Below, we state some initial assumptions of the study to test the truth in the reasoning domain and ensure that the initial assumptions allow the arguments to take root and guide our study.

1. Customer Engagement is key to transforming technological and relational resources into patient outcomes. Technology-Enabled Service Innovation and Relationship Marketing Orientation provide value, but engagement is crucial. Without patients' cognitive, emotional, and behavioral participation, advanced tools and relationship-building will not achieve satisfaction or co-creation.

2. Technology-Enabled Service Innovation will show weak or non-significant direct effects on Patient Satisfaction, despite Customer Orientation strongly driving innovation. Deploying modern equipment does not automatically satisfy patients; technological value materializes primarily through engagement (TESI→CE→PS) rather than direct exposure.

3. The Relationship Marketing Orientation pathway (RMO→CE→CVCB/PS) operates robustly, even when innovation effects are weak. Patients with higher Moral Reasoning are more sensitive to ethical signals in relationship marketing—trust, fairness, transparency—and respond with stronger engagement, co-creation, and satisfaction when perceiving value congruence.

1.3 Research approach

Using a deductive research methodology, the dissertation study moves from established theory to empirical validation. It incorporates Social Exchange Theory (SET), Moral Foundation Theory (MFT), and Service-Dominant Logic (SDL) into a conceptual model.

Using Confirmatory Factor Analysis and validated measurement scales, the study tests whether theoretically derived relationships hold in the Greek medical equipment context.

SDL outlines the innovation pathway, emphasizing how technological resources create value through patient engagement. SET describes the relational pathway, where relationship marketing fosters engagement through reciprocity. MFT highlights that moral reasoning moderates the effects of relationship marketing. This integration shows the indirect impact of innovation on satisfaction through engagement mechanisms.

With an emphasis on diagnostic imaging, cardiology, oncology, and orthopedics, we use a quantitative survey design with structured questionnaires to target adult patients (18+) from Greek public and private hospitals. Within the previous six months, participants must have used medical equipment. Validated scales from Arefin et al. (2025) and Yeboah and Amponsah (2025) will be adapted and culturally validated in Greek for constructs including Customer Orientation, Technology-Enabled Service Innovation, and others. Confirmatory Factor Analysis (CFA) will validate the measurement model to test direct effects, Customer Engagement mediation, and Moral Reasoning moderation.

1.4 Importance of the topic, expected contributions and justification for the focus of the study

Even as healthcare providers embrace digital solutions and cutting-edge medical equipment, it is still difficult to establish a strong correlation between service innovation and patient satisfaction. Customer orientation has a positive impact on service innovation, but it does not considerably increase patient satisfaction, according to recent data. This raises questions about how technology-enabled innovation improves patients' perceived outcomes, challenging the belief that better experiences directly arise from technological advancements.

Research indicates that Relationship Marketing Orientation (RMO) enhances Customer Value Co-Creation Behavior (CVCB) by increasing Customer Engagement (CE). Moral Reasoning moderates the RMO-CVCB relationship, with customer engagement serving as a mediator, emphasizing ethical considerations over service innovation. However, there is a lack of models connecting the innovation pathway (Customer Orientation → Technology-Enabled Service Innovation → Patient Satisfaction) and the relational pathway (RMO → CE → CVCB) to explain satisfaction and behavior in the Greek healthcare context. Grounded in Arefin et al. (2025) and Yeboah and Amponsah (2025), three specific knowledge gaps arise:

The Theoretical Transfer Gap investigates whether patient satisfaction in technology-driven medical equipment contexts can be explained by combining Service-Dominant Logic and Social Exchange Theory, both previously validated in hospital settings. It examines whether customer orientation and technology-enabled service innovation logic can fit in the same framework. Unique aspects of the medical equipment industry include high capital expenditure, patient dependence on equipment, staff proficiency, and direct interaction during procedures. In larger service contexts, such as Greece's mixed public-private healthcare system, where post-crisis modernization and cultural expectations of warmth in healthcare relationships require empirical validation, these dynamics might differ.

The Mediation Mechanism Gap shows that service innovation often does not strongly connect to patient satisfaction, despite customer orientation enhancing innovation. If technology-enabled services do not improve satisfaction, can customer engagement make a difference? Patient satisfaction has a weak correlation with service innovation, but it is strongly correlated with relationship management, customer engagement, and co-creation.

Determining whether engagement raises the value of innovation is crucial in Greek healthcare, where investment prioritization is crucial.

The Boundary Conditions Gap explores how individual patient characteristics, particularly Moral Reasoning capacity, an ethical lens for evaluating care, fairness, and social responsibility, impact the effects of relationship marketing on co-creation and satisfaction. Patients are increasingly evaluating medical equipment suppliers and healthcare facilities based on ethical standards like social responsibility and transparency. However, little is known about how patients' moral Reasoning affects their responses to customer-centered procedures and technology in Greek healthcare. In these settings, the care experience is closely linked to medical equipment, with cultural values emphasizing patient welfare, justice, and trust.

The interaction between technology-enabled service innovation and relationship marketing orientation in producing patient satisfaction and value co-creation is underexplored, particularly in the Greek healthcare sector. Although earlier studies indicate that technology-enabled service innovation has a beneficial effect, its impact on patient satisfaction may be minimal. Although moral Reasoning moderates the significant impact of relationship marketing orientation on value co-creation, these components have not been combined into a coherent model. This lack of integration limits our understanding of how significant patient outcomes can be achieved through investments in technology, relationship-building, and patient engagement, particularly in Greek culture, where ethical considerations may be critical.

This study integrates two theoretical trajectories: (a) the innovation stream with debated direct effects of technology-enabled service innovation but theorized indirect effects through engagement; and (b) the relationship stream supported and moderated by moral reasoning. By positioning Customer Engagement as a key driver of value creation

and satisfaction, the research extends Service-Dominant Logic by showing how engagement enhances resource integration in technology-mediated care. It also supports Social Exchange Theory by suggesting that weak innovation-satisfaction links can be compensated by reciprocity mechanisms that boost engagement and co-creation. Additionally, Moral Foundation Theory is introduced as a boundary condition, adding ethical perspectives to technology adoption and healthcare marketing. The study develops the Patient Citizenship Behavior construct and tests relational marketing frameworks in a technology-intensive service environment, ideally within Greece's mixed public-private healthcare system.

Our study focuses on developing and validating measurement instruments tailored to the medical equipment context for the Greek patient population. We will include Greek-language scales for Customer Orientation, Technology-Enabled Service Innovation, Relationship Marketing Orientation, Customer Engagement, Patient Satisfaction, Customer Value Co-Creation Behavior, and Moral Reasoning. The model will be tested using Confirmatory Factor Analysis (CFA), which uses validated scales with known factor structures. The objectives of this project are to provide unique empirical data on international healthcare marketing, develop validated Greek-language instruments for healthcare service research, and provide a baseline for cross-national comparisons in healthcare technology marketing.

The results offer guidelines for medical equipment companies and Greek healthcare facilities on improving patient outcomes and participation. The work clarifies for providers whether advanced technology alone is enough, or if relationship-building, focusing on personal communication, trust, empathy, and responsiveness, must also be part of their strategy to enhance patient satisfaction and engagement. For Greek hospital administrators, the findings help inform procurement decisions by identifying whether technical innovation

or relationship orientation more strongly predicts patient satisfaction and co-creation in healthcare contexts.

The dissertation offers valuable advice to businesses in the Greek medical equipment market on balancing investments in technology development with culturally appropriate relationship marketing campaigns that align with the relational expectations and ethical orientations of Greek patients.

Considering low patient satisfaction rates, examining relationship marketing and technology in Greece's medical equipment sector underscores the need to enhance patient engagement and service quality to improve healthcare outcomes. Imaging systems and monitoring devices are examples of visible medical equipment that are essential to improving patient experience.

We aim to enhance understanding of patient experiences with medical equipment in Greece. In the wake of the healthcare crisis, modernization has emphasized technology to improve service quality and efficiency despite limited resources (Brindley et al. 2024). The mixed public-private healthcare system requires targeted marketing as patients evaluate providers in the National Health System (ESY) and private services (Sharma et al., 2025; Abu-Hasheesh, 2024). For educated urban populations, perceptions are shaped by cultural norms, trust, technology awareness, and infrastructure challenges (Liang, 2025; Zhang et al., 2025).

Recent policy shifts in Greece toward patient-centered care highlight the importance of aligning relationship strategies, technology, and service design with cultural values (e.g., Dunne et al., 2025; Furmenti et al., 2025). Collectivist principles emphasize trust, moral behavior, and family involvement. This study offers insights for Greek healthcare administrators, policymakers, and medical equipment suppliers to adapt to the unique dynamics of the healthcare environment.

1.5 Structure of the dissertation

The dissertation is organized into eight distinct chapters.

The first chapter describes the dissertation's aim, sets the research objectives and approach, and considers the specific topic's importance.

The second chapter presents the definitions of the dissertations' main concepts, such as: value co-creation, resource integration, reciprocity and social exchange principles, patient citizenship behavior and patient centered care philosophy, leading to the development of the proposed conceptual model and research hypotheses.

The third chapter presents a situation analysis, describing the current state of the Greek healthcare system, the role of medical equipment providers, and the contextual conditions that motivate this research.

The fourth chapter presents the theoretical framework, flow theory, the hypotheses and assumptions, the research model, the research hypothesis, and the literature support organized around each research hypothesis.

The fifth chapter describes the research methodology, which includes the study's approach and motive, the research method, the sample, strategy, process, and data collection, and the research itself.

The sixth chapter of the dissertation presents the research results, including descriptive statistics, reliability analysis, and frequencies, questionnaire interpretation, confirmatory factor analysis, hypothesis testing, correlation and regression analyses, mediation and moderation analysis, and a summary of the research results with the support of the research hypotheses.

The seventh chapter discusses the research results compared to previous similar studies and provides deeper insights into the literature suggesting theoretical and practical implications and future research directions.

The eighth and last chapter concludes and presents the conclusions organized around each research objective and a concise discussion summary.

Chapter 2 - Definition of the concepts

In this chapter, we define and clarify the fundamental concepts that underpin this dissertation. These concepts are essential for understanding the subsequent analysis and discussion. Specifically, we address the following five sections: value co-creation, resource integration, the principles of reciprocity and social exchange, patient citizenship behavior, and the philosophy of patient-centered care.

2.1 Value co-creation

Value co-creation is essential in modern service innovation, particularly in technology-enabled healthcare. It involves collaboration among stakeholders—patients, healthcare providers, organizations, and technologies—to integrate resources and share knowledge for joint service outcomes. This approach marks a shift from traditional provider-centric models to one where patients and other actors actively participate in designing, delivering, and improving services (e.g., Tang et al., 2025; Hasan et al., 2024).

Digital transformation enhances collaboration through technologies such as telemedicine, AI tools, mobile health, and remote monitoring systems, enabling resource integration and real-time information sharing for better decision-making. This technological foundation helps dismantle traditional organizational boundaries, enabling more flexible, more patient-centered service delivery (e.g., Tang et al., 2025; Hasan et al., 2024). For example, co-designed digital health tools and targeted AI interventions have demonstrated efficacy in personalizing care, improving patient engagement, and ultimately enhancing overall patient outcomes (e.g., Song et al., 2025).

The success of value co-creation relies on relationship marketing principles that emphasize trust, open communication, and long-term engagement between providers and patients. Strong relationships are crucial, as trust enhances the effects of technology and service customization on value outcomes. Active patient participation, driven by high self-efficacy and strong engagement, is a crucial prerequisite for success, alongside systemic organizational efforts to promote shared decision-making and genuine collaboration (e.g., Tang et al., 2025).

Given its complexity, value co-creation must be viewed from a systemic, multilevel perspective, encompassing interactions at the individual, organizational, and ecosystem levels. Integrated care models depend on coordination and shared governance across professionals and institutions, where power dynamics and aligned values are crucial for the success of co-creation efforts. (e.g., Marsilio & Mastrodascio, 2025).

2.2 Resource Integration

Resource integration in tech-enabled healthcare involves collaboration among providers, tech firms, patients, and AI systems to create value in complex ecosystems (e.g., Hui, 2025; Feng et al., 2025). This concept is essential for service innovation and relationship marketing in healthcare equipment, as it fosters collaborative advantage, improves system efficiency, and facilitates joint beneficial outcomes for all stakeholders. Integration here includes both operant and operand resources (Kaartemo et al., 2025).

Resource integration in healthcare occurs through various mechanisms. Sociotechnical integration merges human and AI resources, such as in AI-assisted diagnostics, where machine analysis and human judgment work together to enhance outcomes (Kaartemo et al., 2025). Cloud platforms enable cross-organizational integration,

allowing the sharing of digital health resources through technical interoperability, open partnerships, and coordinated governance (e.g., Hui, 2025). Knowledge and technology co-production refers to the collaboration among various actors to merge medical knowledge with digital technologies, resulting in the joint development of innovative AI-based medical solutions (Leszczyński et al., 2025).

It fosters collaborative partnerships by creating long-term, mutually beneficial relationships among manufacturers, providers, and users through shared resources and expertise. Such an integration improves new ideas and personalized services to reach people through digital platforms. It improves patient experiences and leads to better outcomes and enhances system optimization through unified data management and efficient resource allocation. Further, it reduces redundancy and improves healthcare delivery efficiency (e.g., Feng et al., 2025).

2.3 Reciprocity and social exchange principles

Reciprocity in Social Exchange Theory (SET) has been conceptualized in several ways. Homans (1958) views it as psychologically driven behavior based on expected returns, whereas Blau (2017) stresses that trust and cooperation develop through repeated exchanges. Molm (2010) adds that reciprocity also reflects ethical standards and responsibilities shaped by time and context. Thus, reciprocity ranges from calculated exchange to norm-based forms, including direct, indirect, and generalized reciprocity (Xia et al., 2023).

Recent research shows that reciprocity is context-dependent: it shapes responsibility, reinforces group norms, and influences relationship development (Ahmad et al., 2023;

Garcia-Pereyra et al., 2023). It also supports relational stability and sustained prosocial behavior (Li et al., 2022; Uehara, 1995), while generalized reciprocity strengthens cohesion (Molm et al., 2007). In digital, organizational, and healthcare settings, reciprocity remains essential for norms, dependable networks, trust, teamwork, adherence, and value co-creation (Ren et al., 2025; Shankland et al., 2025; Zhang et al., 2025; Kilroy et al., 2022; Deng et al., 2021; Surma, 2016).

2.4 Patient citizenship behavior

Patient Citizenship Behavior (PCB) is typically approached in literature as a form of voluntary, extra-role behavior through which patients contribute to the effectiveness and quality of healthcare services, beyond their basic role as recipients of care. Ulucayli et al. (2023) define PCB as patients’ discretionary actions, such as i) providing feedback, ii) recommending the hospital, or iii) supporting staff cooperation, that are not formally required but help the organization deliver better services. In a complementary way, Ding et al. (2022) describe PCB within online healthcare platforms as one of the key dimensions of patient value co-creation: a) capturing patients’ eagerness to support others, b) sharing information, and c) contributing to the platform’s functioning. A related stream of research in hospital settings shows that PCB develops when patients perceive high service quality and relational value, and therefore, it can strengthen key outcomes of loyalty and commitment (Rahayu, 2023).

For the purposes of this dissertation, we define PCB as a set of voluntary, extra-role behaviors through which patients actively support the healthcare organization and other patients, by giving constructive feedback, recommending services, cooperating with staff, and aiding without direct obligation or formal reward. Conceptually, this definition is closest

to the empirical operationalization in hospital services, in digital health service domains, and it corresponds to the value co-creation framework.

2.5 Patient-centered care philosophy

Patient-centered care (PCC) places patients’ values, needs, preferences, and life context at the center of healthcare decisions (Forsgren et al., 2025). Also described as person- or people-centered care, it emphasizes i) dignity, ii) shared decision-making, and iii) attention to physical, psychological, and social needs, not only clinical issues. Through clear communication and shared decision-making, PCC helps patients set goals and evaluate evidence-based care options (Wasim et al., 2023).

PCC can improve quality of life, reduce costs, and lower hospital admissions, although outcomes vary by implementation model and context, and many settings still struggle to apply it consistently (Janerka et al., 2023; Nkhoma et al., 2022). Persistent gaps in inclusion, communication, and information sharing continue to weaken patient-provider relationships (Havana et al., 2023; Janerka et al., 2023).

These challenges align with contemporary patient experience models that address physical, emotional, social, cultural, and care-related needs across the full care journey (Daleske, 2024). Digital tools, data integration, and AI can strengthen PCC when grounded in human-centered design (Mauro et al., 2024). Accordingly, this dissertation defines PCC as an integrated approach to decision-making, communication, and technology use that supports patient values and active involvement, forming the basis of TESI and RMO (Kim et al., 2024).

Chapter 3 – Situation Analysis

Chapter 3 present a situational analysis of the context in which technology-enabled service innovation and relationship marketing unfold in Greek healthcare. Section 3.1 profiles the health system’s structure and performance and synthesizes patient experiences. Section 3.2 examines medical equipment provision, market dynamics, regulation and procurement, technology adoption, and lifecycle services. Section 3.3 focuses on relationship marketing and patient engagement. Section 3.4 concludes with implications for the dissertation’s empirical design.

3.1 The Greek healthcare system context: Structure, performance, and patient experiences

Greece operates a mixed healthcare system in which core services are delivered by the National Health System (ESY), alongside a substantial private sector offering outpatient, diagnostic, and inpatient care, often financed through out-of-pocket (OOP) payments and voluntary insurance (International Trade Administration, 2025). Capacity remains concentrated in large urban centers, reinforcing a hospital-centric model and persistent urban–rural access inequalities (OECD, 2024).

Greece has ~6.6 physicians per 1,000 population, well above the OECD average of ~3.9–4.0 but only ~3.8 nurses per 1,000, among the OECD’s lowest, indicating a marked skill-mix imbalance (OECD, 2025b). Hospital bed density is ~4.2 per 1,000, close to the OECD average (~4.3 in 2021), consistent with a hospital-oriented configuration (OECD, 2023; The Global Economy, 2019). Public financing covers ~61% of current health expenditure, while households pay ~33–39% through OOP spending, placing Greece among the highest OOP systems in the OECD and increasing inequity and financial hardship,

especially among poorer households (ITA, 2025; OECD, 2025; WHO/Europe, 2025; WHO, 2023).

Satisfaction is low (~27% vs. ~64% OECDa), unmet needs are the EU’s highest (~13.4% vs. ~3.8%), (OECD, 2025b; Eurostat, 2025); and PaRIS findings show low trust and weak self-management support, reinforcing the need for more person- centered, continuous care (OECD, 2025c; ODIPY, 2025).

3.2 Medical equipment provision in Greek healthcare: Market dynamics, technology adoption, and service delivery

Greece’s medical devices market is projected to reach ~US\$1.5 billion by 2028 (CAGR ~3.8%). Because >80% of high-value devices are imported, international suppliers remain pivotal technology and service partners (ITA, 2025). Procurement must meet EU and Greek rules, requiring technical performance, strong compliance, and service. Diagnostic capacity is high, ~4.9 CT scanners and ~3.7 MRI units per 100,000 inhabitants in 2022, placing Greece among EU leaders in imaging resources (Eurostat, 2024). However, this has not consistently improved patient-reported experience because of persistent constraints in access, workforce mix, and service organization (OECD, 2025a). Regulation (EU) 2017/745 (MDR) imposes lifecycle, traceability, clinical evaluation/PMCF, and post-market surveillance requirements, while public procurement is governed by Laws 4412/2016 and 4782/2021 (European Parliament and Council, 2017/2026 consolidated; Hellenic Republic, 2016; Hellenic Republic, 2021). The European medical equipment maintenance market reached ~US\$11.4 billion in 2023 and is growing at ~10% annually, reinforcing bundled services and performance-based contracts as drivers of uptime, reliability, and trust (Grand View Research, 2023; OECD, 2025b).

3.3 Relationship marketing and patient engagement in Greek healthcare services

Relationship marketing in healthcare aims to build long-term, trust-based relationships through proactive communication, follow-up, patient education, and continuous support. In Greece, this is especially important, as patient trust and support for self-management remain below many OECD peers (OECD, 2025b). Accordingly, treating patients as active partners in care is a national priority in the Quality of Care and Patient Safety Strategy 2025–2030 (ODIPY, 2025).

Since July 2025, patients discharged from 127 ESY hospitals have received an SMS with a link to a 35-item digital survey, available for 7 days, assessing clinic-level experience in access, communication, coordination, cleanliness, nutrition, and discharge procedures (Ministry of Health, 2025). Anonymized responses are aggregated into public performance scores, enhancing transparency and supporting continuous improvement (Ministry of Health, 2025).

More broadly, effective communication, follow-up, and patient education strengthen patient–provider relationships. A systematic review found that mutual understanding, respect, and clear information sharing are major determinants of satisfaction (Kim et al., 2024). Thus, through surveys and engagement initiatives, Greek patients are increasingly recognized as active participants in a more patient-centered healthcare system (Development of a National Strategy for Quality of Care, Patient Safety and Patient Engagement in Health-care Provision in Greece, ODIPY).

3.4 Concluding remarks

Overall, Greece’s hospital-centric delivery model, high OOP burden, and uneven patient experiences create a compelling context in which technology-enabled service innovation and relationship marketing can improve perceived quality, trust and equity. Given the MDR-driven lifecycle obligations and Law 4412/2016 procurement requirements, providers that integrate preventive maintenance, remote support, and structured patient-communication into their offerings are better positioned to deliver sustained value to hospitals and patients. These contextual insights inform the hypotheses and design of our study.

Chapter 4 – Theoretical framework and literature review

Chapter 4 presents the theoretical framework, research model, and literature support. The chapter is structured as follows: 4.1 Frame of reference; 4.2 Flow Theory and credibility theory; 4.3 Theoretical model; 4.4 Assumptions; 4.5 Research model and research hypothesis development; and 4.6 Concluding remarks.

4.1 Frame of reference

Integrating Service-Dominant Logic (SDL), Social Exchange Theory (SET), and Moral Foundations Theory (MFT) overcomes limitations of single theories by offering a multi-level explanation of how relationship practices and technology-enabled service innovation (TESI) shape patient outcomes. SDL explains value co-creation and post-adoption behavior, showing that customer orientation mobilizes operant and operand resources in TESI, but value emerges only when patients integrate them (Al Momani & Ramayah, 2025; Thanthrige et al., 2025; Nariswari & Vargo, 2024). SET identifies reciprocity as the micro-mechanism through which relationship marketing orientation (RMO) generates engagement and cooperative patient behavior, extending commitment–trust models that fall short of explaining engagement (Liu et al., 2025; Rehman et al., 2025).

The dissertation integrates a relational stream (RMO, Customer Engagement, Customer Value Co-Creation Behavior, Patient Satisfaction) and an innovation stream (Customer Orientation, TESI, Customer Engagement, Patient Satisfaction), with Customer Engagement as the central mechanism. TESI rarely improves patient satisfaction without engagement; digital transformation tends to increase satisfaction through empowerment and engagement, while chatbots do not reliably enhance retention absent strong engagement

(Zhou et al., 2025; Cevasco et al., 2024). Reviews also show that EHR access and participation mechanisms foster engagement and co-creation, reinforcing Customer Engagement’s mediating role across technical and relational interventions (Alomar et al., 2024; Wu et al., 2024).

TESI is therefore best understood as capability- and service-design reconfiguration, not a belief, explaining inconsistent satisfaction effects when engagement is omitted (Thantrige et al., 2025; Zhou et al., 2025). MFT further acts as a boundary condition: moral reasoning strengthens RMO’s effects on engagement and, indirectly, value co-creation (Arefin et al., 2025; Nowakowska, 2024).

4.2 Theoretical perspectives of Resource Integration, Reciprocity/Exchange and Ethical/Boundary Condition

A framework of three complementary theoretical approaches analyzed in this study explains how technology-enabled innovation and relationship marketing mechanisms jointly shape patients' evaluations about healthcare services they receive, that are directly related to medical technological equipment. These approaches constitute the concepts on which the basic structures of the study are based, and the research model is formed.

From the SDL perspective, value is not evident in products or cutting-edge technologies but is promoted in the integration of resources from various actors during the interaction between services (Vargo & Lusch, 2016; Vargo & Lusch, 2008). In the context of healthcare, technology and more specifically medical equipment are important resources for the system to function, However, their value is only enhanced when patients are actively involved with them, shaping the care process. In the context of this study, facilitating the development and implementation of technologically based innovations concerns practices

that are aligned with patient needs. A necessary prerequisite will be patient involvement, which will create satisfaction and enormous value creation. Recent empirical work supports this logic by highlighting that technology-based innovations in healthcare services shape patient evaluations primarily through processes related to engagement and not necessarily directly to technological performance (Arefin et al., 2025). Therefore, resource integration presents a theoretical basis for understanding why patient engagement mediates between technology-enabled innovation and patient satisfaction.

The innovation-driven pathway linking patient orientation, service innovation, and patient satisfaction is illustrated in Figure 4.1.

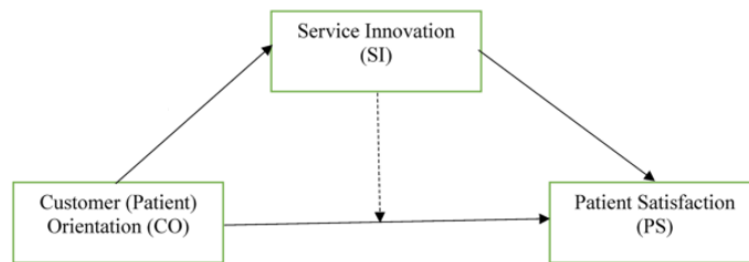


Figure 4.1 : Innovation-driven pathway between Patient Orientation, Service Innovation, and Patient Satisfaction (Yeboah and Amponsah, 2025, p.4)

Complementing the innovation-oriented SDL logic, Social Exchange Theory analyzes how, through reciprocity rules, patient engagement and behavioral responses are influenced by relational practices (Cropanzano & Mitchell, 2005; Blau, 1964). SET argues that when patients receive favorable treatment from healthcare organizations, they are motivated to reciprocate with positive attitudes and behaviors. In healthcare settings, a relationship marketing orientation based on trust-building, responsive communication, and personalized interaction signals commitment, and patients automatically reciprocate with

high levels of collaborative engagement and voluntary value-cocreation behaviors. Thus, empirical evidence in healthcare marketing demonstrates that relationship marketing oriented towards patient engagement leads to satisfaction, loyalty and co-creation behaviors. (Arefin et al., 2025). This explains why relational strategies remain influential even in high-technology service environments and reciprocity emerges as the central exchange mechanism that links relationship marketing orientation with employee engagement and positive outcomes.

While SDL and SET analyze how value is created through innovation and relationships, individual factors and individual differences in the way patients assimilate and respond to the practices they receive must be considered. Thus, a moral and ethical perspective that will introduce moral reasoning as a boundary condition must be introduced to address the above limitation. This perspective is based on Moral Foundation Theory and relates to values and ethical frameworks such as justice, care, responsibility and transparency, frameworks which will also shape the judgment of patients (Shankland et al., 2025). It is further suggested that ethically aligned relationship practices are more likely to show positive outcomes in patients with higher moral reasoning by enhancing trust building and relational engagement (Arefin et al., 2025). Thus, moral reasoning is considered an essential factor shaping the strength of the relationships between relationship marketing orientation and positive or negative patient’s feedback.

The reciprocity-based mechanism linking relationship marketing orientation to customer engagement and customer value co-creation behavior, as well as the moderating role of moral reasoning, is conceptually illustrated in Figure 4.2.

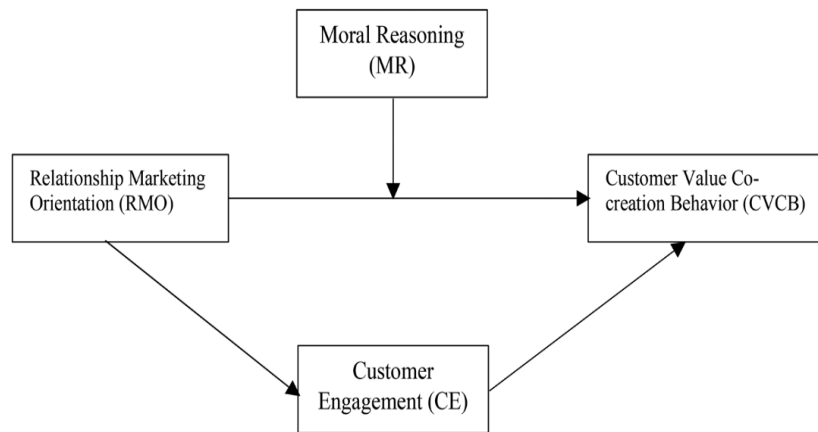


Figure 4.2 : Reciprocity-based pathway linking relationship marketing orientation, customer engagement, and customer value co-creation behavior with moral reasoning as a moderating factor (Arefin et al.,2025, p.10)

This integrated framework models the complex interplay between technological, relational, and ethical elements in the delivery of healthcare services developing the scope for the hypotheses and empirical tests presented in the following sections.

4.3 Assumptions

Service-Dominant Logic (SDL) posits that value emerges through resource integration during service interactions, rather than residing inherently within technologies. Within healthcare, digital tools and medical equipment generate value for patients primarily when these resources are actively integrated into the care process (Vargo & Lusch, 2008, 2016). Recent systematic reviews indicate that patient access to digital resources, such as electronic health records (EHRs) and clinical notes, enhance engagement, empowerment, and satisfaction. This evidence highlights engagement as the primary mechanism through which technology influences patient outcomes (Alomar et al., 2024; Yoshimura et al., 2025).

Social Exchange Theory (SET) identifies reciprocity as the central mechanism connecting relationship practices to patient responses. When organizations engage in trust-

building, responsive communication, and personalization, patients perceive relational benefits and respond with increased engagement and cooperative behaviors (Cropanzano & Mitchell, 2005; Blau, 1964). Empirical evidence from digital and relational interventions demonstrates that technology, in isolation, seldom drives retention or satisfaction without the presence of exchange dynamics that foster sustained engagement (Cevasco et al., 2024).

Moral Foundations Theory (MFT) asserts that moral judgments are rooted in intuitive concerns, such as care, fairness, authority, loyalty, and purity, which are shaped by cultural and contextual factors (Nowakowska, 2024; Graham et al., 2013). In healthcare, relationship practices aligned with ethical principles, including transparency, care, and fairness, are anticipated to increase trust and engagement, particularly among patients with higher levels of moral reasoning (Arefin et al., 2025). Additional research in public health demonstrates that moral concerns systematically influence health-related attitudes and behaviors (Pizza et al., 2023; Haidt, 2001).

Drawing upon these complementary theoretical frameworks, the conceptual model developed in this dissertation is based on the following assumptions:

1. *Technology-enabled service innovation (TESI) increases customer engagement (CE), thereby enhancing patient satisfaction (PS) and customer value co-creation behavior (CVCB). The value derived from technology is primarily realized when patients can integrate digital and clinical resources into their care (Vargo & Lusch, 2016; Alomar et al., 2024).*
2. *The influence of TESI on PS and CVCB is expected to occur primarily through CE. Direct effects of TESI on PS are anticipated to diminish once CE is included in the model (Vickery et al., 2025; Zhou et al., 2025).*
3. *Relationship Marketing Orientation (RMO), characterized by trust-building, responsive communication, and personalization, generates perceived benefits and reciprocal patient engagement. This engagement subsequently promotes PS and CVCB (Cropanzano & Mitchell, 2005; Blau, 1964).*

4. *Moral reasoning moderates the relationship between RMO and CE, such that ethically aligned relational practices have a greater impact on engagement among patients with higher levels of moral reasoning (Arefin et al., 2025; Graham et al., 2013).*
5. *TESI and RMO function as formative composites, while CE represents a distinct cognitive, emotional, and behavioral state that is conceptually separate from satisfaction and co-creation outcomes in healthcare (Alomar et al., 2024; Vargo & Lusch, 2016; Vargo & Lusch, 2008).*
6. *Patient-orientation and participation mechanisms, such as access to clinical notes and EHRs, facilitate resource integration and amplify the effect of TESI on CE (Yoshimura et al., 2025; Alomar et al., 2024).*
7. *The innovation stream and the relationship stream operate in parallel and are mutually reinforcing, converging at engagement (Vargo & Lusch, 2016; Vickery et al., 2025).*
8. *Technology, in isolation, rarely improves satisfaction or retention. Without engagement, even advanced tools such as chatbots produce inconsistent outcome improvements, whereas relational practices maintain their influence through reciprocity (Cevasco et al., 2024; Cropanzano & Mitchell, 2005).*

4.4 Research model and research hypotheses development

In this section, we conduct the literature review, and the research hypotheses derived from the review.

Customer orientation and service innovation are positively correlated, even in the absence of immediate increases in customer satisfaction. This association demonstrates a methodical commitment to understanding patient needs and appropriately adjusting services (Yeboah & Amponsah, 2025). However, staff competencies, data readiness, and strong governance frameworks are necessary for the successful implementation of digital technologies. Adoption of technology by itself won't spur service innovation (Mauro et al., 2024). Depending on caregiver engagement and readiness, configurational analyses of

telemedicine show several routes to value co-creation and co-destruction. These findings highlight the need to involve users in the co-creation of technology-enabled service innovation (Marsilio & Mastrodascio, 2025). Recent studies have highlighted the quick but dispersed digitization of patient experiences; for instance, the adoption of wearable devices indicates that suppliers must address performance expectations, ease of use, social influence, and enabling conditions to facilitate uptake (Guo & Chen, 2026; Aytekin et al., 2025; Deloitte, 2025; WHO/Europe, 2025). Remote monitoring, virtual care, and AI-enabled documentation are identified by WHO/Europe and Deloitte studies as patient-centered performance levers; however, adoption remains inconsistent and is primarily influenced by return on investment. Therefore, we can state that

H1: Customer orientation positively influences technology-enabled service innovation

Patients' cognitive, emotional, and behavioral engagement in care is consistently enhanced by a relationship-marketing orientation (Arefin et al., 2025). Relationship marketing tactics and patient engagement are directly and favorably linked, according to hospital data, and this relationship is reinforced when the tactics align with patients' values (Arefin et al. 2025). In technology-enabled healthcare encounters, sustained participation depends primarily on perceived trust and commitment, rather than on technological features alone (Liu et al., 2025). Additional studies show that perceived empathy and two-way communication enhance the doctor–patient relationship and facilitate shared decision-making, both of which are essential components of engagement (Chen et al., 2025; Han et al., 2025). To maintain active patient participation, effective telemedicine also necessitates coordinated interpersonal, team, and system-level strategies, such as training, coordination, privacy, and usability (Hu et al., 2026).

Counter-evidence identifies important boundary conditions. When provider trust or credible safeguards for artificial intelligence are insufficient, the benefits of patient engagement become limited and inconsistent (Nong & Ji, 2025). Furthermore, many current findings are context specific. Multilevel, cross-system studies are advised by a recent meta-narrative review to differentiate engagement from related outcomes and to more thoroughly look at ethical issues (Bassi et al., 2026). Therefore, we can state that

H2: Relationship marketing orientation positively influences customer engagement

Value co-creation behaviors, such as advocacy, helpfulness, constructive criticism, and responsible participation, are consistently linked to customer engagement—the cognitive, emotional, and behavioral investment in interactions. Engagement is a crucial element of relationship-focused practices, according to empirical data, and it promotes cocreation behaviors in hospital settings (Arefin et al., 2025; Vickery et al., 2025).

Along the lines of Vickery et al. (2025), operations research supports the notion that greater patient involvement enhances cocreation and downstream performance, thereby establishing engagement to achieve value. Patients who are self-assured and actively participate in the treatment of chronic illnesses transform their engagement into cocreation practices, thereby enhancing the quality of care and outcomes (Tang et al. 2025). According to Marsilio and Mastrodascio (2025), technology-enabled redesigns add value only when users actively integrate digital and clinical resources, underscoring the importance of user involvement in cooperative value creation.

However, counter-arguments emphasize that the effects of engagement depend on context, ethical alignment, and trust. Recent reviews advocate for multilevel research designs that differentiate engagement from related outcomes and clarify boundary conditions (Bassi et al., 2026). Further, causal inference is limited to settings characterized by informational asymmetries and patient vulnerability because many studies are cross-

sectional and exclude equipment-intensive encounters (Bassi et al., 2026; Vickery et al., 2025). Therefore, there is still a significant gap in determining the accuracy of engagement in predicting value cocreation in technology-intensive, mixed public-private hospital systems, particularly when considering the impact of moderating ethical signals (Bassi et al., 2026; Arefin et al., 2025). Therefore, we can state that

H3a: Customer engagement positively influences customer value co-creation behavior

Patients who are involved in their care process are more likely to actively participate, communicate effectively with healthcare providers and act in decision-making. All of the above enhance the quality of their experience, resulting in the patient evaluating it very positively. According to Aytekin et al. (2025), digital health technologies that promote patient participation and engagement have a positive impact on their experience and satisfaction. Similarly, Zhou et al. (2025) argue that active participation through digitally supported services as well as encouragement makes them perceive the quality of services and psychological support, enhancing their satisfaction and trust. Also, Yoshimura et al. (2025) demonstrate that when patients have access to issues of their care, they interact, feel familiar and report greater satisfaction with the services they receive. Finally, Wu et al. (2024) argue that commitment through patient involvement directly contributes to their satisfaction as the value of services is perceived. Therefore, we can state that

H3b: Customer engagement positively influences patient satisfaction

Technology-Enabled Service Innovation has played a huge role in the transformation of healthcare as healthcare providers invest in advanced technological equipment, digital tools and integrate processes supported by high technology. All these innovations aim to maximize patient satisfaction through improved efficiency, diagnostic accuracy and accessibility. Mauro et al. (2024) research highlights that the coordination of services, the

improvement of administrative support following technological interventions and technological transformation, positively affect the patient experience. Zhou et al. (2025) also argue that through the digitization of healthcare processes, patients’ perceptions of their quality care are improved. Yoshimura et al. (2025) also make a similar finding where they refer to digital access and associate it with increased levels of satisfaction due to the perceived quality of care. Also, other research supports that when coordination is facilitated and personalized therapeutic methods are promoted with technological tools, then patient satisfaction is also enhanced (Endalamaw et al., 2025). Therefore, we can state that

H4: Technology-enabled service innovation positively influences patient satisfaction

In healthcare settings, strategies to strengthen patient-provider relationships are expected to encourage patients to actively participate in healthcare processes, however recent literature suggests that relationship marketing orientation directly influences behavioral outcomes such as value co-creation. Thus, Arefin et al. (2025) showed that patients who perceive stronger relational commitment are more likely to engage and subsequently participate in co-creation activities, concluding that relationship marketing orientation plays an important role in value co-creation behavior through the mediating role of engagement. Similarly, Hasan et al. (2024) argue that engagement is the key mechanism by which relational values are linked to behavioral outcomes and collaborative behavior is promoted. Wu et al. (2024) also emphasize that engagement is a bridge between relational interactions and value co-creation processes. Furthermore, Vickery et al. (2025) state that patients who are involved are likely to actively participate in value co-creation activities and performance-enhancing behaviors. Finally, according to Ren et al. (2025), regarding social exchange mechanisms in healthcare, when patients perceive benefits such as trust, they contribute collaboratively with outcomes that develop value co-creation. Therefore, we can state that

H5a: Customer engagement mediates the relationship between relationship marketing orientation and customer value co-creation behavior

Relationship marketing is a key strategic approach to patients with whom it is possible to build a long-term relationship of trust through practices such as personalized communication, responsiveness, and ethical behavior. The above results in strengthening the positive perception of your patients regarding the quality of care. However, recent literature indicates that the relationship between relationship marketing and patient satisfaction is not always direct but depends on commitment, which is the main factor linking relational strategies to satisfaction. Thus, Arefin et al. (2025) present the chain relationship of commitment which is strengthened by the relationship marketing orientation and subsequently enhances patient satisfaction. Abu-Hasheesh et al. (2024) show that patient perceptions are positively influenced by relationship marketing practices and ethical service provision, but the results are enhanced when they themselves are actively involved in the process. Also, Liu et al. (2025) emphasize that values such as trust and relational commitment strengthen patient commitment and by extension upgrade their satisfaction. Even according to (Daleske, 2024) patient involvement is a determining factor in their satisfaction according to the experience model they analyze. Finally, they conclude that commitment is a central path connecting strategic relationship marketing with satisfaction results in all service environments. Therefore, we can state that

H5b: Customer engagement mediates the relationship between relationship marketing orientation and patient satisfaction

Even though the delivery of medical services is continually evolving, recent data suggests caution in assuming a direct relationship between patient satisfaction and technology adoption. Zhou et al. (2025) and Yeboah and Amponsah (2025) state that, rather than the technology itself, patient satisfaction increases when they use it in a cognitive and

behavioral way. As stated by Yoshimura et al. (2025), online clinical information access shows that participation is the primary route, and that mechanisms for participation and disclosure enhance patient empowerment and perceived care quality.

According to studies on how technology creates value, advancements are only perceived as valuable when patients actively incorporate clinical and digital resources into their daily care regimens. It is necessary to participate in this cocreation process (Marsilio & Mastrodascio, 2025). Research on digital strategies for managing multimorbidity has shown that programs that explicitly promote participation and self-management perform better than those that merely digitize processes (Endalamaw et al., 2025).

The inconsistent rate of digitalization, the dependence on context, and the potential that technological innovations may not enhance experiences in the absence of continuous interpersonal support and ethical alignment are counterarguments suggesting differing direct effects on satisfaction (Bassi et al., 2026). All recent research points to a lack of solid empirical tests that treat engagement as a mediator between service innovation and satisfaction in hospital settings with extensive equipment (e.g., Coiera et al., 2025; Yeboah & Amponsah, 2025). They also agree on the process by which engagement converts technological capabilities into value that patients perceive. Therefore, we can state that

H6: Customer engagement mediates the relationship between technology-enabled service innovation and patient satisfaction

According to earlier studies, a relationship marketing approach is associated with improved patient-provider co-creation of customer value through engagement; however, these effects vary by patient group and setting (Arefin et al., 2025; Vickery et al., 2025). Reciprocity is necessary for value co-creation, and proponents contend that careful communication, trust-building, and shared values foster this quality (Liu et al. 2025; Vickery et al. 2025). Critics claim that when there are insufficient situational cues, ethical

signals, or considerations for patient diversity, these advantages may not apply. It highlights the need for specific boundary conditions rather than focusing on whether a relationship marketing strategy will affect everyone (Bassi et al., 2026; Hu et al., 2026).

Recent evidence indicates that moral reasoning is an important framework through which patients interpret relational practices. Care that is transparent, fair, and patient-focused is associated with better moral reasoning, trust, information exchange, and constructive actions that encourage value co-creation (Arefin et al., 2025; Zhang et al., 2025). Most recent research treats ethical climate as a direct antecedent of engagement rather than as a moderator that influences the level of relationship marketing orientation. The importance of ethical signals in interactions involving important technology and equipment is further increased by perceived vulnerability and informational asymmetries (Bassi et al., 2026; Shankland et al., 2025). Therefore, it is unclear if moral reasoning enhances the influence of relationship marketing orientation on value co-creation when patients view it that way. Patients with higher moral reasoning skills show a stronger relationship between relationship marketing orientation and customer value co-creation behavior because moral reasoning moderates this relationship (Arefin et al., 2025; Shankland et al., 2025; Zhang et al., 2025). Therefore, we can state that

H7: Moral reasoning moderates the relationship between relationship marketing orientation and customer value co-creation behavior, such that the relationship is stronger when patients have higher moral reasoning

Recent research indicates that the impact of relationship marketing orientation on patient satisfaction depends on patients' moral perceptions of relational practices. When patients feel there is ethical alignment, they are more satisfied (Shankland et al., 2025; Zhang et al., 2025). However, studies also reveal that the main factors influencing satisfaction are frequently communication quality and engagement. Therefore, without

strong interpersonal and system-level support, relationship marketing initiatives may not consistently improve attitudes (Bassi et al. 2026; Hu et al., 2026).

Emerging research attempts to explain these mixed findings. Patients with higher levels of moral reasoning are more sensitive to indicators of care, fairness, and accountability, making them more likely to convert ethically congruent interactions toward trust and positive satisfaction. In contrast, patients with lower moral reasoning may prioritize transactional or technical factors (Arefin et al., 2025; Shankland et al., 2025). However, there aren't many empirical studies of this moderating effect on satisfaction, especially in care settings that involve extensive equipment and digital media, where informational asymmetries and moral concerns are more acute (Vickery et al., 2025). Furthermore, ethical alignment and overall communication quality are frequently conflated in the literature currently under review. Concerns about confidence and openness, which may strengthen the moderating effect of moral reasoning but are not sufficiently examined in satisfaction models, are further heightened by the quick adoption of artificial intelligence (Bassi et al., 2026; Hu et al., 2026; Zhou et al., 2025; Nong & Ji, 2025; Yoshimura et al., 2025). Therefore, we can state that

H8: Moral Reasoning moderates the relationship between Relationship Marketing Orientation and Patient Satisfaction, such that the relationship is stronger when patients have higher moral reasoning capacity

The operational definitions of the key constructs are presented in Table 4.1.

Constructs	Definitions	References
<i>Customer Orientation (CO)</i>	The extent to which healthcare providers understand patient needs, respond to expectations, and coordinate activities to create superior value in care delivery	Yeboah & Amponsah (2025)
<i>Technology-Enabled Service Innovation (TESI)</i>	The introduction into use of a new or significantly improved service or service-delivery process—often enabled by digital/medical technologies—that enhances patient value (e.g., access, experience, quality, safety, outcomes) in a healthcare setting	Yeboah & Amponsah (2025)
<i>Relationship Marketing Orientation (RMO)</i>	An organizational orientation to build and maintain long-term, mutually beneficial relationships, encompassing trust, bonding, communication, shared values, empathy, and reciprocity.	Arefin et al. (2025); Morgan & Hunt (1994)
<i>Customer Engagement (CE)</i>	A multidimensional psychological state (cognitive, emotional, behavioral) arising from interactive, co-creative service experiences with the provider.	Arefin et al. (2025)
<i>Patient Satisfaction (PS)</i>	Patients’ overall evaluation of healthcare services relative to their expectations, shaped by perceived quality, interactions, convenience, and outcomes.	Yeboah & Amponsah (2025)
<i>Customer Value Co-Creation Behavior (CVCB)</i>	Patients’ participation (information seeking/sharing, responsible behavior, personal interaction) and citizenship (feedback, advocacy, helping, tolerance) behaviors that co-create value.	Arefin et al. (2025)

<i>Moral Reasoning (MR)</i>	The cognitive process used to evaluate right and wrong in healthcare interactions based on ethical principles and societal norms.	Arefin et al. (2025)
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Table 4-1: Operational definitions of the key constructs.

The research hypotheses derived from the literature review that inform the research model are presented in Figure 4.3.

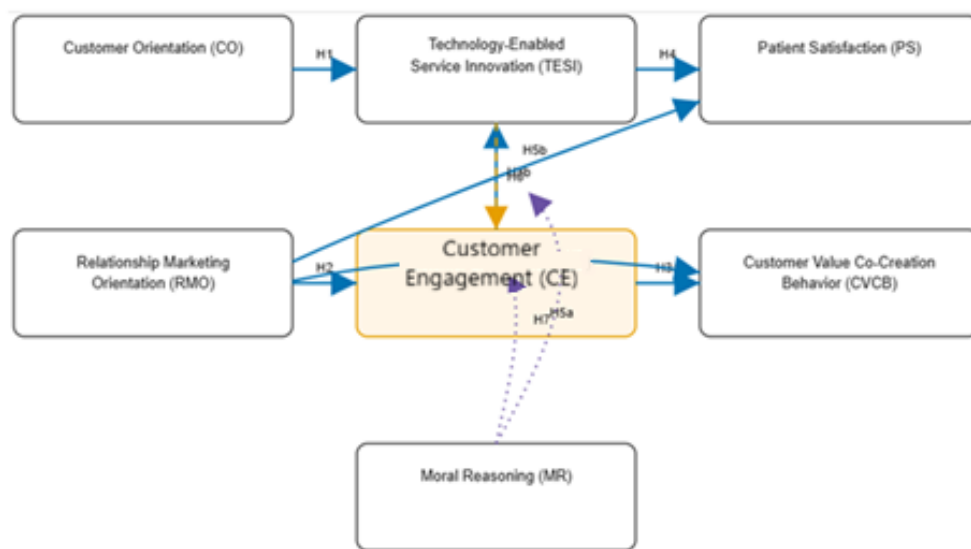


Figure 4.3 : Research model. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

4.5 Concluding remarks

This chapter developed the theoretical and conceptual basis of the thesis to explain how technology-enabled service innovation and relationship marketing orientation jointly influence patient satisfaction and customer value co-creation behavior within the context of medical equipment provision. The enormous importance of patient engagement, through which technological investments are translated into meaningful results, was emphasized, while it was also emphasized that ethical reasoning functions as a key boundary condition that shapes patients' relational responses. Based on the research framework that can capture the patterns shaped by innovation and the relationships to patient outcomes, a set of

hypotheses and a research model were developed to empirically examine the relationships between the key constructs of the study in the Greek healthcare context. Thus, an analytical basis is created for the methodological design and analysis procedures of the next chapter.

Chapter 5: Research Methodology

Chapter 5 presents research methodology and design. The chapter is structured as follows: 5.1 Research motive, research approach, and research method; 5.2 Sample, Sampling Strategy, Process, and Data Collection; 5.3 Measures, measurement of variables and variables' level of measurement; 5.4 Structure of the research instrument; and 5.5 Tools and Statistical Analyses.

5.1 Research motive, research approach, and research method

This section presents the research motive, the research approach, and the method adopted in this thesis. The study investigates how technology-enabled service innovation and relationship marketing practices influence patient satisfaction and value co-creation behavior for patients in the context of the provision of medical devices in Greek healthcare. To achieve the research objective, the Service-Dominant Logic (SDL), Social Exchange Theory (SET) and Moral Foundations Theory (MFT) are incorporated into a model that examines the relationships between customer orientation, technology-enabled service innovation, relationship marketing orientation, customer engagement, moral reasoning, patient satisfaction, and value co-creation behavior.

The research is related to the ongoing transformation of healthcare services driven by digital technologies, advanced medical equipment and the increasing emphasis on patient-centered care. Healthcare systems are transforming, shifting from provider-centric models to models based on collaborative value creation where patients are active agents in shaping their healthcare experience, by evaluating their experience not only in terms of technical outcomes but also considering relational and ethical dimensions. Despite significant investments in medical technology and digital innovation, patient satisfaction and engagement remain disproportionately high across healthcare systems. Recent studies show that technological interventions and improvements do not necessarily guarantee positive outcomes for patients in terms of feedback unless they are driven by sound relationship marketing practices and meaningful patient engagement. Thus, the present study, taking into account this research gap, examines how technological and relational factors interact to shape patient satisfaction behaviors and value co-creation behaviors in the Greek healthcare space.

A deductive research approach is used, starting with an established theoretical framework and continuing with empirical testing of the proposed conceptual model. Hypothesized relationships are also examined based on recent literature on healthcare marketing and service innovation, which is in line with our approach. The research process includes theory development, hypothesis formulation, data collection through structured questionnaires, and statistical testing of the proposed model. Based on recent literature on service innovation, relationship marketing, patient engagement, and moral reasoning, the study develops a comprehensive theoretical framework, which is subsequently tested using quantitative methods.

The study adopts a quantitative research design with the aim of measuring the relationships of the predefined constructs being tested and validating the research model. Data will be collected through structured questionnaires that will be completed by patients who have recently received healthcare services involving medical equipment in public and private healthcare institutions in Greece. This approach enables the measurement of perceptions related to technology-enabled service innovation, relationship marketing practices, engagement, satisfaction, and co-creation behaviors. Statistical techniques including confirmatory factor analysis, reliability and validity assessment, correlation analysis, regression analysis, mediation testing, and moderation analysis will be employed to evaluate the research model and test the hypotheses.

The methodological design adopted in this study provides a structured and theoretically informed framework for examining patient experiences and behavioral outcomes in technology-driven healthcare institutes. This section sets the methodological foundation for the subsequent sections on sampling strategy, data collection procedures, and measurement of variables.

5.2 Sample, Sampling Strategy, Process and Data Collection

The present study uses a structured self-administered questionnaire (SAQ) to collect primary data and empirically test the proposed conceptual model. A questionnaire is a systematic set of structured questions designed to capture the perceptions and experiences of respondents, or data, in a consistent and measurable manner. Thus, by collecting consistent and measurable standardized data from a relatively large number of participants, the researcher has the ability to perform statistical analysis and hypothesis testing. The

questionnaire will be distributed electronically through an online survey platform (e.g., Google Forms), allowing easy access and participation while ensuring efficient data collection and management.

Before participating, participants will be informed about the purpose of the study, its academic nature and the voluntary basis of their participation. They will also be asked to give consent before completing the questionnaire and all responses will remain anonymous without recording any personally identifiable information. The data will be stored securely and will only be accessible to the researcher for academic purposes. Participants will also be informed of their right to withdraw from the study at any time without any consequences. All of the above procedures ensure compliance with ethical research standards and data protection regulations.

Sampling refers to the process of selecting a subset of individuals from a larger population with the aim of drawing conclusions about that population. In this study, the sample will consist of adult patients in Greece who have recently received healthcare services that involve the use of medical technology equipment such as diagnostic imaging systems, monitoring devices, and other diagnostic tools. Only individuals aged 18 years and over will be included in the sample to ensure that participants have the legal capacity to provide informed consent and evaluate their healthcare experiences. The sampling frame focuses on patients who have experienced healthcare services in public or private hospitals and institutions in the last 6 months. The application of this criterion ensures that respondents can accurately recall and evaluate their experiences of interactions with medical technology and healthcare providers. The data will be collected from major urban areas in Greece including Athens and Thessaloniki as well as other areas where there is access to healthcare facilities and will allow for a comprehensive understanding of patients' experiences in relation to the mixed structure of the Greek healthcare system.

Summarizing, the elements that define the research sample of this thesis are presented below:

➤ Sampling unit: Adult Greek male and female patients from different age groups who have received healthcare services involving the use of medical technological equipment (e.g., diagnostic imaging, cardiology monitoring, oncology treatment technologies, or orthopedic diagnostic equipment) in public or private healthcare institutions in Greece.

➤ Sampling area: Data will be collected from patients residing in major urban areas across Greece, primarily in Athens and Thessaloniki, where large public and private hospitals and diagnostic centers are located and where access to technologically supported healthcare services is more extensive.

➤ Period of data collection: March 10th to April 10th, 2026

5.3 Measures, measurement of variables and variables’ level of measurement

In this section, the measures, operationalization of variables, and their levels of measurement are discussed. The research model incorporates key constructs derived from Service-Dominant Logic, Social Exchange Theory, and Moral Foundation Theory, aiming to examine how customer orientation, relationship marketing orientation, and technology-enabled service innovation influence patient satisfaction and customer value co-creation behavior through the mediating role of customer engagement and the moderating role of moral reasoning within the Greek healthcare context.

Each variable is measured using validated instruments from previous studies, with reliability and validity checks. Given the study’s focus and the need for a straightforward, respondent-friendly approach, a 5-point Likert type scale (1 = strongly disagree; 5 = strongly agree) is used for all constructs. While a 7-point Likert scale offers more nuanced data and higher granularity, the 5-point scale is preferred due to its simplicity, reduced cognitive load, and ease of response. It ensures quicker completion and is well-suited for surveys involving many participants. Additionally, for the intended statistical analysis, the ordinal nature of the 5-point scale remains appropriate and effective in capturing patients’ satisfaction and customer satisfaction. We present the primary constructs below.

(1) *Customer Orientation (CO)* denotes the extent to which healthcare providers understand patient needs, respond to expectations, and coordinate activities to create superior value in care delivery (Yeboah & Amponsah, 2025). It is operationalized as a first-order reflective construct with ten items (CO1–CO10) on a 5-point Likert scale, analyzed at the ordinal level.

(2) *Technology-Enabled Service Innovation (TESI)* denotes the introduction and use of new or significantly improved services or delivery processes, enabled by digital/medical technologies, that enhance patient value (Yeboah & Amponsah, 2025). It is modeled as a second-order formative construct formed by five first-order reflective dimensions: New Service Concept (TESINSC) (Yeboah & Amponsah, 2025), Modern Technology (TESIMT) (Yeboah & Amponsah, 2025), New Delivery System (TESINDS) (Yeboah & Amponsah, 2025), New Culture (TESINC) (Yeboah & Amponsah, 2025), and Customer Interaction (TESICU) (Yeboah & Amponsah, 2025). All indicators use 5-point Likert responses and are treated as ordinal.

(3) *Relationship Marketing Orientation (RMO)* denotes the organizational orientation to build and maintain long-term, mutually beneficial relationships grounded in trust, communication, shared values, empathy, and reciprocity (Arefin et al., 2025; Tran & Vu, 2021). It is operationalized as a first-order reflective construct measured with nine 5-point Likert items (RMO1–RMO9), analyzed at the ordinal level.

(4) *Customer Engagement (CE)* is a multidimensional psychological state—cognitive, emotional, and behavioral, arising from interactive, co-creative service experiences (Arefin et al., 2025; Rather & Sharma, 2019). It is specified as a second-order reflective construct with three first-order reflective dimensions: Identification (CEID) (Arefin et al., 2025; Rather & Sharma, 2019), Enthusiasm (CEE) (Arefin et al., 2025; Rather & Sharma, 2019), and Interaction (CEIN) (Arefin et al., 2025; Rather & Sharma, 2019). All indicators are 5-point Likert and treated as ordinal.

(5) *Patient Satisfaction (PS)* denotes patients’ overall evaluation of healthcare services relative to expectations, shaped by perceived quality, interactions, convenience, and outcomes (Yeboah & Amponsah, 2025). It is modeled as a first-order reflective construct with five 5-point Likert items (PS1–PS5), analyzed at the ordinal level.

(6) *Customer Value Co-Creation Behavior (CVCB)* denotes patients’ participation (information seeking/sharing, responsible behavior, personal interaction) and citizenship (feedback, advocacy, helping, tolerance) behaviors that co-create value (Arefin et al., 2025; Tran & Vu, 2021). It is treated as a first-order reflective construct with six 5-point Likert items (CVCB1–CVCB6), analyzed at the ordinal level.

(7) *Moral Reasoning (MR)* denotes the cognitive process individuals use to evaluate right and wrong in healthcare interactions based on ethical principles and societal norms (Yeboah & Amponsah, 2025; Rapert et al., 2021). It is operationalized as a first-order

reflective construct with four 5-point Likert items (MR1–MR4), analyzed at the ordinal level.

Item wording remains adjusted to “hospital/clinic/diagnostic center” to align with the sampling unit and care contexts in Greece (e.g., diagnostic imaging, cardiology monitoring, oncology technologies, orthopedic diagnostic equipment).

Constructs	Variables	Questionnaire Items	Scale	Level of measurement	References
Customer Orientation	CO	CO1: I am excited about the range of services that the hospital/clinic/diagnostic center provides. CO2: The hospital/clinic/diagnostic center provides personalized services that meet my health preferences. CO3: Customer service is provided excellently by the hospital/clinic/diagnostic center CO4: The hospital/clinic/diagnostic center works hard to satisfy patients. CO5: No matter how employees feel, they always do the best they can for every patient they serve. CO6: The hospital/clinic/diagnostic center often makes an extra effort to help patients even if it is not expected of them. CO7: The hospital/clinic/diagnostic center periodically finds out patient’s needs in order to serve them better CO8: I am well-informed about the services being provided. CO9: I have high confidence in the services that the hospital/clinic/diagnostic center provides. CO10: The range of health services that the hospital/clinic/diagnostic center provides is adequate.	1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree	Ordinal	Yeboah & Amponsah (2025)
Technology-Enabled Service Innovation	TESINSC = New Service Concept TESIMT = Modern Technology TESINDS = New Delivery System	TESINSC: The use of technology gives a priority in the provision of healthcare services at the hospital/clinic/diagnostic center. TESIMT1: The hospital/clinic/diagnostic center provides modern treatment routines for patients. TESIMT2: The hospital/clinic/diagnostic center has a modern technology that helps in diagnosing and treating patients. TESINDS1: The hospital/clinic/diagnostic center has a technology that simplifies patients’ administration procedures.	1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree	Ordinal	Yeboah & Amponsah (2025)

	TESINC = New Culture TESICI = Customer Interaction	TESINDS2: Hospital/Clinic/Diagnostic Center staff ensures that the right tools and equipment are used in the provision of service. TESINC1: I have great confidence in the systems used by the hospital/clinic/diagnostic center in the provision of services. TESINC2: Poor systems are avoided by the hospital/clinic/diagnostic center to ensure patient satisfaction. TESINC3: The hospital/clinic/diagnostic center uses innovation in the provision of services TESICI1: Services delivery at the hospital/clinic/diagnostic center is fast and quick. TESICI2: I am satisfied with the innovative ways the hospital/clinic/diagnostic center adopts in the provision of services.			
Relationship Marketing Orientation	RMO	RMO1: Clinicians respect my views and take them seriously. RMO2: We keep our promises to each other in any situation. RMO3: Hospitals/Clinics/Diagnostic Centers provide trustworthy information about their services. RMO4: They maintaining a standard level of quality. RMO5: Hospital/Clinics/Diagnostic Centers are adaptable in meeting my requirements. RMO6: Hospital/Clinics/Diagnostic Centers provide customized services to meet my needs. RMO7: Problems are quickly resolved at this hospital/clinic/diagnostic center RMO8: The hospital/clinic/diagnostic center make an effort to avoid potential conflicts. RMO9: This hospital/clinic/diagnostic center staff listens well and understands my complaints.	1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree	Ordinal	Arefin et al. (2025); Tran & Vu (2021)

Customer Engagement	CEID = Identification CEE = Enthusiasm CEIN = Interaction	CEID1: It seems insulting to be criticized by someone about this hospital/clinic/diagnostic center. CEID2: Usually, I refer to this hospital/clinic/diagnostic center as “we” rather than “they” when I speak about it. CEID3: I see the successes of this hospital/clinic/diagnostic center as my successes. CEID4: It seems like a personal compliment when someone gives this hospital/clinic/diagnostic center recognition. CEE1: This hospital/clinic/diagnostic center is very important to me. CEE2: I feel excited about this hospital/clinic/diagnostic center. CEE3: Anything related to this hospital/clinic/diagnostic center grabs my attention. CEE4: I get happy when I’m interacting with the clinicians. CEE5: Hospitals/Clinics/Diagnostic Centers can modify their services to fit my needs. CEIN1: In conversations with those who share interest in this hospital/clinic/diagnostic center, I prefer to take an active part. CEIN2: I really like sharing thoughts with other individuals who share interest in this hospital/clinic/diagnostic center. CEIN3: I frequently take part in events with individuals who share interest in this hospital/clinic/diagnostic center.	1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree	Ordinal	Arefin et al. (2025); Rather & Sharma, (2019)
Patient Satisfaction	PS	PS1: Overall, I was satisfied with the physician’s level of availability in attending to me. PS2: Overall, I was satisfied with the administrative procedures in the hospital/clinic/diagnostic center. PS3: Overall, I was satisfied with the treatment by the medical staff. PS4: I was satisfied with the quality of services that the hospital/clinic/diagnostic center provides.	1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree	Ordinal	Yeboah & Amponsah (2025)

		PS5: I received the kind of services that I needed and preferred from the hospital/clinic/diagnostic center.			
<i>Customer Value Co-Creation Behavior</i>	CVCB	CVCB1: I have enquired with others and looked up details about the location and services provided by the hospital/clinic/diagnostic center. CVCB2: I've observed how others make good use of this hospital's/clinic's/diagnostic centers services. CVCB3: I supplied the clinicians with all the information they required to carry out their responsibilities. CVCB4: I successfully finished all necessary tasks and shown all desired characteristics. CVCB5: I followed the staff's instructions and performed my duties to this hospital/clinic/diagnostic center. CVCB6: I treated the clinicians with kindness and friendliness.	1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree	Ordinal	Arefin et al. (2025); Tran & Vu (2021)
<i>Moral Reasoning</i>	MR	MR1: Usually, my consideration for other people guides my choices. MR2: I make a decision that will maximize the help that others get. MR3: My decisions are often motivated by the welfare of others. MR4: If I required any more services from other hospital/clinic/diagnostic center, I would first get in touch with the existing one.	1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree	Ordinal	Yeboah & Amponsah (2025); Rapert et al. (2021)

Table 5-1: Operationalization of variables, measurement and questionnaire items of variables

5.4 Structure of the research instrument

Our survey was conducted using a structured questionnaire consisting of 14 questions organized in 9 sections. The questionnaire is available in English and Greek and is included in Appendix A.

The questionnaire is structured as follows:

Section A consists of three questions (nos. 1-3) related to the Healthcare Services Experience.

Section B consists of four questions (nos. 4-7) about the demographic profile, including age, gender, education level and residency.

Section C consists of 1 question (no. 8) related to the customer orientation (CO) based on Yeboah & Amponsah (2025).

Section D consists of 1 question (no. 9) related to the technology-enabled service innovation (TESI) based on Yeboah & Amponsah (2025).

Section E consists of 1 question (no. 10) related to the relationship marketing orientation (RMO) based on Arefin et al. (2025) and Tran & Vu (2021).

Section F consists of 1 question (no. 11) related to the customer engagement (CE) based on Arefin et al. (2025) and Rather & Sharma (2019).

Section G consists of 1 question (no. 12) related to the patient satisfaction (PS) based on Yeboah & Amponsah (2025).

Section H consists of 1 question (no. 13) related to the customer value co-creation behavior (CVCB) based on Arefin et al. (2025) and Tran & Vu (2021).

Section I consists of 1 question (no. 14) related to the moral reasoning (MR) based on Yeboah & Amponsah (2025) and Rapert et al. (2021).

5.5 Tools and Statistical Analyses

The statistical analysis of the collected data was conducted using JASP version 0.96, which was employed as the main statistical software for the descriptive statistics, reliability analysis, confirmatory factor analysis, correlation analysis, regression analysis, mediation analysis, and moderation analysis. Python was also used as a complementary tool for the remodeling and refinement of selected graphs.

Descriptive and inferential statistics

Descriptive statistics are used to quantify and summarize the sample's attributes. Measures of central tendency include the mean and median, while measures of variability include the standard deviation, minimum, and maximum values. Furthermore, frequency distributions and percentages are used to summarize categorical variables and describe the profile of the respondents. This study uses descriptive statistics to summarize the demographic characteristics of the sample, such as gender, age, educational level, and other background variables, as well as the main construct variables of the research model, which are Customer Orientation, Technology-Enabled Service Innovation, Relationship Marketing Orientation, Customer Engagement, Patient Satisfaction, Customer Value Co-Creation Behavior, and Moral Reasoning. Composite mean scores were calculated for each construct based on the corresponding questionnaire items.

In addition, inferential statistics enable conclusions beyond the descriptive profile of the sample by testing the relationships specified in the research hypotheses. In this study, inferential analysis included Spearman correlation analysis, confirmatory factor analysis, reliability analysis, linear regression analysis, mediation analysis, and moderation analysis. These techniques were used to examine the strength, direction, and statistical significance of the relationships among the constructs, to assess the measurement properties of the retained latent variables, and to test the direct, indirect, and moderating effects included in the proposed empirical model.

Spearman's rank and Pearson correlation coefficient

Spearman's rank correlation coefficient is a non-parametric statistic used to assess the strength and direction of monotonic relationships, without requiring normality assumptions, and is therefore appropriate for Likert-type and ordinal data. In this study, Spearman's rho was used as the primary correlation measure to examine the associations among the composite construct scores before hypothesis testing. Pearson's correlation coefficient was also calculated as a complementary statistic, since it estimates the strength and direction of linear relationships between approximately continuous variables. Thus, Spearman's rho was retained as the main coefficient due to the ordinal nature of the

questionnaire data, while Pearson’s r was used to verify whether the observed monotonic associations were also consistent with corresponding linear trends.

Confirmatory Factor Analysis (CFA)

CFA was used to assess the measurement structure of the retained latent constructs and to examine whether the observed questionnaire items loaded adequately on their theoretically specified factors. CFA was conducted in JASP/lavaan using the DWLS estimator, which is appropriate for ordinal Likert-type indicators. The final CFA model included CO, TESI, RMO, PS, CVCB, and MR as latent variables measured by their corresponding observed items. Model fit was evaluated through standard fit indices, including χ^2/df , CFI, TLI, RMSEA, and SRMR, while factor loadings and statistical significance were examined to assess convergent validity at the item level. CE was not retained as an item-level latent factor in the final CFA model due to unstable estimation results and was therefore assessed separately through reliability analysis and used as a composite score in the subsequent regression-based analyses.

Validity and reliability analysis

Validity and reliability analysis was conducted to evaluate the measurement quality of the retained constructs. Construct validity was assessed through CFA, by examining the overall model fit and the statistical significance of the factor loadings of the observed items on their theoretically specified latent constructs. Reliability and internal consistency were assessed through Cronbach’s alpha and McDonald’s ω coefficients. Cronbach’s alpha was used as the main reliability indicator, while McDonald’s ω was additionally considered where the estimates were admissible and interpretable. Values above the commonly accepted threshold of 0.70 were considered satisfactory, indicating that the retained multi-item scales were reliable and suitable for the subsequent correlation, regression, mediation, and moderation analyses.

Regression analysis

Regression analysis was used to examine the direct predictive relationships specified in the research hypotheses. The analysis was conducted on the composite construct scores, using linear regression models in which the theoretically defined outcome variable was regressed on the corresponding predictor variable(s). The regression outputs included the model summary, ANOVA significance test, unstandardized and standardized coefficients, t-values, p-values, and R^2 values. These statistics were used to evaluate the direction, strength, and statistical significance of the effects among the constructs, and to determine whether each direct hypothesis was empirically supported.

Mediation analysis

Mediation analysis examines whether the relationship between an independent variable and a dependent variable is transmitted through a third variable, referred to as the mediator. In this study, mediation analysis was used to examine whether CE explains the indirect effects of RMO on CVCB, RMO on PS, and TESI on PS. More specifically, the analysis tested whether the independent variable significantly predicts the mediator (path a), whether the mediator significantly predicts the dependent variable while controlling for the independent variable (path b), and whether the indirect effect through the mediator (path ab) is statistically significant. The total effect (path c) and the direct effect after including the mediator (path c') were also examined, in order to determine whether the mediation was partial or full. The mediation models were estimated through regression-based analysis in JASP, and the significance of the indirect effects was evaluated through the reported p-values and confidence intervals. Therefore, mediation analysis was used to assess whether CE functions as an intermediate mechanism through which relational and technology-enabled factors influence patient outcomes.

Moderation analysis

Moderation analysis examines whether the strength or direction of the relationship between an independent and a dependent variable changes according to the level of a third variable, referred to as the moderator. In this study, moderation analysis was used to test

whether MR moderates the relationships between RMO and CVCB, and between RMO and PS. The analysis was performed through multiple linear regression models in JASP. In each model, the dependent variable was regressed on the independent variable, the moderator, and their interaction term ($RMO \times MR$). A moderation effect was considered statistically supported when the regression coefficient of the interaction term was significant, indicating that the effect of RMO on the outcome variable differed according to the level of MR.

Chapter 6: Research results

Chapter 6 presents the empirical findings obtained through the analysis of the questionnaire data. The chapter is structured as follows: Section 6.1 provides an overview of the sample profile and descriptive statistics; Section 6.2 discusses the analysis and interpretation of the questionnaire responses; Section 6.3 examines the confirmatory factor analysis and the assessment of the measurement model; Section 6.4 presents the hypothesis testing procedure and statistical analyses conducted. Section 6.5 summarizes the results of the hypothesis testing process, while Section 6.6 illustrates the final empirically supported research model.

6.1 Sample characteristics and descriptive statistics

This study received a total of 468 responses. Following data screening, 9 respondents who reported being under 18 years of age were excluded, as they did not meet the adult sampling criterion specified in the research design. After this exclusion, 459 valid responses were retained for analysis. All retained respondents had visited a hospital, clinic or diagnostic centre in Greece during the past 6 months and had received healthcare services involving the use of medical technological equipment, ensuring the contextual relevance and quality of the data collected.

The gender distribution showed a moderate female predominance, with 257 respondents (56.0%) identifying as female and 199 (43.4%) as male, while three participants (0.7%) preferred not to disclose their gender (see Table B-1, Appendix B). This pattern is broadly consistent with reported gender profiles in Greek healthcare research, where women tend to be more frequently engaged with diagnostic services and outpatient care.

In terms of age, the sample was concentrated in the most economically active and frequently health-engaged adult cohorts. The 35–44 age group constituted the largest share of the sample ($n = 147$, 32.0%), followed by 25–34 ($n = 116$, 25.3%) and 45–54 ($n = 89$, 19.4%). Smaller proportions were observed in the 55–64 ($n = 61$, 13.3%), 18–24 ($n = 37$, 8.1%) and 65+ ($n = 9$, 2.0%) brackets (see Table B-2, Appendix B). Overall, more than 76% of respondents fell within the 25–54 age range, reflecting a profile of working-age adult patients with regular exposure to medical equipment-enabled healthcare services.

Regarding educational attainment, the sample was characterised by a high proportion of well-educated respondents. Tertiary education graduates accounted for 40.7% (n = 187) of the sample, while postgraduate-degree holders represented an almost equal 39.9% (n = 183). Respondents with secondary education comprised 10.7% (n = 49), while 7.4% (n = 34) reported alternative educational backgrounds and 1.3% (n = 6) had completed only basic education (see Table B-3, Appendix B). Combined, more than 80% of respondents held a tertiary or postgraduate qualification, suggesting a sample with strong cognitive and informational engagement capacity, a feature particularly relevant when evaluating technology-enabled healthcare services.

With respect to place of residence, respondents were predominantly based in major Greek urban centres, in line with the sampling design. Athens hosted the largest proportion (n = 174, 37.9%), followed by Ioannina (n = 136, 29.6%) and Thessaloniki (n = 84, 18.3%). Smaller groups resided in Patras (n = 22, 4.8%), Piraeus (n = 17, 3.7%) and Heraklion (n = 3, 0.7%), while 23 respondents (5.0%) reported living in other Greek cities (see Table B-4, Appendix B).

In terms of the type of healthcare facility most recently visited, public hospitals had the most data (n = 308, 67.1%), followed by diagnostic centres (n = 80, 17.4%), private hospitals (n = 39, 8.5%) and private clinics (n = 32, 7.0%) (see Table B-5, Appendix B). This distribution closely mirrors the structural reality of the Greek healthcare system, in which the National Health System (ESY) remains the principal provider of inpatient and high-complexity diagnostic services, complemented by a sizeable private sector for outpatient and specialised diagnostic care.

Concerning the frequency of healthcare encounters during the past 6 months, the majority of respondents reported between 1 and 2 visits (n = 312, 68.0%), followed by 3–5 visits (n = 115, 25.1%), 6–10 visits (n = 21, 4.6%) and more than 10 visits (n = 11, 2.4%) (see Table B-6, Appendix B). This pattern is consistent with typical adult healthcare service usage in Greece and ensures that the analysis is grounded in recent, first-hand patient experiences with hospital, clinic or diagnostic-centre encounters involving technology-supported services.

Taken together, these socio-demographic and usage characteristics indicate that the sample is well aligned with the target population of the study namely, adult patients residing in major Greek urban centers who have recently engaged with technology-enabled healthcare services. The composite distribution of all six demographic variables is

summarised in Figure B.1 of Appendix B, while detailed frequencies and percentages for each demographic variable are reported in Tables B-1 to B-6 of Appendix B.

6.2 Interpretation of questionnaire results

Grouped variables were created by calculating each participant's mean response across the items comprising each construct. All questionnaire items were measured on a five-point Likert scale, ranging from 1 = Strongly Disagree to 5 = Strongly Agree. After excluding incomplete construct-level responses, the analysis was based on $N = 436$ valid responses across all constructed variables. Figure B.2 and Table B-7 of Appendix B present the descriptive statistics of the constructs, including mean values, medians, standard deviations, and minimum and maximum scores.

Overall, the results indicate generally positive perceptions across most constructs of the proposed research model. The highest mean score was observed for Customer Value Co-Creation Behavior (CVCB: $M = 3.829$, $SD = 0.695$), suggesting that respondents tended to agree that they actively participate in the healthcare service process through information sharing, responsible behavior, cooperation with healthcare professionals, and supportive interaction. The median value of 4 further indicates that the central tendency of responses was close to “Agree”, reflecting a relatively strong orientation toward co-creation behavior in healthcare service encounters.

Moral Reasoning (MR) also received a high score ($M = 3.745$, $SD = 0.695$), with a median of 4.000. This finding suggests that respondents generally reported that ethical considerations, concern for others, and responsibility toward healthcare interactions guide their decisions. The relatively low standard deviation indicates that responses were comparatively consistent across the sample. This is important for the present study, as Moral Reasoning is included in the model as a moderating construct that may shape how patients respond to relationship-oriented healthcare practices.

Patient Satisfaction (PS) followed closely ($M = 3.624$, $SD = 0.873$), also with a median of 4. This indicates that respondents were generally satisfied with the healthcare services they received, including the availability of professionals, administrative procedures, medical staff treatment, quality of services, and the extent to which the services met their needs. Although the mean is clearly above the neutral midpoint of the scale, the

standard deviation shows some variability, suggesting that satisfaction was not uniformly high for all respondents.

Relationship Marketing Orientation (RMO) presented a similarly positive pattern ($M = 3.616$, $SD = 0.858$; Median = 3.889). This result suggests that respondents tended to perceive healthcare providers as relationship-oriented, particularly in terms of respect, communication, trust, empathy, and the development of mutually beneficial relationships. The relatively high mean supports the relevance of relationship marketing practices in the healthcare context examined in this dissertation.

Technology-Enabled Service Innovation (TESI) had a moderate-to-positive mean score ($M = 3.464$, $SD = 0.817$; Median = 3.700). This indicates that respondents perceived the use of technology and innovation in healthcare service delivery positively, although less strongly than constructs such as CVCB, MR, PS, and RMO. In practical terms, patients appear to recognize the role of technology in diagnosis, treatment, administrative simplification, equipment use, and innovative service provision, but their evaluations suggest that there is still room for improvement in how technology-enabled innovation is experienced in healthcare settings.

Customer Orientation (CO) also showed a moderate-to-positive evaluation ($M = 3.380$, $SD = 0.880$; Median = 3.600). This suggests that respondents tended to perceive healthcare providers as reasonably attentive to patient needs, preferences, expectations, and service quality. However, compared with the other constructs, CO received one of the lower mean values. This may indicate that while patients generally recognize customer-oriented practices, they do not evaluate them as strongly as co-creation behavior, moral reasoning, satisfaction, or relationship marketing orientation.

The lowest mean score was observed for Customer Engagement (CE: $M = 2.630$, $SD = 0.777$; Median = 2.625). This value is below the neutral midpoint of the scale, indicating that respondents did not strongly identify with active engagement behaviors toward healthcare providers. This may reflect limited willingness or opportunity to interact beyond the basic service encounter, participate in discussions, share experiences with others, or engage more actively with hospitals, clinics, or diagnostic centers. Therefore, although respondents reported relatively high value co-creation behavior, their broader psychological and behavioral engagement with healthcare providers appears weaker.

In summary, the descriptive results show that respondents evaluated co-creation behavior, moral reasoning, patient satisfaction, and relationship marketing orientation

positively. Technology-enabled service innovation and customer orientation were also evaluated positively, but at a more moderate level. Customer engagement was the only construct with a mean score below the neutral midpoint, suggesting that active patient engagement remains a weaker area in the healthcare service context examined. These findings provide an initial descriptive basis for the following confirmatory factor analysis and hypothesis testing, where the relationships among Customer Orientation, Technology-Enabled Service Innovation, Relationship Marketing Orientation, Customer Engagement, Patient Satisfaction, Customer Value Co-Creation Behavior, and Moral Reasoning are examined in greater depth.

6.3 Confirmatory factor analysis

6.3.1. Model specification

CFA was conducted to assess the construct validity of the measurement model, using the Lavaan implementation within JASP software. The model includes six first-order latent factors and one second-order latent factor, derived from the theoretical framework of the study concerning technology-enabled service innovation, relationship marketing, patient satisfaction, value co-creation behavior, and moral reasoning in the healthcare context.

The first-order latent variables included in the model are: CO, TESI, RMO, MR, PS, and CVCB. In addition, a second-order construct was specified in order to represent the broader higher-order structure formed by Customer Orientation, Technology-Enabled Service Innovation, Relationship Marketing Orientation, and Patient Satisfaction. The CE construct was not retained in the final CFA model, since its inclusion produced an inadmissible solution in JASP/lavaan. This suggests that the CE measurement block created estimation problems in the overall model, most likely due to empirical overlap with other constructs and insufficiently stable parameter estimation. This decision is also consistent with the descriptive findings, where CE presented the lowest mean score among the examined constructs, indicating weaker respondent identification with active engagement behaviors toward healthcare providers.

The exclusion of CE concerned only the item-level latent measurement model tested through CFA. CE remained theoretically central to the research model and was therefore

retained in the subsequent hypothesis testing. For this reason, CE was assessed separately through internal consistency reliability analysis and was operationalized as a composite mean score of its observed items for the correlation, regression, and mediation analyses.

Each latent construct was measured using multiple observed indicators, each of which corresponds to one questionnaire item rated on a five-point Likert scale. The CFA results confirmed that the retained factor structure provided a satisfactory representation of the data and that the observed indicators loaded strongly onto their intended constructs. The model was estimated using the DWLS estimator, which is appropriate for ordinal Likert-type data.

Factor: CO – Customer Orientation

The factor Customer Orientation consists of 10 indicators (CO1 to CO10), with standardized loadings ranging from 0.852 to 0.921.

Factor: TESI – Technology-Enabled Service Innovation

The factor Technology-Enabled Service Innovation consists of 10 indicators (TESI1 to TESI10), with standardized loadings ranging from 0.750 to 0.924.

Factor: RMO – Relationship Marketing Orientation

The factor Relationship Marketing Orientation consists of 9 indicators (RMO1 to RMO9), with standardized loadings ranging from 0.875 to 0.951.

Factor: MR – Moral Reasoning

The factor Moral Reasoning consists of 4 indicators (MR1 to MR4), with standardized loadings ranging from 0.671 to 0.993.

Factor: PS – Patient Satisfaction

The factor Patient Satisfaction consists of 5 indicators (PS1 to PS5), with standardized loadings ranging from 0.909 to 0.957.

Factor: CVCB – Customer Value Co-Creation Behavior

The factor Customer Value Co-Creation Behavior consists of 6 indicators (CVCB1 to CVCB6), with standardized loadings ranging from 0.825 to 0.956.

Second-order factor

The second-order factor was specified using Customer Orientation, Technology-Enabled Service Innovation, Relationship Marketing Orientation, and Patient Satisfaction as first-order indicators. The standardized second-order loadings ranged from 0.897 to 0.940, indicating that these constructs contributed strongly to the higher-order latent structure. Specifically, the standardized loading was 0.897 for CO, 0.940 for TESI, 0.940 for RMO, and 0.920 for PS.

Overall, the CFA model supports the adequacy of the retained measurement structure. All retained constructs demonstrated strong standardized factor loadings, as presented in Figure 6.1, suggesting that the observed questionnaire items represented their respective latent variables satisfactorily. The exclusion of CE was therefore treated as a necessary model specification decision in order to obtain an admissible and interpretable measurement model.

6.3.2. Model fit assessment

The overall fit of the confirmatory factor analysis model was assessed using several goodness-of-fit indices. Since the questionnaire items were measured on a five-point Likert scale, the model was estimated using the DWLS estimator, which is suitable for ordinal data.

The CFA model showed an acceptable to very good fit to the data. The chi-square value of the factor model was $\chi^2 = 2767.637$ with 846 degrees of freedom. Although the chi-square test is commonly reported in CFA, it is highly sensitive to sample size and model complexity. Therefore, model fit was mainly evaluated through incremental and absolute fit indices.

The incremental fit indices indicated excellent model fit. More specifically, the Comparative Fit Index was very high (CFI = 0.998), as were the Tucker-Lewis Index (TLI = 0.997), the Bentler-Bonett Non-normed Fit Index (NNFI = 0.997), the Bentler-Bonett Normed Fit Index (NFI = 0.997), the Bollen Incremental Fit Index (IFI = 0.998), and the Relative Noncentrality Index (RNI = 0.998). These values are above the commonly accepted threshold of 0.90 and exceed the stricter threshold of 0.95, indicating that the hypothesized measurement model fits the data very well.

Regarding absolute and residual-based fit measures, the RMSEA value was 0.072, with a 90% confidence interval ranging from 0.069 to 0.075. This value indicates an acceptable level of approximation error. In addition, the SRMR value was 0.048, which is below the recommended threshold of 0.08 and therefore indicates good residual fit.

Overall, the CFA results suggest that the retained measurement model demonstrates satisfactory fit. The very high incremental fit indices, together with the acceptable RMSEA and strong SRMR value, support the adequacy of the proposed measurement structure. Therefore, the model can be considered suitable for the subsequent assessment of factor loadings, reliability, and validity.

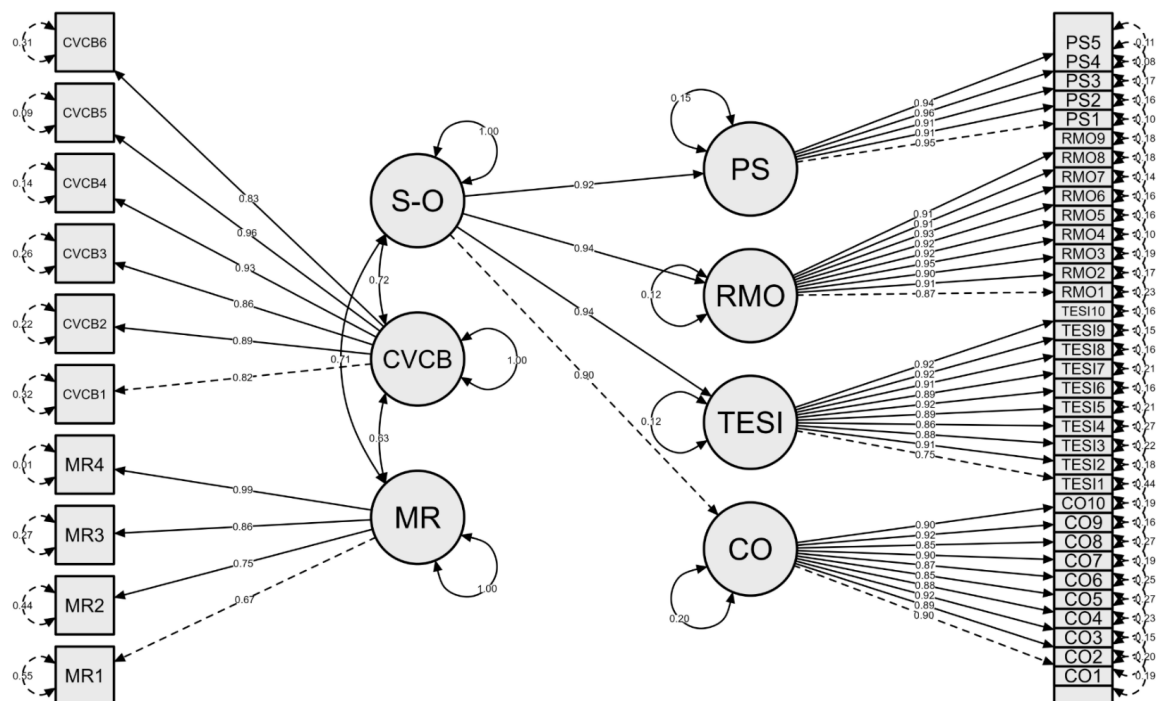


Figure 6.1 : CFA Path diagram

Additional CFA assessment of CE

An additional single-factor CFA was conducted for CE, because CE was not retained in the final CFA measurement model. The model specified CE as one latent construct measured by twelve observed indicators (CE1–CE12), using the DWLS estimator for ordinal indicators. The one-factor CE model was statistically significant, $\chi^2(54) = 2048.488$, $p < .001$, indicating poor global model fit. The χ^2/df ratio was 37.94, which is substantially

above commonly accepted thresholds. Therefore, the results do not support the strict unidimensionality of CE at the item-level CFA specification.

At the parameter level, however, all CE indicators loaded positively and significantly on the latent factor (see Figure 6.2). CE1 was fixed to 1.000 for model identification, while the remaining unstandardized loadings ranged from 1.338 (CE12) to 1.697 (CE3), all $p < .001$. The latent factor variance was also positive and statistically significant (Estimate = 0.322, $p < .001$), and all residual variances were positive, indicating that the model did not produce an inadmissible solution. Overall, the CE-only CFA suggests that the CE items are positively associated with the underlying construct, but the one-factor latent specification does not provide acceptable global fit. For this reason, CE was not included as an item-level latent factor in the final CFA model. Instead, CE was retained for the subsequent hypothesis testing as a composite construct, following separate internal consistency reliability assessment.

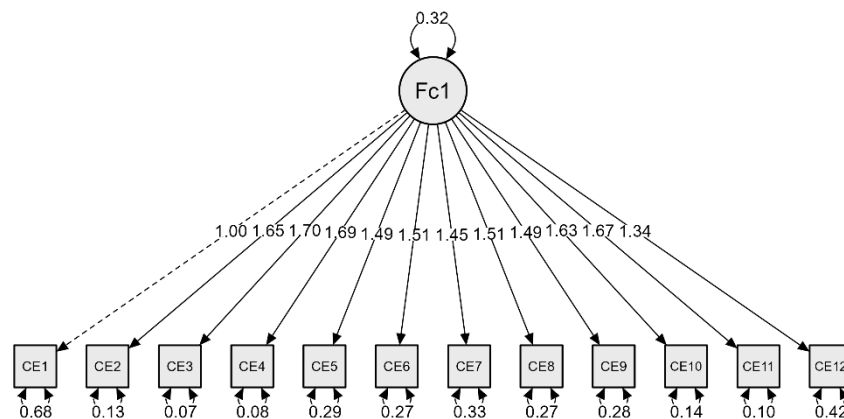


Figure 6.2 : Additional Confirmatory Factor Analysis model of Customer Engagement.
Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare equipment provision: An empirical study in the Greek healthcare context”

6.3.3. Factor loadings and significance

The standardized factor loadings of the retained CFA model were examined to evaluate the strength of association between each observed indicator and its corresponding latent construct. Overall, the results indicated satisfactory to very strong loadings across all retained constructs, suggesting that the observed indicators adequately represented their intended latent variables.

For CO, the standardized loadings ranged from 0.852 to 0.921, indicating consistently strong item–factor relationships. For TESI, the standardized loadings ranged from 0.750 to 0.924, showing that all retained TESI items contributed substantially to the construct. RMO demonstrated particularly strong loadings, ranging from 0.875 to 0.951. MR showed standardized loadings from 0.671 to 0.993; although MR1 presented the lowest loading, it remained within an acceptable range. PS also showed very high standardized loadings, ranging from 0.909 to 0.957. Finally, CVCB presented strong loadings ranging from 0.825 to 0.956.

The second-order factor loadings were also high. The loadings of the first-order constructs on the second-order factor ranged from 0.897 to 0.940, indicating that CO, TESI, RMO, and PS were strongly associated with the higher-order construct.

Overall, the CFA results support the adequacy of the model. Since all standardized loadings were above commonly accepted minimum thresholds, the findings provide evidence of convergent validity for the retained constructs. The detailed factor loading estimates are presented in Appendix B.

6.3.4. Reliability and internal consistency

Reliability analysis was conducted to evaluate the internal consistency of the retained constructs of the CFA model. Cronbach's alpha and McDonald's ω coefficients were examined for each construct. Cronbach's alpha was used as the main indicator of internal consistency, while McDonald's ω was additionally considered where the estimates were admissible and interpretable.

The Cronbach's alpha values across the retained constructs ranged from 0.810 to 0.965, exceeding the commonly accepted threshold of 0.70. More specifically, Customer Orientation showed very high internal consistency ($\alpha = 0.964$), as did Technology-Enabled Service Innovation ($\alpha = 0.962$), Relationship Marketing Orientation ($\alpha = 0.965$), Patient Satisfaction ($\alpha = 0.955$), and Customer Value Co-Creation Behavior ($\alpha = 0.870$). Moral Reasoning also demonstrated acceptable reliability, with $\alpha = 0.810$.

The McDonald's ω coefficients also supported the reliability of the retained constructs where interpretable. The values were high for Customer Orientation ($\omega = 0.970$),

Technology-Enabled Service Innovation ($\omega = 0.967$), Relationship Marketing Orientation ($\omega = 0.974$), Moral Reasoning ($\omega = 0.957$), and Patient Satisfaction ($\omega = 0.954$). For Customer Value Co-Creation Behavior and the total scale, the ω estimates exceeded the theoretical upper bound of 1.00. Therefore, these values were not interpreted, and Cronbach’s alpha was retained as the appropriate reliability indicator for these cases.

Overall, the reliability results indicate satisfactory to excellent internal consistency for all retained constructs. Therefore, the measurement scales can be considered reliable and suitable for subsequent hypothesis testing. The detailed reliability coefficients are presented in Table B-8 of Appendix B.

6.4 Hypothesis testing

6.4.1 Correlation analysis

To examine the direction, strength, and nature of the relationships among the study constructs, a correlation analysis is conducted and presented in Figures 6.3–6.7. Because all constructs were computed from 5-point Likert-type (ordinal) questionnaire items, Spearman’s rank-order correlation (Spearman’s ρ) was used as the primary coefficient to assess monotonic associations. Pearson’s correlation coefficient (r) was also reported as a complementary measure to examine the corresponding linear associations. An integrated correlation matrix (Spearman’s ρ , p -values, and N) for all constructs (CO, TESI, RMO, CE, PS, CVCB, MR) is provided in Table B-9 (Appendix B).

Research Hypothesis 1 (H1): Customer orientation positively influences technology-enabled service innovation.

The relationship between Customer Orientation (CO) and Technology-Enabled Service Innovation (TESI) presents a strong positive monotonic association (Spearman’s $\rho = 0.839$, $p < 0.001$), indicating that higher levels of customer orientation are consistently associated with higher levels of perceived service innovation. The polynomial equation (see 6.1) suggests that for every one-unit increase in Customer Orientation, Technology-Enabled Service Innovation increases by approximately 0.77 units. The positive intercept indicates that even at low levels of customer orientation, a baseline level of service innovation is perceived. Therefore, H1 is supported.

The equation explaining the relationship is:

$$Y = 0.7711X + 0.8574 \text{ (6.1)}$$

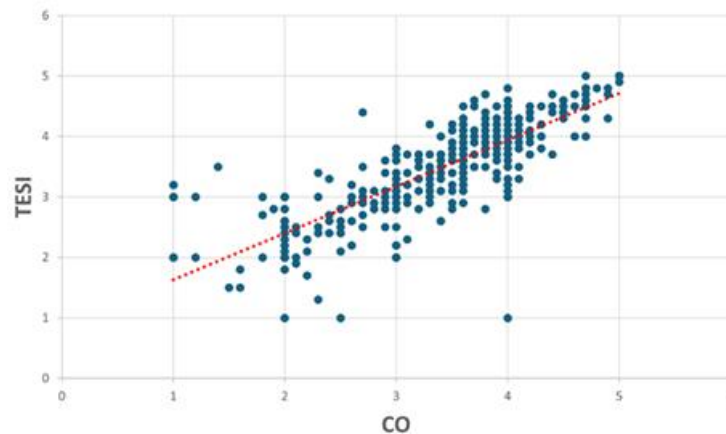


Figure 6.3 : Linear positive monotonic relationship between Customer Orientation (CO) and Technology-Enabled Service Innovation (TESI). Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Research Hypothesis 2 (H2): Relationship marketing orientation positively influences customer engagement.

A moderate positive monotonic association is observed between Relationship Marketing Orientation (RMO) and Customer Engagement (CE) (Spearman’s $\rho = 0.449$, $p < 0.001$), indicating that stronger relationship-oriented practices are associated with higher levels of engagement. The polynomial equation (see 6.2) indicates that a one-unit increase in Relationship Marketing Orientation corresponds to an increase of approximately 0.43 units in Customer Engagement. The relatively higher intercept suggests that engagement exists even at moderate levels of relational orientation. Therefore, H2 is supported.

The equation explaining the relationship is:

$$Y = 0.4276X + 1.0835 \text{ (6.2)}$$

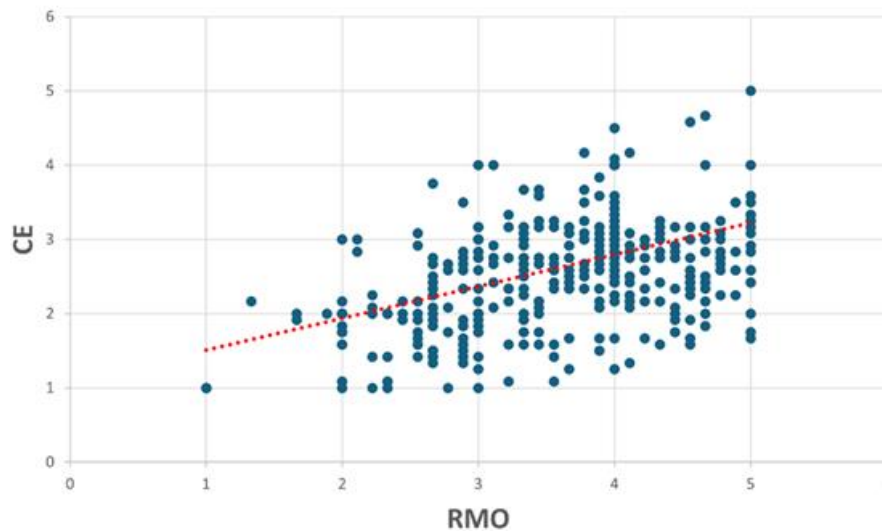


Figure 6.4 : Linear positive monotonic relationship between Relationship Marketing Orientation (RMO) and Customer Engagement (CE). Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Research Hypothesis 3a (H3a): Customer engagement positively influences customer value co-creation behavior.

A positive monotonic association is identified between Customer Engagement (CE) and Customer Value Co-Creation Behavior (CVCB) (Spearman’s $\rho = 0.379$, $p < 0.001$), indicating that increased engagement is associated with higher co-creation behavior. The relationship is best described by a cubic polynomial function (see 6.3). This non-linear form suggests that the relationship is not constant across all levels of engagement. Specifically, at lower levels of engagement, increases lead to moderate gains in co-creation behavior. At intermediate levels, the relationship shows slight curvature, indicating diminishing or fluctuating effects, and at higher levels, the positive cubic term dominates, suggesting a stronger acceleration of co-creation behavior. Engagement becomes increasingly influential at higher intensity levels. Therefore, H3a is supported.

The equation explaining the relationship is:

$$Y = 0.0271X^3 - 0.3826X^2 + 1.7780X + 1.4047 \quad (6.3)$$

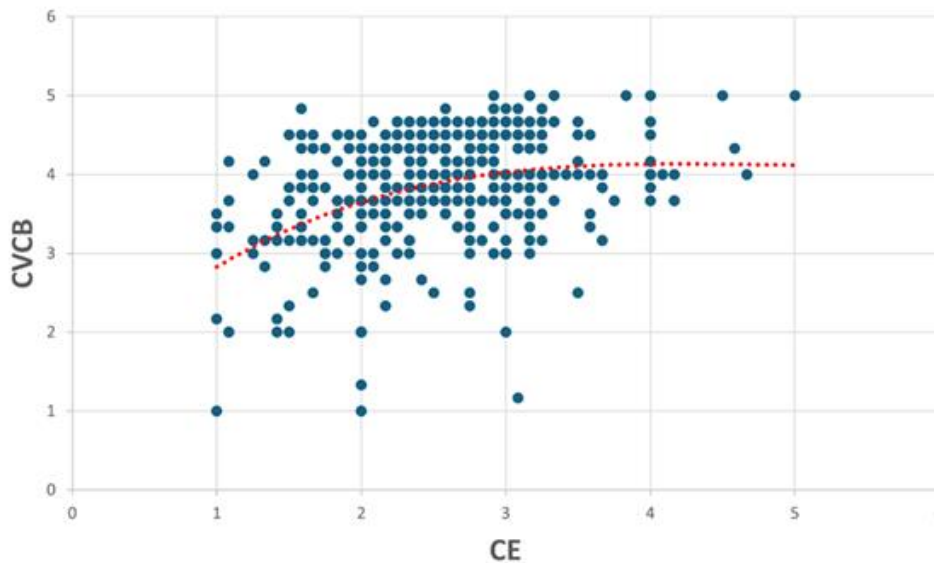


Figure 6.5 : Nonlinear (cubic) relationship between Customer Engagement (CE) and Customer Value Co-Creation Behavior (CVCB). Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Research Hypothesis 3b (H3b): Customer engagement positively influences patient satisfaction.

A moderate positive monotonic association is found between Customer Engagement (CE) and Patient Satisfaction (PS) (Spearman’s $\rho = 0.518$, $p < 0.001$), indicating that higher engagement leads to higher satisfaction levels. The cubic polynomial model (see 6.4) reveals a nonlinear relationship where at lower levels of engagement, satisfaction increases gradually, and at moderate levels, the negative quadratic term introduces slight flattening (reduced rate of increase). At higher levels of engagement, the positive cubic component leads to a renewed increase in satisfaction. This suggests that while engagement always contributes positively, its effect varies depending on its intensity. Therefore, H3b is supported.

The equation explaining the relationship is:

$$Y = 0.0018X^3 - 0.2588X^2 + 1.9502X + 0.3985 \quad (6.4)$$

-

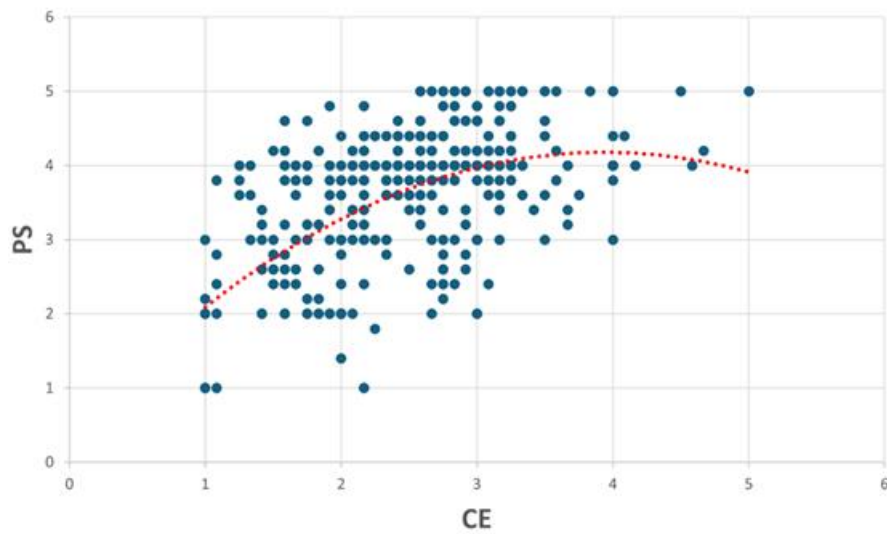


Figure 6.6 : Nonlinear (cubic) relationship between Customer Engagement (CE) and Patient Satisfaction (PS). Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Research Hypothesis 4 (H4): Technology-enabled service innovation positively influences patient satisfaction.

A strong positive monotonic association is observed between Technology-Enabled Service Innovation (TESI) and Patient Satisfaction (PS) (Spearman’s $\rho = 0.787$, $p < 0.001$), indicating that higher levels of innovation are associated with higher satisfaction. The polynomial equation (see 6.5) indicates that a one-unit increase in Technology-Enabled Service Innovation leads to an increase of approximately 0.85 units in Patient Satisfaction. The slope is relatively steep, suggesting a strong direct effect, while the positive intercept indicates a baseline satisfaction level even at lower innovation levels. Therefore, H4 is supported.

The equation explaining the relationship is:

$$Y = 0.85X + 0.68 \text{ (6.5)}$$

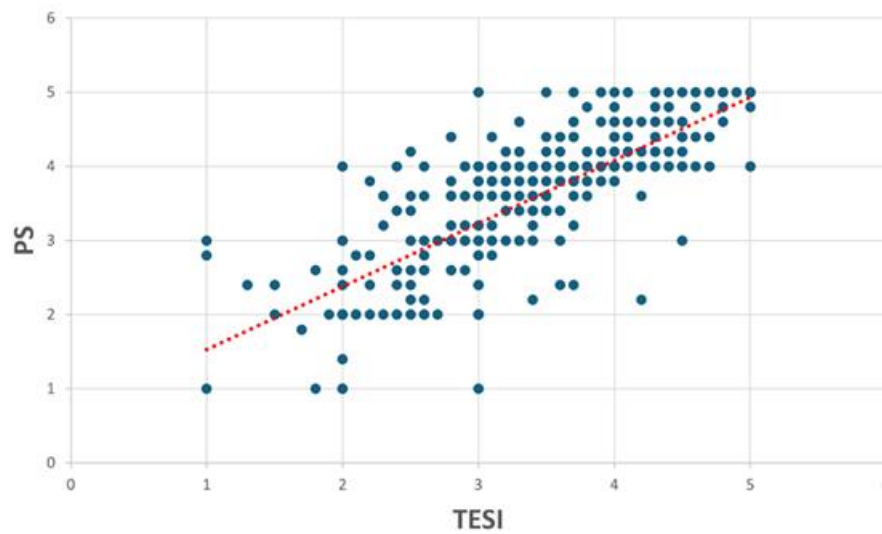


Figure 6.7 : Linear positive monotonic relationship between Technology-Enabled Service Innovation (TESI) and Patient Satisfaction (PS). Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

6.4.2 Mediation analysis

Mediation analyses were conducted in JASP using the Mediation Analysis function of the Structural Equation Modeling module to test hypotheses H5a, H5b, and H6. Bootstrapping with 5,000 samples was used to estimate the indirect effects and their 95% confidence intervals.

Research Hypothesis 5a (H5a): Customer engagement mediates the relationship between relationship marketing orientation and customer value co-creation behavior.

To test whether CE mediates the relationship between RMO and CVCB, a mediation analysis was conducted. The total effect (path c) of RMO on CVCB was significant ($\beta = 0.686$, $p < .001$). RMO significantly predicted CE (path a: $\beta = 0.472$, $p < .001$). When both RMO and CE were included in the model predicting CVCB, CE remained significant (path b: $\beta = 0.082$, $p = .023$) and the direct effect of RMO on CVCB was reduced but remained significant ($c' = 0.648$, $p < .001$). The indirect effect of RMO on CVCB through CE was also significant ($\beta = 0.039$, $p = .024$, 95% CI [0.005, 0.073]). This suggests partial mediation, as the effect of RMO on CVCB was reduced but remained significant after including CE. Thus, H5a is supported. Figure 6.8 presents the mediation effect of Customer Engagement on the relationship between Relationship Marketing Orientation and Customer Value Co-

Creation Behavior, while the full mediation output is presented in Table B-10 in Appendix B.

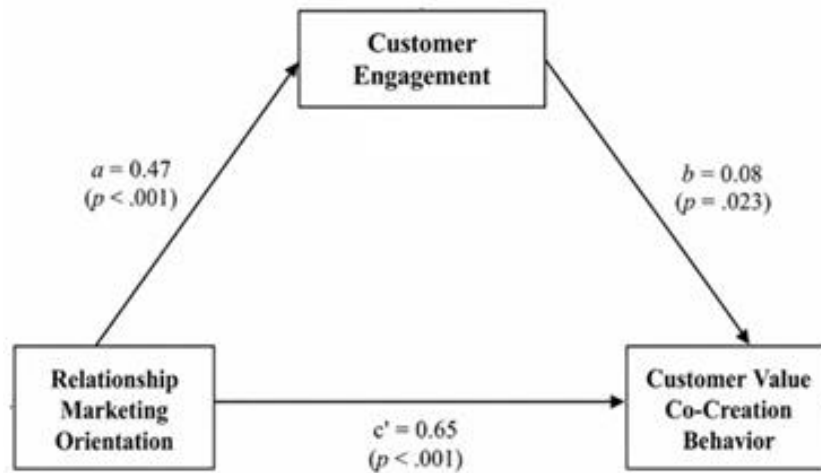


Figure 6.8 : Mediation effect of Customer Engagement on the relationship between Relationship Marketing Orientation and Customer Value Co-Creation Behavior. Source: Michail, M (2026) "Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context"

Research Hypothesis 5b (H5b): Customer engagement mediates the relationship between relationship marketing orientation and patient satisfaction.

To test whether CE mediates the relationship between RMO and PS, a mediation analysis was conducted. The total effect (path c) of RMO on PS was significant ($\beta = 0.847$, $p < .001$). RMO significantly predicted CE (path a: $\beta = 0.472$, $p < .001$). When both RMO and CE were included in the model predicting PS, CE remained significant (path b: $\beta = 0.165$, $p < .001$) and the direct effect of RMO on PS was reduced but remained significant ($c' = 0.769$, $p < .001$). The indirect effect of RMO on PS through CE was also significant ($\beta = 0.078$, $p < .001$, 95% CI [0.053, 0.105]). This suggests partial mediation, as the effect of RMO on PS was reduced but remained significant after including CE. Thus, H5b is supported. Figure 6.9 presents the mediation effect of Customer Engagement on the relationship between Relationship Marketing Orientation and Patient Satisfaction, while the full mediation output is presented in Table B-11 in Appendix B.

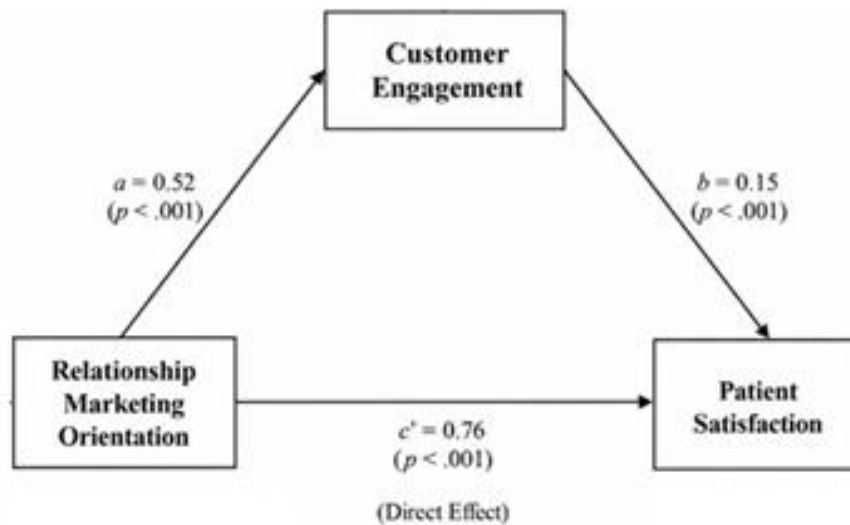


Figure 6.9 : Mediation effect of Customer Engagement on the relationship between Relationship Marketing Orientation and Patient Satisfaction. Source: Michail, M (2026) "Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context"

Research Hypothesis 6 (H6): Customer engagement mediates the relationship between technology-enabled service innovation and patient satisfaction.

To test whether CE mediates the relationship between TESI and PS, a mediation analysis was conducted. The total effect (path c) of TESI on PS was significant ($\beta = 0.795$, $p < .001$). TESI significantly predicted CE (path a: $\beta = 0.498$, $p < .001$). When both TESI and CE were included in the model predicting PS, CE remained significant (path b: $\beta = 0.175$, $p < .001$) and the direct effect of TESI on PS was reduced but remained significant ($c' = 0.708$, $p < .001$). The indirect effect of TESI on PS through CE was also significant ($\beta = 0.087$, $p < .001$, 95% CI [0.055, 0.122]). This suggests partial mediation, as the effect of TESI on PS was reduced but remained significant after including CE. Thus, H6 is supported. Figure 6.10 presents the mediation effect of Customer Engagement on the relationship between Technology-Enabled Service Innovation and Patient Satisfaction, while the full mediation output is presented in Table B-12 in Appendix B.

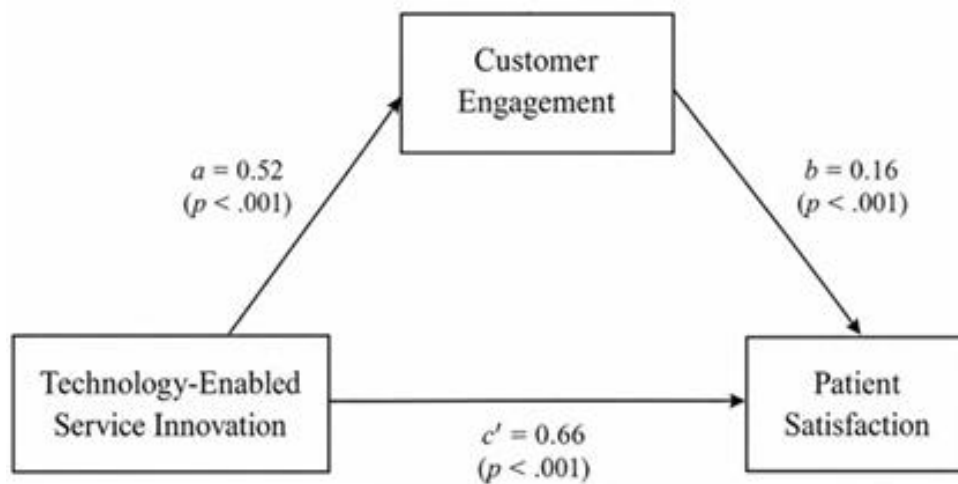


Figure 6.10 : Mediation effect of Customer Engagement on the relationship between Technology-Enabled Service Innovation and Patient Satisfaction. Source: Michail, M (2026) "Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context"

6.4.3 Moderation analysis

Moderation analysis was conducted to examine the two hypotheses concerning the moderating role of MR in the relational pathway of the proposed model. Specifically, the analysis tested whether Moral Reasoning moderates the relationship between RMO and CVCB (H7), as well as the relationship between RMO and PS (H8). The moderation analyses were performed in JASP using linear regression models with interaction terms. For each model, the independent variable, the moderator, and their interaction term were entered as predictors. Therefore, the statistical evaluation of moderation was based on the significance of the interaction term between Relationship Marketing Orientation and Moral Reasoning. Full statistical outputs are presented in Appendix B (see Table B-13 and Table B-14).

Research Hypothesis 7 (H7): Moral reasoning moderates the relationship between relationship marketing orientation and customer value co-creation behavior, such that the relationship is stronger when patients have higher moral reasoning.

A moderation analysis was conducted using linear regression in JASP, with CVCB as the dependent variable, RMO as the independent variable, MR as the moderator, and the interaction term $RMO \times MR$ as the moderation effect.

We present below the regression equation (see 6.6):

$$\text{CVCB} = 0.500 + 0.607\text{RMO} + 0.533\text{MR} - 0.062(\text{RMO} \times \text{MR}) \quad (6.6)$$

The overall regression model is statistically significant, $F(3, 432) = 166.7, p < .001$, with $R = 0.732$ and $R^2 = 0.537$, indicating that the model explains 53.7% of the variance in CVCB. RMO has a positive and statistically significant effect on CVCB ($b = 0.607, \beta = 0.748, t = 4.753, p < .001$). Further, MR has a positive and statistically significant effect on CVCB ($b = 0.533, \beta = 0.533, t = 4.453, p < .001$). However, the interaction term between RMO and MR was not statistically significant ($b = -0.062, \beta = -0.442, t = -1.828, p = .068$). Therefore, MR does not significantly moderate the relationship between RMO and CVCB. Although RMO and MR independently contribute to CVCB, MR does not significantly change the strength of the relationship between RMO and CVCB at $\alpha = .05$.

Figure 6.11 visually presents the simple slopes of the RMO–CVCB relationship at low, mean, and high levels of Moral Reasoning. Although the relationship remains positive across all levels of MR, the interaction effect is not statistically significant. Therefore, H7 is not supported.

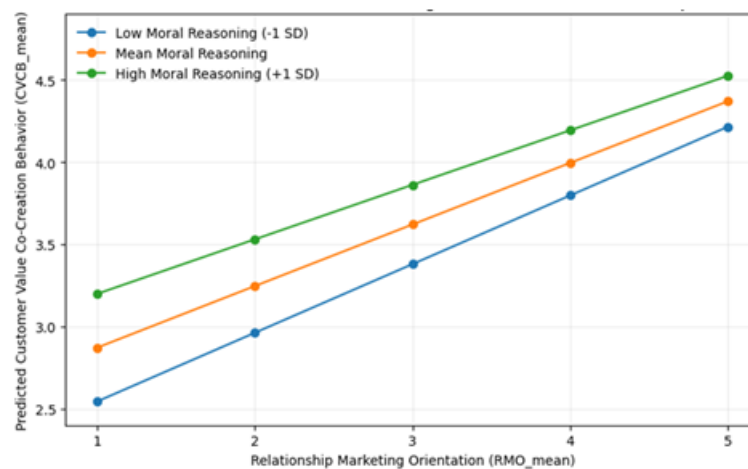


Figure 6.11 : Moderation effect of Moral Reasoning on the relationship between Relationship Marketing Orientation and Customer Value Co-Creation Behavior. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Research Hypothesis 8 (H8): Moral reasoning moderates the relationship between relationship marketing orientation and patient satisfaction, such that the relationship is stronger when patients have higher moral reasoning.

A moderation analysis is conducted using linear regression in JASP, with PS as the dependent variable, RMO as the independent variable, MR as the moderator, and the interaction term $RMO \times MR$ as the moderation effect.

We present below the regression equation (see 6.7):

$$PS = -0.477 + 1.006RMO + 0.353MR - 0.061(RMO \times MR) \quad (6.7)$$

The overall regression model is statistically significant, $F(3, 432) = 384.3$, $p < .001$, with $R = 0.853$ and $R^2 = 0.727$, indicating that the model explains 72.7% of the variance in Patient Satisfaction. Relationship Marketing Orientation has a positive and statistically significant effect on Patient Satisfaction ($b = 1.006$, $\beta = 0.988$, $t = 8.181$, $p < .001$). Moral Reasoning also has a positive and statistically significant effect on Patient Satisfaction ($b = 0.353$, $\beta = 0.281$, $t = 3.057$, $p = .002$). However, the interaction term between RMO and MR is not statistically significant at the conventional 5% significance level ($b = -0.061$, $\beta = -0.350$, $t = -1.884$, $p = .060$). Therefore, Moral Reasoning does not significantly moderate the relationship between Relationship Marketing Orientation and Patient Satisfaction. Figure 6.12 visually presents the simple slopes of the RMO–PS relationship at low, mean, and high levels of Moral Reasoning. Although the relationship remains positive across all levels of MR, the interaction effect is not statistically significant. Therefore, H8 is not supported.

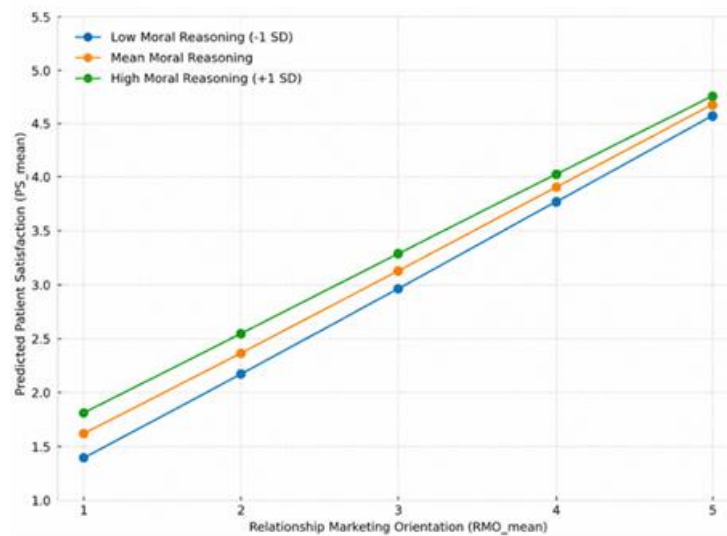


Figure 6.12 : Moderation effect of Moral Reasoning on the relationship between Relationship Marketing Orientation and Patient Satisfaction. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

6.5 Summary of hypotheses testing

Figure 6.13 summarizes the research results of the proposed model by presenting the supported and non-supported research hypotheses. The model includes the direct relationships among Customer Orientation, Technology-Enabled Service Innovation, Relationship Marketing Orientation, Customer Engagement, Patient Satisfaction, and Customer Value Co-Creation Behavior, as well as the mediating role of Customer Engagement and the moderating role of Moral Reasoning.

The blue arrows in the figure represent the direct relationships examined through correlation analysis. The dashed red paths indicate the mediating effects of Customer Engagement, while the orange paths represent the moderating effects of Moral Reasoning. The results show that the direct relationships included in the model were statistically supported. In addition, Customer Engagement was confirmed as a mediator in the examined relationships. However, the moderating role of Moral Reasoning was not statistically supported, as the interaction terms were not significant at the conventional 5% level.

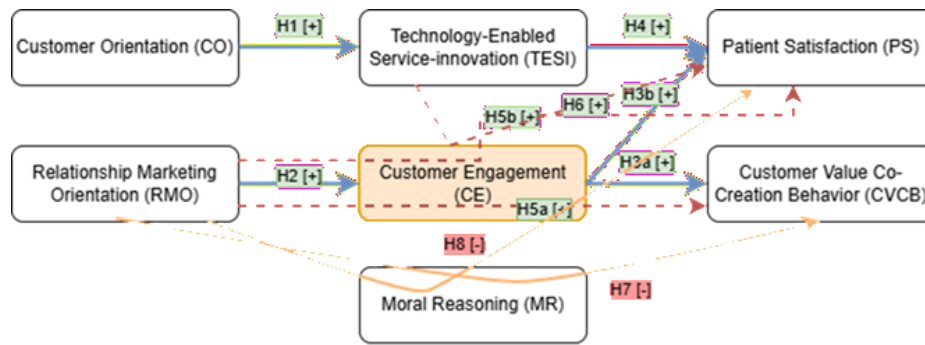


Figure 6.13 : Research model including the research hypotheses results. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

In the following Table 6-1, the support of the research hypotheses and the corresponding significance level are summarized.

Hypothesis	Research hypothesis	Support	Significance level
H1	Customer Orientation positively influences Technology-Enabled Service Innovation.	Supported	$\alpha = .05$
H2	Relationship Marketing Orientation positively influences Customer Engagement.	Supported	$\alpha = .05$
H3a	Customer Engagement positively influences Customer Value Co-Creation Behavior.	Supported	$\alpha = .05$
H3b	Customer Engagement positively influences Patient Satisfaction.	Supported	$\alpha = .05$
H4	Technology-Enabled Service Innovation positively influences Patient Satisfaction.	Supported	$\alpha = .05$
H5a	Customer Engagement mediates the relationship between Relationship Marketing Orientation and Customer Value Co-Creation Behavior.	Supported	$\alpha = .05$ (95% bootstrap CI excludes 0): [0.005, 0.073]
H5b	Customer Engagement mediates the relationship between Relationship Marketing Orientation and Patient Satisfaction.	Supported	$\alpha = .05$ (95% bootstrap CI excludes 0): [0.053, 0.105]
H6	Customer Engagement mediates the relationship between Technology-Enabled Service Innovation and Patient Satisfaction.	Supported	$\alpha = .05$ (95% bootstrap CI excludes 0): [0.055, 0.122]

H7	Moral Reasoning moderates the relationship between Relationship Marketing Orientation and Customer Value Co-Creation Behavior.	Not supported	$\alpha = .05, p = .068$
H8	Moral Reasoning moderates the relationship between Relationship Marketing Orientation and Patient Satisfaction.	Not supported	$\alpha = .05, p = .060$

Note. H1–H4 were tested using Spearman’s rho correlation analysis and statistical significance is reported using the α level. H5a–H6 were tested using bootstrapped mediation analysis (5,000 bootstrap resamples). Indirect effects are considered statistically significant at $\alpha = .05$ when the 95% bootstrap confidence interval excludes zero. H7–H8 were tested using moderation regression analysis; moderation is supported only when the interaction term is statistically significant at $\alpha = .05$

Table 6-1: Hypotheses’ results. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Based on the assumptions of the adopted theoretical model we can interpret the above research results as follows.

- Under Service-Dominant Logic (SDL), customer orientation helps organizations recognize patient needs and adjust resources to support technology-based service improvements (TESI). Therefore, a strong positive link between customer-focused practices and TESI is expected. When providers systematically attend to patient needs, they are more likely to establish and improve technology-based services that patients perceive as new and valuable. In SDL terms, customer-focused approaches enhance the provider’s ability to leverage knowledge, responsiveness, and coordination, which are key components of TESI (see H1).
- Grounded in Social Exchange Theory (SET), Relationship Marketing Orientation (RMO) is a set of relational signals, specifically, trust, communication, responsiveness, and empathy, that create perceived relational benefits. According to SET, these benefits activate reciprocity norms, which in turn motivate patients to respond with stronger Customer Engagement (CE) (see H2). The results show that when patients notice relationship-oriented practices, they reciprocate by being more cognitively, emotionally, and behaviorally engaged. This finding supports the dissertation’s idea that reciprocity is the mechanism linking relational practices to patient responses.
- Within the integrated framework, CE is the main psychological engine, transforming relational and technological inputs into behavioral outcomes. Further, the positive relationship between CE and Customer Value Co-Creation Behavior (CVCB) supports the idea that engaged patients are more willing to invest effort, share information, and engage

- in voluntary co-creation behaviors (see H3a). This finding aligns with SDL's view that value emerges in use, through participation and resource integration. Additionally, it supports SET's idea that engagement is a reciprocating response, expressed as co-creation behavior.
- The link between CE and Patient Satisfaction (PS) shows that in technology-intensive healthcare, satisfaction comes not only from service features but also from patients' psychological involvement (see H3b). In SDL, engagement means actively integrating resources. In SET, it means reciprocating relational benefits. Higher engagement leads to more positive evaluations and higher satisfaction, supporting the model's view that while engagement is distinct from satisfaction, it strongly predicts it.
 - SDL contends that while technology and equipment are valuable resources, service procedures that enhance access, coordination, dependability, and perceived quality are what add value. Patients perceive technology-enabled service innovation, as evidenced by the positive correlation between TESI and PS, which directly improves their service experience and outcomes (e.g., better delivery, responsiveness, and routines). Higher satisfaction results from these improvements (see H4). According to section 4.4, innovation primarily improves patient outcomes when it is perceived as a capability or a reconfiguration of service design, rather than just the presence of technology.
 - The partial mediation of CE in the relationship between RMO and CVCB is consistent with the SET-based premise that relational practices promote engagement through reciprocity and that engagement then channels that reciprocity into co-creation behaviors (see H5a). The idea that relationship marketing can affect patient behavior beyond engagement mechanisms is supported by a partial mediation effect, with theoretical significance because it implies that RMO promotes co-creation both directly and indirectly.
 - The model's logic is supported by H5b's evidence for partial mediation. RMO generates perceived benefits (SET) and relational value, which in turn cause CE. Engagement then leads to more favorable assessments of the service interaction, thereby raising PS. Therefore, partial mediation implies that relationship marketing also directly influences satisfaction, probably through trust, communication, and responsiveness, even though engagement is a crucial pathway. This works well even in situations that require a lot of technology and is consistent with the relational stream of the dissertation.
 - According to SDL, the TESI-PS relationship is mediated by CE. Technology-enabled innovation mainly adds value when patients use these tools in their treatment (see H6). Engagement is what makes this integration possible. TESI raises engagement, which in turn increases satisfaction, by facilitating more effective processes, increasing empowerment, and broadening interactions. Partial mediation shows that TESI also raises satisfaction

through perceived quality, efficiency, and dependability, as well as directly through engagement.

- The non-significant interaction indicates that MR has no effect on the strength of the RMO-CVCB relationship in this sample (see H7). This implies that moral reasoning could function primarily as a stand-alone ethical lens. In this situation, the relational-to-behavioral pathway might function similarly at all levels of moral reasoning.
- MFT-based assumptions suggest that higher moral reasoning should make patients more responsive to ethical relational cues, strengthening RMO's effect on PS (see H8). The non-significant moderation suggests that the satisfaction benefits of relationship marketing do not depend on patients' moral reasoning in this data. It may be that RMO's relational practices are salient enough to improve satisfaction regardless of MR. Also, MR's ethical sensitivity may not affect satisfaction responses when relational quality is already high.
- The results validate the hypothesized relationship and innovation streams. The primary mechanism by which relational and technological inputs are converted into patient outcomes is confirmed to be customer engagement. However, our sample does not support the use of moral reasoning as a boundary condition.

6.6 Empirical Tested Model

Following hypothesis testing, two multiple linear regression models were estimated to assess the explanatory power of the statistically supported predictors for the two main outcome variables. The first regression model examined PS as the dependent variable. The predictors were TESI, RMO, and CE, based on the supported direct and mediating relationships involving PS. The second regression model examined CVCB as the dependent variable. The predictors were RMO and CE, based on the supported relational and engagement pathway leading to CVCB. MR is not included in the empirical regression models because its hypothesized moderating role is not supported by H7 and H8. The results of the regression analyses are presented below.

Patient Satisfaction

For the first empirical regression model, PS was entered as the dependent variable, while TESI, RMO, and CE were entered as independent variables.

The multiple linear regression model was statistically significant, $F(3, 432) = 435.1$, $p < .001$, indicating that the selected predictors significantly explain Patient Satisfaction. The model showed a strong explanatory power, with $R = 0.867$, $R^2 = 0.751$, and Adjusted $R^2 = 0.750$, meaning that 75.1% of the variance in Patient Satisfaction is explained by TESI, RMO, and CE.

Regarding the individual predictors, all three variables had statistically significant positive effects on Patient Satisfaction. Relationship Marketing Orientation was the strongest predictor ($b = 0.603$, $\beta = 0.593$, $t = 12.94$, $p < .001$), followed by Technology-Enabled Service Innovation ($b = 0.239$, $\beta = 0.223$, $t = 4.791$, $p < .001$) and Customer Engagement ($b = 0.154$, $\beta = 0.137$, $t = 4.916$, $p < .001$). Therefore, the empirical model confirms that Patient Satisfaction is mainly explained by relationship marketing, while technology-enabled service innovation and customer engagement also contribute significantly. We present below the regression equation (see 6.8):

$$\text{PS} = 0.211 + 0.239 \text{ TESI} + 0.603 \text{ RMO} + 0.154 \text{ CE} \quad (6.8)$$

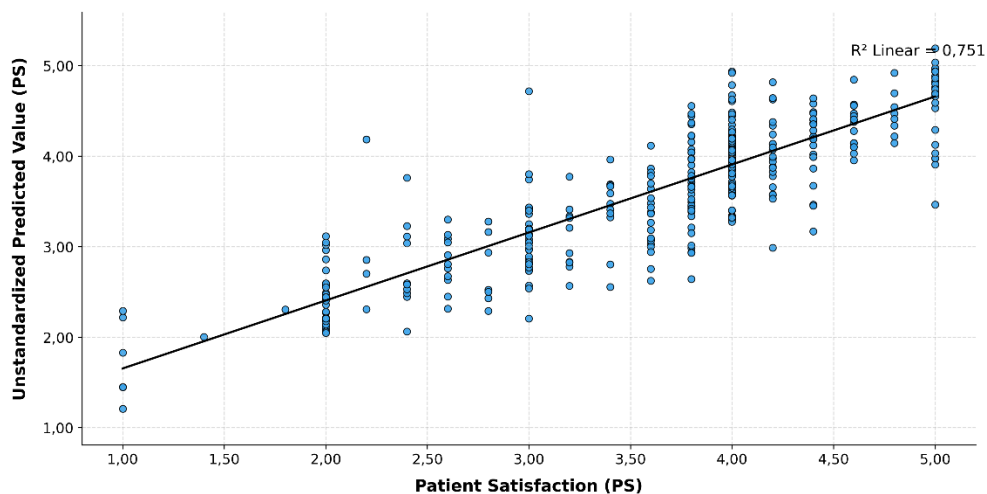


Figure 6.14 : Regression fitted line plot. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

The detailed analysis can be found in Appendix Table B-15.

Customer Value Co-Creation Behavior

For the second empirical regression model, CVCB was entered as the dependent variable, while RMO and CE were entered as independent variables. The multiple linear

regression model was statistically significant, $F(2, 433) = 196.6$, $p < .001$, indicating that the selected predictors significantly explain Customer Value Co-Creation Behavior. The model showed moderate-to-strong explanatory power, with $R = 0.690$, $R^2 = 0.476$, and Adjusted $R^2 = 0.473$, meaning that 47.6% of the variance in Customer Value Co-Creation Behavior is explained by RMO and CE.

Regarding the individual predictors, both variables had statistically significant positive effects on Customer Value Co-Creation Behavior. Relationship Marketing Orientation was the strongest predictor ($b = 0.525$, $\beta = 0.648$, $t = 16.41$, $p < .001$), while Customer Engagement also had a smaller but statistically significant positive effect ($b = 0.073$, $\beta = 0.082$, $t = 2.071$, $p = .039$). Therefore, the empirical model confirms that Customer Value Co-Creation Behavior is mainly explained by Relationship Marketing Orientation, with Customer Engagement also contributing significantly. We present below the regression equation (see 6.9):

$$\text{CVCB} = 1.738 + 0.525 \text{ RMO} + 0.073 \text{ CE} \quad (6.9)$$

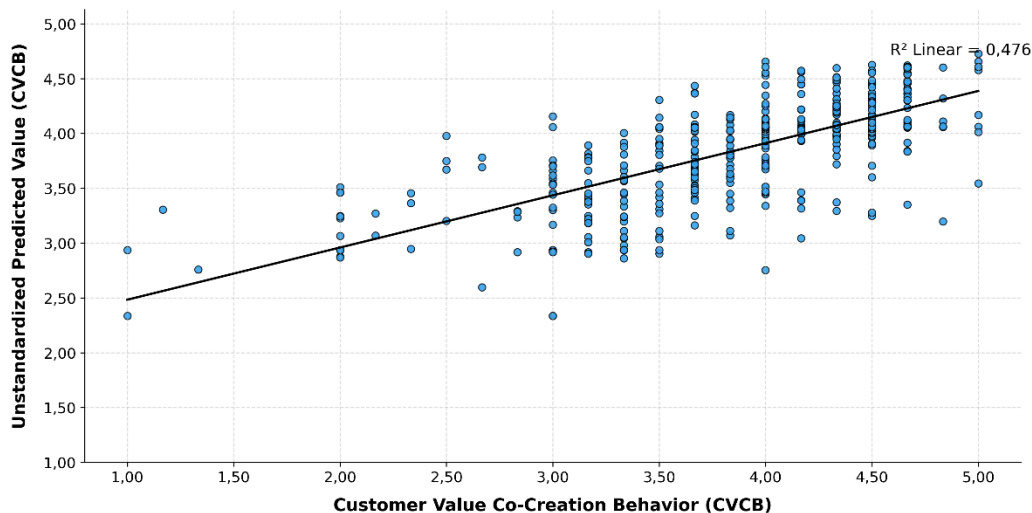


Figure 6.15 : Regression fitted line plot. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

The detailed analysis can be found in Appendix Table B-16.

Therefore, based on the research results, the final model of our study is depicted in Figure 6.16.

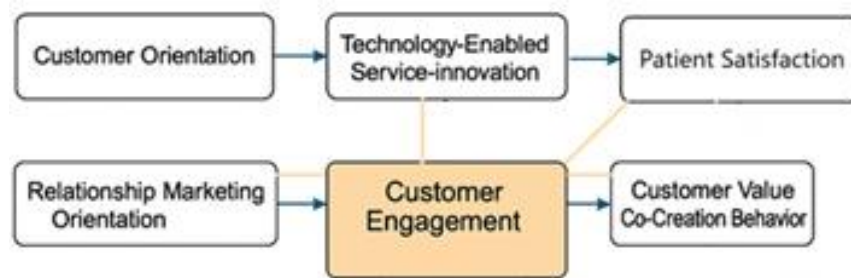


Figure 6.16 : Empirical tested model. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Chapter 7: Discussion

Chapter 7 presents discussion points associated with our research results. The chapter is structured as follows: Section 7.1 discusses the degree of answering the research objectives and the support of the initial assumptions; Section 7.2 discusses relating our findings with those of previous studies; Section 7.3 examines theoretical and research implications; Section 7.4 discusses practical implications; and section 7.5 discusses proposed directions for further research and the study’s limitations.

7.1 The degree of answering the research objectives and the support of the initial assumptions

The proposed integrated model successfully explains the specific relationships among constructs in the Greek healthcare context, as evidenced by the study's findings, which closely align with the research objectives. According to the findings, customer orientation positively affects innovation in technology-enabled services, while relationship marketing orientation positively affects customer engagement.

Additionally, it has been demonstrated that customer engagement plays a significant role in shaping both customer behavior in generating value and patient satisfaction. Customer engagement mediates the relationship between technology-enabled service innovation and relationship marketing orientation in relation to patient outcomes, according to mediation analysis. These relationships are empirically validated through correlation, regression, and mediation analyses, demonstrating the interplay between technological and relational mechanisms that influence patient outcomes, thereby fulfilling the study's primary objective.

The findings support the central premise that customer engagement is the main psychological mechanism linking innovation and relationship marketing to patient outcomes, confirming the initial assumptions. Customer engagement, in particular, plays a crucial role in influencing the correlation between relationship marketing orientation and technology-driven service innovation. This interaction affects both patient satisfaction and the co-creation of customer value. This confirms the crucial role that customer engagement plays in establishing a connection between organizational inputs and patient experiences.

The second assumption was only partially supported, suggesting that technology-enabled service innovation has weak or limited direct effects on patient satisfaction. Although mediation analysis reveals that customer engagement significantly enhances this effect, the results show a strong direct connection between technology-enabled service innovation and patient satisfaction. According to this finding, technology has a direct impact on patient perceptions, yet its full significance is evident when patients are actively involved.

The third assumption was a strong support for the robustness of the relational pathway. A relationship marketing orientation is a crucial predictor of engagement and outcomes, and communication, trust, and relationship quality are crucial in healthcare. However, moral reasoning did not show a significant moderating effect and acts more as an independent evaluative factor than a boundary condition for relational effects.

The study provides strong empirical support for the integrated framework by confirming the central role of customer engagement and the complementary roles of technological innovation and relationship marketing. The findings validated most of the assumptions, but they also improved understanding of how innovation directly affects moral reasoning and of the limited moderating role of moral reasoning.

7.2 Relating the findings to earlier work

The empirical pattern is consistent with Service-Dominant Logic and Social Exchange Theory (Vargo & Lusch, 2008; Cropanzano & Mitchell, 2005), supporting the two-stream logic by demonstrating that both an innovation pathway and a relational pathway contribute to patient outcomes, with customer engagement acting as a central transmission mechanism. The strong positive correlation between customer orientation and technology-enabled service innovation supports previous findings that needs-sensing, responsiveness, and coordinated service practices foster perceived innovation capability in healthcare services (Yeboah & Amponsah, 2025; Mauro et al., 2024).

The research results both confirm and refine the mixed evidence on whether technology-enabled service innovation translates into satisfaction. Prior work cautions that technology alone may not reliably improve satisfaction unless patients can meaningfully integrate digital and clinical resources, implying a primarily indirect mechanism through engagement, empowerment, and participation (Yoshimura et al., 2025; Zhou et al., 2025).

Although our study found a strong direct correlation between technology-enabled service innovation and patient satisfaction, the significant indirect effect through customer engagement is consistent with explanations based on engagement, indicating that technology improves coordination, access, and perceived reliability in ways that encourage involvement (Endalamaw et al., 2025; Vickery et al., 2025).

The relational stream is a close replica of previous relationship-marketing data. Relationship marketing orientation and customer engagement are positively correlated, and engagement is positively correlated with satisfaction and value co-creation behavior. These findings align with research suggesting that responsiveness, communication, and trust activate reciprocity norms and encourage cooperative patient behaviors (Arefin et al., 2025; Liu et al., 2025).

Further, the view that relationship marketing can influence outcomes by cultivating engagement and by exerting additional direct effects through perceived relational value is also supported by the observed partial mediation patterns (Arefin et al., 2025; Tran & Vu, 2021).

First, the weaker psychometric behavior of customer engagement at the item level echoes calls to treat engagement as multidimensional and context-sensitive rather than strictly unidimensional, which helps explain measurement instability in complex hospital settings (Bassi et al., 2026; Alomar et al., 2024). Second, moral reasoning did not moderate the relational effects, contrasting with findings that ethical sensitivity amplifies responses to relationship marketing; this discrepancy may indicate that, in Greek equipment-intensive encounters, relational quality cues are sufficiently salient to influence most patients similarly, leaving moral reasoning to operate more as an independent predictor than a boundary condition (Arefin et al., 2025; Shankland et al., 2025; Zhang et al., 2025).

7.3 Theoretical and research implications

The findings carry important ontological implications for the study of healthcare services. First, they reinforce the view that value is not embedded in medical technologies or relational practices per se, but emerges through patients’ active integration of technological, organizational, and relational resources during service experiences (Vargo & Lusch, 2008, 2016). In this sense, patient satisfaction and value co-creation are shown to be relationally emergent phenomena, rather than fixed outcomes of service delivery.

Although the non-significant moderating role of moral reasoning suggests that ethical evaluation may function more as a parallel evaluative disposition than as a contingent boundary condition in this context, the confirmed role of customer engagement further supports an ontology of healthcare. An ontology is a partial mediator in which patients actively co-create value (Arefin et al., 2025).

At the epistemological level, the findings lend credence to a theory-based, post-positivist interpretation of patient experience, according to which latent service phenomena can be identified by empirically measuring perceptions, actions, and indirect effects. As a result, the study reinforces SDL and SET as complementary explanatory lenses, demonstrating that engagement is the primary mechanism by which relationship marketing and innovation translate into significant results (Cropanzano and Mitchell, 2005; Vargo & Lusch, 2016).

The verified integrated model makes it clear that technology by itself is not enough as a research implication. When relationship quality and engagement are modeled together, the explanatory power increases. As a result, the study provides a more context-sensitive framework for analyzing patient outcomes in healthcare settings that heavily rely on technology (Alomar et al., 2024; Cevasco et al., 2024).

7.4 Practical implications

The findings suggest that managers of hospitals, clinics, diagnostic centers, and medical equipment providers should avoid treating technology investment as sufficient in itself. Instead, technology-enabled service innovation should be designed and delivered as an integrable service experience, supported by clear communication, patient guidance, responsive staff interaction, and processes that help patients use technological resources meaningfully in their care.

Because engagement is what transforms relational and technological inputs into increased satisfaction and co-creation outcomes, investments in digital tools, state-of-the-art equipment, and service redesign should be accompanied by patient-facing support

mechanisms that strengthen understanding, confidence, and participation (Alomar et al., 2024; Cevasco et al., 2024).

Further, the findings suggest that, rather than being abstract strategic goals, relationship marketing techniques should be operationalized as routine customer service procedures. Because these techniques both directly raise customer satisfaction and indirectly improve outcomes through customer engagement, frontline interactions should include trust-building, responsiveness, empathy, personalized communication, and effective complaint handling (Arefin et al. 2025; Mitchell and Cropanzano, 2005). This means that healthcare administrators should align patient communication systems, service protocols, and staff training with engagement-oriented care.

Finally, moral reasoning did not significantly moderate the relational effects. Therefore, ethically sound treatment remains a general standard of care. However, providers should prioritize consistent relational quality and engagement-building across all patient groups rather than segmenting practice primarily by assumed ethical sensitivity (Arefin et al. 2025).

7.5 Further research and limitations

It's critical to acknowledge the various limitations of research. First, the integrated model's conclusions are context-specific because they were validated in Greek healthcare and thus reflect a particular institutional, relational, and cultural setting. Second, the study employs a quantitative, perception-based methodology, which provides an intrinsically limited representation of intricate patient experiences and assessment processes but is ideal for investigating theoretical connections. Third, despite the widespread support for the integrated framework, moral reasoning did not serve as a significant boundary condition in this sample, suggesting that its explanatory role may be weaker or more context-dependent than initially thought.

Based on these limitations, further research could test the model in other healthcare systems and cultural contexts to assess the transferability of the present findings. It would also be useful to adopt multi-level and more context-sensitive designs that examine

engagement, satisfaction, and co-creation across different healthcare encounters and organizational settings. In addition, future studies may refine the operationalization of engagement and moral reasoning to more fully clarify their roles within technology-intensive healthcare relationships.

Chapter 8: Conclusion

The aim of this dissertation was to examine how Customer Orientation (CO) and Relationship Marketing Orientation (RMO) in medical equipment provision influence Patient Satisfaction (PS) and Customer Value Co-Creation Behavior (CVCB), through the mediating roles of Technology-Enabled Service Innovation (TESI) and Customer Engagement (CE), while considering the moderating role of Moral Reasoning (MR) in the Greek healthcare context.

Regarding the first research objective, the study confirmed that Customer Orientation positively influences Technology-Enabled Service Innovation. This indicates that when providers systematically identify and respond to patient needs, they are better able to develop and deliver innovations that patients perceive as meaningful and valuable.

Regarding the second research objective, the results showed that Relationship Marketing Orientation positively affects Customer Engagement, and that Customer Engagement, in turn, positively affects both Patient Satisfaction and Customer Value Co-Creation Behavior. These findings highlight that trust, responsiveness, empathy, and communication remain central in technology-intensive healthcare and that patient outcomes depend not only on technological capability, but also on active relational participation.

Regarding the third research objective, the mediation analyses demonstrated that Customer Engagement partially mediates the effects of RMO on PS and CVCB, and of TESI on PS. Therefore, engagement emerged as the central mechanism by which relational and technological inputs translate into meaningful patient outcomes.

As for the fourth research objective, the study did not find significant support for the moderating role of Moral Reasoning. This suggests that, in this context, moral reasoning functions more as an independent evaluative disposition than as a strong boundary condition shaping relational effects.

The dissertation contributes to healthcare services marketing, and more specifically to relationship marketing in technology-intensive healthcare services, by validating an integrated model in the underexplored setting of Greek healthcare equipment provision. For

academia, it offers a context-sensitive, empirically grounded integration of SDL, SET, and MFT. For marketing managers and healthcare administrators, it shows that superior patient outcomes require not only advanced technologies, but also engagement-oriented relationship practices embedded in everyday service delivery.

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Appendix A: “Questionnaire”

COVER LETTER

Dear Madam/Sir,

For the research needs of the dissertation titled *“Technology-Enabled Service Innovation and Relationship Marketing in Healthcare Equipment Provision: An Empirical Study in the Greek Healthcare Context”*, we would like to invite you to participate in our study.

The dissertation is prerequisite for the successful completion of the Master in Business Administration (M.B.A) Programme of the Hellenic Open University (H.O.U.). The study aims to examine the role of technology-enabled service innovation and relationship marketing orientation in shaping customer engagement, patient satisfaction, and customer value co-creation behavior in the Greek healthcare context.

Based on the survey method, the responses of patients who have visited a hospital, clinic, or diagnostic center in Greece are investigated.

Your participation in this study is of great importance to us. It is completely voluntary, and you have the right to withdraw at any stage. It should only take you a few minutes to complete the survey.

The collected data will be used for the research needs of this dissertation.

Feel free to contact us.

Thank you in advance for your cooperation.

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QUESTIONNAIRE

Section A: Healthcare Service Experience

1. Have you ever visited a hospital, clinic, or diagnostic center in Greece? (mark (X) one answer)

- ☐ Yes ☐ No

[If you answered "No", please do not continue with the questionnaire. Thank you for your time.]

2. In the past 12 months, how many times have you visited a hospital, clinic, or diagnostic center in Greece? (mark (X) one answer)

- ☐ 1–2 times
☐ 3–5 times
☐ 6–10 times
☐ More than 10 times

3. What type of healthcare facility did you most recently visit? (mark (X) one answer)

- ☐ Public Hospital
☐ Private Hospital
☐ Private Clinic
☐ Diagnostic Center

Section B: Demographic Profile

4. Please select your gender (mark (X) one answer).

- ☐ Male
☐ Female
☐ I prefer not to say

5. Please select the age group you belong (mark (X) one answer).

- ☐ Under 18
☐ 18 – 24
☐ 25 – 34
☐ 35 – 44
☐ 45 – 54
☐ 55 – 64
☐ 65 or over

[If you chose "Under 18", please do not answer the following questions.]

6. Please select the highest level of education you have completed (mark (X) one answer).

- ☐ Basic Education
- ☐ Secondary Education
- ☐ Higher Education
- ☐ Postgraduate Studies
- ☐ Other

7. In which city do you currently reside? (mark (X) one answer)

- ☐ Athens ☐ Piraeus ☐ Thessaloniki ☐ Patras ☐ Heraklion ☐ Ioannina

Section C: Customer Orientation

8. The following statements relate to *customer orientation*. Please indicate to what extent you agree or disagree with the following statements. Please tick (X) one answer for each statement.

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am excited about the range of services that the hospital/clinic/diagnostic center provides.	☐	☐	☐	☐	☐
The hospital/clinic/diagnostic center provides personalized services that meet my health preferences.	☐	☐	☐	☐	☐
Customer service is provided excellently by the hospital/clinic/diagnostic center.	☐	☐	☐	☐	☐
The hospital/clinic/diagnostic center works hard to satisfy patients.	☐	☐	☐	☐	☐
No matter how employees feel, they always do the best they can for every patient they serve.	☐	☐	☐	☐	☐
The hospital/clinic/diagnostic center often makes an extra effort to help patients even if it is not expected of them.	☐	☐	☐	☐	☐
The hospital/clinic/diagnostic center periodically finds out patients' needs in order to serve them better.	☐	☐	☐	☐	☐

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am well-informed about the services being provided.	☐	☐	☐	☐	☐
I have high confidence in the services that the hospital/clinic/diagnostic center provides.	☐	☐	☐	☐	☐
The range of health services that the hospital/clinic/diagnostic center provides is adequate.	☐	☐	☐	☐	☐

Section D: Technology-Enabled Service Innovation

9. The following statements relate to *technology-enabled service innovation*. Please indicate to what extent you agree or disagree with the following statements. Please tick (X) one answer for each statement.

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The use of technology gives a priority in the provision of healthcare services at the hospital/clinic/diagnostic center.	☐	☐	☐	☐	☐
The hospital/clinic/diagnostic center provides modern treatment routines for patients.	☐	☐	☐	☐	☐
The hospital/clinic/diagnostic center has a modern technology that helps in diagnosing and treating patients.	☐	☐	☐	☐	☐
The hospital/clinic/diagnostic center has a technology that simplifies patients' administration procedures.	☐	☐	☐	☐	☐
Hospital/Clinic/Diagnostic Center staff ensures that the right tools and equipment are used in the provision of service.	☐	☐	☐	☐	☐
I have great confidence in the systems used by the hospital/clinic/diagnostic center in the provision of services.	☐	☐	☐	☐	☐
Poor systems are avoided by the hospital/clinic/diagnostic center to ensure patient satisfaction.	☐	☐	☐	☐	☐

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The hospital/clinic/diagnostic center uses innovation in the provision of services.	☐	☐	☐	☐	☐
Services delivery at the hospital/clinic/diagnostic center is fast and quick.	☐	☐	☐	☐	☐
I am satisfied with the innovative ways the hospital/clinic/diagnostic center adopts in the provision of services.	☐	☐	☐	☐	☐

Section E: Relationship Marketing Orientation

10. The following statements relate to *relationship marketing orientation*. Please indicate to what extent you agree or disagree with the following statements. Please tick (X) one answer for each statement.

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Clinicians respect my views and take them seriously.	☐	☐	☐	☐	☐
We keep our promises to each other in any situation.	☐	☐	☐	☐	☐
Hospitals/Clinics/Diagnostic Centers provide trustworthy information about their services.	☐	☐	☐	☐	☐
They maintain a standard level of quality.	☐	☐	☐	☐	☐
Hospital/Clinics/Diagnostic Centers are adaptable in meeting my requirements.	☐	☐	☐	☐	☐
Hospital/Clinics/Diagnostic Centers provide customized services to meet my needs.	☐	☐	☐	☐	☐
Problems are quickly resolved at this hospital/clinic/diagnostic center.	☐	☐	☐	☐	☐
The hospital/clinic/diagnostic center makes an effort to avoid potential conflicts.	☐	☐	☐	☐	☐

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
This hospital/clinic/diagnostic center staff listens well and understands my complaints.	☐	☐	☐	☐	☐

Section F: Customer Engagement

11. The following statements relate to *customer engagement*. Please indicate to what extent you agree or disagree with the following statements. Please tick (X) one answer for each statement.

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
It seems insulting to be criticized by someone about this hospital/clinic/diagnostic center.	☐	☐	☐	☐	☐
Usually, I refer to this hospital/clinic/diagnostic center as "we" rather than "they" when I speak about it.	☐	☐	☐	☐	☐
I see the successes of this hospital/clinic/diagnostic center as my successes.	☐	☐	☐	☐	☐
It seems like a personal compliment when someone gives this hospital/clinic/diagnostic center recognition.	☐	☐	☐	☐	☐
This hospital/clinic/diagnostic center is very important to me.	☐	☐	☐	☐	☐
I feel excited about this hospital/clinic/diagnostic center.	☐	☐	☐	☐	☐
Anything related to this hospital/clinic/diagnostic center grabs my attention.	☐	☐	☐	☐	☐
I get happy when I'm interacting with the clinicians.	☐	☐	☐	☐	☐
Hospitals/Clinics/Diagnostic Centers can modify their services to fit my needs.	☐	☐	☐	☐	☐

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
In conversations with those who share interest in this hospital/clinic/diagnostic center, I prefer to take an active part.	☐	☐	☐	☐	☐
I really like sharing thoughts with other individuals who share interest in this hospital/clinic/diagnostic center.	☐	☐	☐	☐	☐
I frequently take part in events with individuals who share interest in this hospital/clinic/diagnostic center.	☐	☐	☐	☐	☐

Section G: Patient Satisfaction

12. The following statements relate to *patient satisfaction*. Please indicate to what extent you agree or disagree with the following statements. Please tick (X) one answer for each statement.

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Overall, I was satisfied with the physician's level of availability in attending to me.	☐	☐	☐	☐	☐
Overall, I was satisfied with the administrative procedures in the hospital/clinic/diagnostic center.	☐	☐	☐	☐	☐
Overall, I was satisfied with the treatment by the medical staff.	☐	☐	☐	☐	☐
I was satisfied with the quality of services that the hospital/clinic/diagnostic center provides.	☐	☐	☐	☐	☐
I received the kind of services that I needed and preferred from the hospital/clinic/diagnostic center.	☐	☐	☐	☐	☐

Section H: Customer Value Co-Creation Behavior

13. The following statements relate to *customer value co-creation behavior*. Please indicate to what extent you agree or disagree with the following statements. Please tick (X) one answer for each statement.

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I have enquired with others and looked up details about the location and services provided by the hospital/clinic/diagnostic center.	☐	☐	☐	☐	☐
I've observed how others make good use of this hospital's/clinic's/diagnostic center's services.	☐	☐	☐	☐	☐
I supplied the clinicians with all the information they required to carry out their responsibilities.	☐	☐	☐	☐	☐
I successfully finished all necessary tasks and shown all desired characteristics.	☐	☐	☐	☐	☐
I followed the staff's instructions and performed my duties to this hospital/clinic/diagnostic center.	☐	☐	☐	☐	☐
I treated the clinicians with kindness and friendliness.	☐	☐	☐	☐	☐

Section I: Moral Reasoning

14. The following statements relate to *moral reasoning*. Please indicate to what extent you agree or disagree with the following statements. Please tick (X) one answer for each statement.

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Usually, my consideration for other people guides my choices.	☐	☐	☐	☐	☐
I make a decision that will maximize the help that others get.	☐	☐	☐	☐	☐
My decisions are often motivated by the welfare of others.	☐	☐	☐	☐	☐

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
If I required any more services from other hospital/clinic/diagnostic center, I would first get in touch with the existing one.	☐	☐	☐	☐	☐

Thank you for completing the questionnaire!

ΣΥΝΟΛΕΥΤΙΚΗ ΕΠΙΣΤΟΛΗ

Αξιότιμη Κυρία / Αξιότιμε Κύριε,

Για τις ερευνητικές ανάγκες της διπλωματικής διατριβής με τίτλο «Καινοτομία Υπηρεσιών με Τεχνολογική Υποστήριξη και Μάρκετινγκ Σχέσεων στην Παροχή Ιατροτεχνολογικού Εξοπλισμού: Μια Εμπειρική Μελέτη στο Πλαίσιο της Ελληνικής Υγειονομικής Περίθαλψης», θα θέλαμε να σας προσκαλέσουμε να συμμετάσχετε στην έρευνά μας.

Η διπλωματική εργασία αποτελεί προαπαιτούμενο για την επιτυχή ολοκλήρωση του Προγράμματος Μεταπτυχιακών Σπουδών στη Διοίκηση Επιχειρήσεων (Master in Business Administration M.B.A.) του Ελληνικού Ανοικτού Πανεπιστημίου (Ε.Α.Π.). Η μελέτη αποσκοπεί στη διερεύνηση του ρόλου της τεχνολογικά υποστηριζόμενης καινοτομίας και του προσανατολισμού στο μάρκετινγκ σχέσεων όσον αφορά στη διαμόρφωση της εμπλοκής των πελατών, της ικανοποίησης των ασθενών και της συμπεριφοράς συν-δημιουργίας αξίας από τους πελάτες στο πλαίσιο της ελληνικής υγειονομικής περίθαλψης.

Με βάση τη μέθοδο της έρευνας μέσω ερωτηματολογίου, διερευνώνται οι απαντήσεις ασθενών που έχουν επισκεφθεί νοσοκομείο, κλινική ή διαγνωστικό κέντρο στην Ελλάδα.

Η συμμετοχή σας στη συγκεκριμένη έρευνα είναι ιδιαίτερα σημαντική για εμάς. Είναι απολύτως εθελοντική και έχετε το δικαίωμα να αποχωρήσετε σε οποιοδήποτε στάδιο. Η συμπλήρωση του ερωτηματολογίου απαιτεί μόνο λίγα λεπτά από τον χρόνο σας.

Τα δεδομένα που θα συλλεχθούν θα χρησιμοποιηθούν αποκλειστικά για τις ερευνητικές ανάγκες της παρούσας διατριβής.

Μη διστάσετε να επικοινωνήσετε μαζί μας.

Σας ευχαριστούμε εκ των προτέρων για τη συνεργασία σας.

Μάριος Μιχαήλ
Μεταπτυχιακός Φοιτητής, Ελληνικό
Ανοικτό Πανεπιστήμιο, Μεταπτυχιακό
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ΕΡΩΤΗΜΑΤΟΛΟΓΙΟ

Τμήμα Α: Εμπειρία Υπηρεσιών Υγειονομικής Περίθαλψης

1. Έχετε επισκεφθεί ποτέ νοσοκομείο, κλινική ή διαγνωστικό κέντρο στην Ελλάδα; (Σημειώστε (X) μία απάντηση)

- ☐ Ναι ☐ Όχι

[Εάν απαντήσατε «Όχι», παρακαλούμε μην συνεχίσετε τη συμπλήρωση του ερωτηματολογίου. Σας ευχαριστούμε για τον χρόνο σας.]

2. Κατά τους τελευταίους 12 μήνες, πόσες φορές έχετε επισκεφθεί νοσοκομείο, κλινική ή διαγνωστικό κέντρο στην Ελλάδα; (Σημειώστε (X) μία απάντηση)

- ☐ 1–2 φορές
☐ 3–5 φορές
☐ 6–10 φορές
☐ Πάνω από 10 φορές

3. Ποιον τύπο υγειονομικής μονάδας επισκεφθήκατε πιο πρόσφατα; (Σημειώστε (X) μία απάντηση)

- ☐ Δημόσιο Νοσοκομείο
☐ Ιδιωτικό Νοσοκομείο
☐ Ιδιωτική Κλινική
☐ Διαγνωστικό Κέντρο

Τμήμα Β: Δημογραφικό Προφίλ

4. Παρακαλώ επιλέξτε το φύλο σας. (Σημειώστε (X) μία απάντηση)

- ☐ Άνδρας
☐ Γυναίκα
☐ Δεν επιθυμώ να απαντήσω

5. Παρακαλώ επιλέξτε την ηλικιακή ομάδα στην οποία ανήκετε. (Σημειώστε (X) μία απάντηση)

- ☐ Κάτω των 18
☐ 18 – 24
☐ 25 – 34
☐ 35 – 44
☐ 45 – 54
☐ 55 – 64
☐ 65 ή παραπάνω

[Εάν επιλέξατε «Κάτω των 18 ετών», παρακαλούμε μην απαντήσετε στις επόμενες ερωτήσεις.]

6. Παρακαλώ επιλέξτε το υψηλότερο επίπεδο εκπαίδευσης που έχετε ολοκληρώσει.

- ☐ Βασική Εκπαίδευση
☐ Δευτεροβάθμια Εκπαίδευση
☐ Τριτοβάθμια Εκπαίδευση
☐ Μεταπτυχιακές Σπουδές
☐ Άλλο

7. Σε ποια πόλη διαμένετε σήμερα; (Σημειώστε (X) μία απάντηση)

- ☐ Αθήνα ☐ Πειραιά ☐ Θεσσαλονίκη ☐ Πάτρα ☐ Ηράκλειο ☐ Ιωάννινα

Τμήμα Γ: Προσανατολισμός στον Πελάτη

8. Οι ακόλουθες δηλώσεις αφορούν τον προσανατολισμό στον πελάτη. Παρακαλώ δηλώστε τον βαθμό στον οποίο συμφωνείτε ή διαφωνείτε με καθεμία από τις παρακάτω δηλώσεις. Παρακαλώ σημειώστε (X) μία απάντηση για κάθε δήλωση.

Δήλωση	Διαφωνώ Απόλυτα	Διαφωνώ	Ούτε Συμφωνώ ούτε Διαφωνώ	Συμφωνώ	Συμφωνώ Απόλυτα
Είμαι ενθουσιασμένος/η με το εύρος των υπηρεσιών που παρέχει το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο.	☐	☐	☐	☐	☐
Το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο παρέχει εξατομικευμένες υπηρεσίες που ανταποκρίνονται στις προτιμήσεις μου σχετικά με την υγεία μου.	☐	☐	☐	☐	☐
Η εξυπηρέτηση πελατών παρέχεται με άριστο τρόπο από το νοσοκομείο/την κλινική/το διαγνωστικό κέντρο.	☐	☐	☐	☐	☐
Το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο καταβάλλει ουσιαστική προσπάθεια για την ικανοποίηση των ασθενών.	☐	☐	☐	☐	☐
Ανεξάρτητα από το πώς αισθάνονται οι εργαζόμενοι, καταβάλλουν πάντοτε τη μέγιστη δυνατή προσπάθεια για κάθε ασθενή που εξυπηρετούν.	☐	☐	☐	☐	☐

Δήλωση	Διαφωνώ Απόλυτα	Διαφωνώ	Ούτε Συμφωνώ ούτε Διαφωνώ	Συμφωνώ	Συμφωνώ Απόλυτα
Το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο συχνά καταβάλλει επιπλέον προσπάθεια για να βοηθήσει τους ασθενείς, ακόμη και όταν αυτό δεν αναμένεται.	☐	☐	☐	☐	☐
Το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο διερευνά σε τακτική βάση τις ανάγκες των ασθενών, προκειμένου να τους εξυπηρετεί καλύτερα.	☐	☐	☐	☐	☐
Είμαι επαρκώς ενημερωμένος/η σχετικά με τις υπηρεσίες που παρέχονται.	☐	☐	☐	☐	☐
Διατηρώ υψηλό επίπεδο εμπιστοσύνης στις υπηρεσίες που παρέχει το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο.	☐	☐	☐	☐	☐
Το εύρος των υπηρεσιών υγείας που παρέχει το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο είναι επαρκές.	☐	☐	☐	☐	☐

Τμήμα Δ: Τεχνολογικά Υποστηριζόμενη Καινοτομία Υπηρεσιών

9. Οι ακόλουθες δηλώσεις αφορούν στην τεχνολογικά υποστηριζόμενη καινοτομία υπηρεσιών. Παρακαλώ δηλώστε τον βαθμό στον οποίο συμφωνείτε ή διαφωνείτε με καθεμία από τις παρακάτω δηλώσεις. Παρακαλώ σημειώστε (X) μία απάντηση για κάθε δήλωση.

Δήλωση	Διαφωνώ Απόλυτα	Διαφωνώ	Ούτε Συμφωνώ ούτε Διαφωνώ	Συμφωνώ	Συμφωνώ Απόλυτα
Η χρήση της τεχνολογίας αποτελεί προτεραιότητα στην παροχή υπηρεσιών υγείας από το νοσοκομείο/την κλινική/το διαγνωστικό κέντρο.	☐	☐	☐	☐	☐
Το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο εφαρμόζει σύγχρονες θεραπευτικές πρακτικές για τους ασθενείς.	☐	☐	☐	☐	☐

Δήλωση	Διαφωνώ Απόλυτα	Διαφωνώ	Ούτε Συμφωνώ ούτε Διαφωνώ	Συμφωνώ	Συμφωνώ Απόλυτα
Το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο διαθέτει σύγχρονη τεχνολογία που συμβάλλει στη διάγνωση και τη θεραπεία των ασθενών.	☐	☐	☐	☐	☐
Το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο διαθέτει τεχνολογία που απλοποιεί τις διοικητικές διαδικασίες για τους ασθενείς.	☐	☐	☐	☐	☐
Το προσωπικό του νοσοκομείου/της κλινικής/του διαγνωστικού κέντρου διασφαλίζει ότι χρησιμοποιούνται τα κατάλληλα εργαλεία και ο εξοπλισμός κατά την παροχή των υπηρεσιών	☐	☐	☐	☐	☐
Διατηρώ υψηλή εμπιστοσύνη στα συστήματα που χρησιμοποιεί το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο στην παροχή υπηρεσιών.	☐	☐	☐	☐	☐
Το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο αποφεύγει τη χρήση ανεπαρκών συστημάτων, προκειμένου να διασφαλίσει την ικανοποίηση των ασθενών.	☐	☐	☐	☐	☐
Το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο χρησιμοποιεί καινοτομία κατά την παροχή υπηρεσιών.	☐	☐	☐	☐	☐
Η παροχή υπηρεσιών στο νοσοκομείο/στην κλινική/στο διαγνωστικό κέντρο είναι γρήγορη και άμεση.	☐	☐	☐	☐	☐
Είμαι ικανοποιημένος/η από τους καινοτόμους τρόπους που υιοθετεί το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο κατά την παροχή υπηρεσιών.	☐	☐	☐	☐	☐

Τμήμα Ε: Προσανατολισμός στο Μάρκετινγκ Σχέσεων

10. Οι ακόλουθες δηλώσεις αφορούν στον προσανατολισμό στο μάρκετινγκ σχέσεων. Παρακαλώ δηλώστε τον βαθμό στον οποίο συμφωνείτε ή διαφωνείτε με καθεμία από τις παρακάτω δηλώσεις. Παρακαλώ σημειώστε (X) μία απάντηση για κάθε δήλωση.

Δήλωση	Διαφωνώ Απόλυτα	Διαφωνώ	Ούτε Συμφωνώ ούτε Διαφωνώ	Συμφωνώ	Συμφωνώ Απόλυτα
Οι κλινικοί επαγγελματίες υγείας σέβονται τις απόψεις μου και τις λαμβάνουν σοβαρά υπόψη.	☐	☐	☐	☐	☐
Τηρούμε τις υποσχέσεις μας ο ένας προς τον άλλον σε κάθε περίπτωση.	☐	☐	☐	☐	☐
Τα νοσοκομεία/οι κλινικές/τα διαγνωστικά κέντρα παρέχουν αξιόπιστες πληροφορίες σχετικά με τις υπηρεσίες τους.	☐	☐	☐	☐	☐
Διατηρούν ένα σταθερό επίπεδο ποιότητας.	☐	☐	☐	☐	☐
Τα νοσοκομεία/οι κλινικές/τα διαγνωστικά κέντρα επιδεικνύουν προσαρμοστικότητα στην κάλυψη των απαιτήσεών μου.	☐	☐	☐	☐	☐
Τα νοσοκομεία/οι κλινικές/τα διαγνωστικά κέντρα παρέχουν εξατομικευμένες υπηρεσίες που ανταποκρίνονται στις ανάγκες μου.	☐	☐	☐	☐	☐
Τα προβλήματα επιλύονται γρήγορα στο συγκεκριμένο νοσοκομείο/στην κλινική/στο διαγνωστικό κέντρο.	☐	☐	☐	☐	☐
Το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο καταβάλλει προσπάθεια για την αποφυγή πιθανών συγκρούσεων.	☐	☐	☐	☐	☐
Το προσωπικό του συγκεκριμένου νοσοκομείου/της κλινικής/του διαγνωστικού κέντρου ακούει με προσοχή και κατανοεί τις ανησυχίες μου.	☐	☐	☐	☐	☐

11. Οι ακόλουθες δηλώσεις αφορούν στην εμπλοκή πελατών. Παρακαλώ δηλώστε τον βαθμό στον οποίο συμφωνείτε ή διαφωνείτε με καθεμία από τις παρακάτω δηλώσεις. Παρακαλώ σημειώστε (X) μία απάντηση για κάθε δήλωση.

Δήλωση	Διαφωνώ Απόλυτα	Διαφωνώ	Ούτε Συμφωνώ ούτε Διαφωνώ	Συμφωνώ	Συμφωνώ Απόλυτα
Μου φαίνεται προσβλητικό να ασκεί κάποιος κριτική για το συγκεκριμένο νοσοκομείο/την κλινική/το διαγνωστικό κέντρο.	☐	☐	☐	☐	☐
Συνήθως, όταν αναφέρομαι στο συγκεκριμένο νοσοκομείο/στην κλινική/στο διαγνωστικό κέντρο, χρησιμοποιώ το «εμείς» αντί για το «αυτοί».	☐	☐	☐	☐	☐
Αντιλαμβάνομαι τις επιτυχίες του συγκεκριμένου νοσοκομείου/της κλινικής/του διαγνωστικού κέντρου ως δικές μου επιτυχίες.	☐	☐	☐	☐	☐
Η αναγνώριση προς το νοσοκομείο/την κλινική/το διαγνωστικό κέντρο μοιάζει με προσωπικό κομπλιμέντο.	☐	☐	☐	☐	☐
Το συγκεκριμένο νοσοκομείο/η κλινική/το διαγνωστικό κέντρο είναι πολύ σημαντικό/ή για εμένα.	☐	☐	☐	☐	☐
Νιώθω ενθουσιασμό για το συγκεκριμένο νοσοκομείο/την κλινική/το διαγνωστικό κέντρο.	☐	☐	☐	☐	☐
Οτιδήποτε σχετίζεται με το συγκεκριμένο νοσοκομείο/την κλινική/το διαγνωστικό κέντρο προσελκύει την προσοχή μου.	☐	☐	☐	☐	☐
Η αλληλεπίδρασή μου με τους κλινικούς επαγγελματίες υγείας μου προκαλεί αίσθημα χαράς.	☐	☐	☐	☐	☐
Τα νοσοκομεία/οι κλινικές/τα διαγνωστικά κέντρα μπορούν να προσαρμόζουν τις υπηρεσίες τους στις ανάγκες μου.	☐	☐	☐	☐	☐
Σε συζητήσεις με άτομα που ενδιαφέρονται για το συγκεκριμένο νοσοκομείο/την κλινική/το διαγνωστικό κέντρο, προτιμώ να συμμετέχω ενεργά.	☐	☐	☐	☐	☐

Δήλωση	Διαφωνώ Απόλυτα	Διαφωνώ	Ούτε Συμφωνώ ούτε Διαφωνώ	Συμφωνώ	Συμφωνώ Απόλυτα
Πραγματικά μου αρέσει να μοιράζομαι σκέψεις με άλλα άτομα που ενδιαφέρονται για το συγκεκριμένο νοσοκομείο/την κλινική/το διαγνωστικό κέντρο.	☐	☐	☐	☐	☐
Συμμετέχω συχνά σε εκδηλώσεις με άτομα που ενδιαφέρονται για το συγκεκριμένο νοσοκομείο/την κλινική/το διαγνωστικό κέντρο.	☐	☐	☐	☐	☐

Τμήμα Ζ: Ικανοποίηση Ασθενών

12. Οι ακόλουθες δηλώσεις αφορούν στην ικανοποίηση των ασθενών. Παρακαλώ δηλώστε τον βαθμό στον οποίο συμφωνείτε ή διαφωνείτε με καθεμία από τις παρακάτω δηλώσεις. Παρακαλώ σημειώστε (X) μία απάντηση για κάθε δήλωση.

Δήλωση	Διαφωνώ Απόλυτα	Διαφωνώ	Ούτε Συμφωνώ ούτε Διαφωνώ	Συμφωνώ	Συμφωνώ Απόλυτα
Συνολικά, ήμουν ικανοποιημένος/η από το επίπεδο διαθεσιμότητας του κλινικού επαγγελματία υγείας κατά την εξυπηρέτησή μου.	☐	☐	☐	☐	☐
Συνολικά, ήμουν ικανοποιημένος/η από τις διοικητικές διαδικασίες στο νοσοκομείο/στην κλινική/στο διαγνωστικό κέντρο.	☐	☐	☐	☐	☐
Συνολικά, ήμουν ικανοποιημένος/η από τη φροντίδα που έλαβα από το ιατρικό προσωπικό.	☐	☐	☐	☐	☐
Ήμουν ικανοποιημένος/η από την ποιότητα των υπηρεσιών που παρέχει το νοσοκομείο/η κλινική/το διαγνωστικό κέντρο.	☐	☐	☐	☐	☐
Έλαβα από το νοσοκομείο/την κλινική/το διαγνωστικό κέντρο τις υπηρεσίες που χρειάζομαι και προτιμούσα.	☐	☐	☐	☐	☐

Τμήμα Η: Συμπεριφορά Συν-δημιουργίας Αξίας από τον Πελάτη

13. Οι ακόλουθες δηλώσεις αφορούν στη συμπεριφορά συν-δημιουργίας αξίας από τον πελάτη. Παρακαλώ δηλώστε τον βαθμό στον οποίο συμφωνείτε ή διαφωνείτε με καθεμία από τις παρακάτω δηλώσεις. Παρακαλώ σημειώστε (X) μία απάντηση για κάθε δήλωση.

Δήλωση	Διαφωνώ Απόλυτα	Διαφωνώ	Ούτε Συμφωνώ ούτε Διαφωνώ	Συμφωνώ	Συμφωνώ Απόλυτα
Έχω ρωτήσει άλλους και έχω αναζητήσει λεπτομέρειες για την τοποθεσία και τις υπηρεσίες του νοσοκομείου/της κλινικής/του διαγνωστικού κέντρου.	☐	☐	☐	☐	☐
Έχω παρατηρήσει τον τρόπο με τον οποίο άλλοι αξιοποιούν αποτελεσματικά τις υπηρεσίες του νοσοκομείου/της κλινικής/του διαγνωστικού κέντρου.	☐	☐	☐	☐	☐
Παρέιχα στους κλινικούς επαγγελματίες υγείας όλες τις απαιτούμενες πληροφορίες για την άσκηση των καθηκόντων τους.	☐	☐	☐	☐	☐
Ολοκλήρωσα με επιτυχία όλες τις απαραίτητες εργασίες και επέδειξα τα ζητούμενα χαρακτηριστικά.	☐	☐	☐	☐	☐
Ακολούθησα τις οδηγίες του προσωπικού και εκπλήρωσα τις υποχρεώσεις μου απέναντι στο συγκεκριμένο νοσοκομείο/στην κλινική/στο διαγνωστικό κέντρο.	☐	☐	☐	☐	☐
Συμπεριφέρθηκα στους κλινικούς επαγγελματίες υγείας με ευγένεια και φιλικότητα.	☐	☐	☐	☐	☐

Τμήμα Θ: Ηθικός Συλλογισμός

14. Οι ακόλουθες δηλώσεις αφορούν στον ηθικό συλλογισμό. Παρακαλώ δηλώστε τον βαθμό στον οποίο συμφωνείτε ή διαφωνείτε με καθεμία από τις παρακάτω δηλώσεις. Παρακαλώ σημειώστε (X) μία απάντηση για κάθε δήλωση.

Δήλωση	Διαφωνώ Απόλυτα	Διαφωνώ	Ούτε Συμφωνώ ούτε Διαφωνώ	Συμφωνώ	Συμφωνώ Απόλυτα
Συνήθως, το ενδιαφέρον μου για τους άλλους καθοδηγεί τις επιλογές μου.	☐	☐	☐	☐	☐
Λαμβάνω αποφάσεις που μεγιστοποιούν τη βοήθεια προς τους άλλους.	☐	☐	☐	☐	☐
Συνήθως λαμβάνω αποφάσεις με γνώμονα το καλό των άλλων.	☐	☐	☐	☐	☐
Εάν χρειάζομαι επιπλέον υπηρεσίες από άλλο νοσοκομείο/κλινική/διαγνωστικό κέντρο, θα επικοινωνούσα πρώτα με το υφιστάμενο-η.	☐	☐	☐	☐	☐

Σας ευχαριστούμε για τη συμπλήρωση του ερωτηματολογίου!

Appendix B: “Tables and Figures”

Demographic profile of respondents (N = 459)

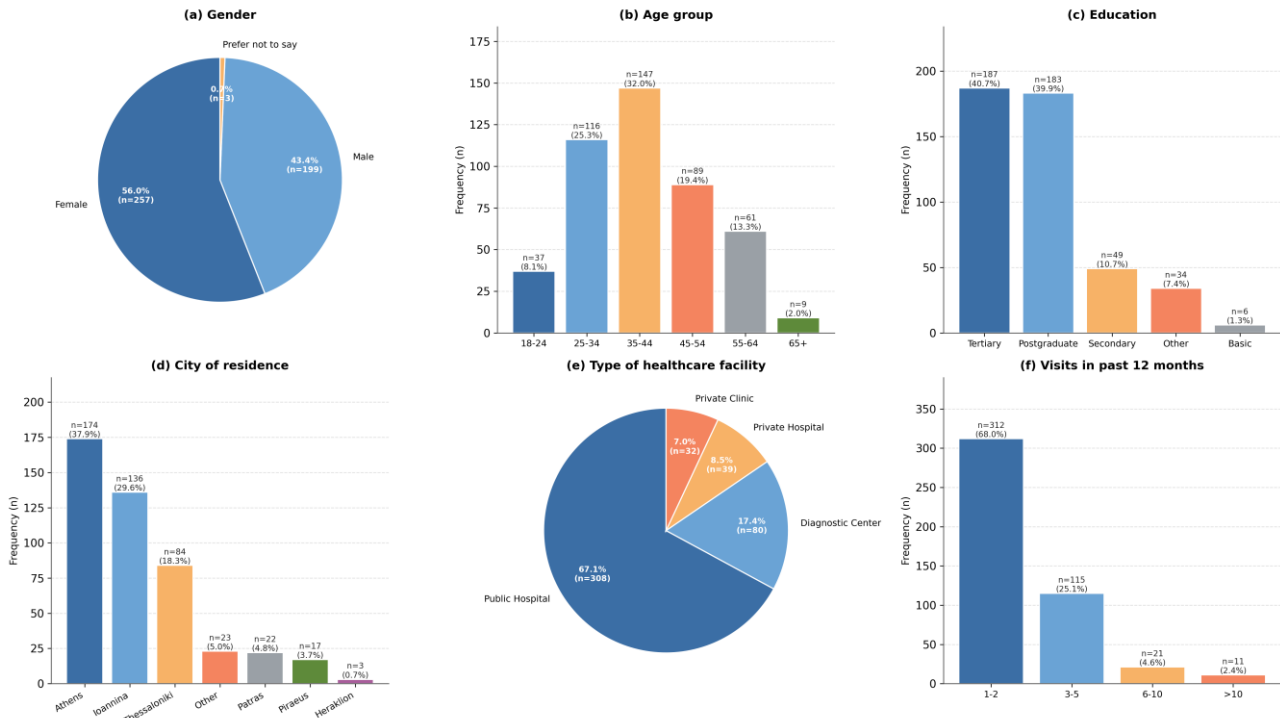


Figure B.1 : Demographic profile of respondents (N = 459). (a) Gender; (b) Age group; (c) Education; (d) City of residence; (e) Type of healthcare facility; (f) Visits during the past 6 months. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Gender	Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Female	257	56.0	56.0	56.0
Male	199	43.4	43.4	99.3
Prefer not to say	3	0.7	0.7	100.0
Total	459	100.0	—	—

Table B-1: Frequencies of respondents by gender (N = 459). Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Age group	Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
18–24	37	8.1	8.1	8.1
25–34	116	25.3	25.3	33.3
35–44	147	32.0	32.0	65.4
45–54	89	19.4	19.4	84.7
55–64	61	13.3	13.3	98.0
65+	9	2.0	2.0	100.0
Total	459	100.0	—	—

Table B-2: Frequencies of respondents by age group (N = 459). Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Education	Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Tertiary education	187	40.7	40.7	40.7
Postgraduate studies	183	39.9	39.9	80.6
Secondary education	49	10.7	10.7	91.3
Other	34	7.4	7.4	98.7
Basic education	6	1.3	1.3	100.0
Total	459	100.0	—	—

Table B-3: Frequencies of respondents by education level (N = 459). Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

City	Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Athens	174	37.9	37.9	37.9
Ioannina	136	29.6	29.6	67.5
Thessaloniki	84	18.3	18.3	85.8
Other city	23	5.0	5.0	90.8
Patras	22	4.8	4.8	95.6
Piraeus	17	3.7	3.7	99.3
Heraklion	3	0.7	0.7	100.0
Total	459	100.0	—	—

Table B-4: Frequencies of respondents by city of residence (N = 459). Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Facility type	Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Public hospital	308	67.1	67.1	67.1
Diagnostic centre	80	17.4	17.4	84.5
Private hospital	39	8.5	8.5	93.0
Private clinic	32	7.0	7.0	100.0
Total	459	100.0	—	—

Table B-5: Frequencies of respondents by type of healthcare facility most recently visited (N = 459).
Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Visits (past 6 months)	Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
1–2 times	312	68.0	68.0	68.0
3–5 times	115	25.1	25.1	93.0
6–10 times	21	4.6	4.6	97.6
More than 10 times	11	2.4	2.4	100.0
Total	459	100.0	—	—

Table B-6: Frequencies of respondents by number of healthcare visits in the past 6 months (N = 459).
Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Distribution of construct mean scores (N = 436, 5-point Likert scale)

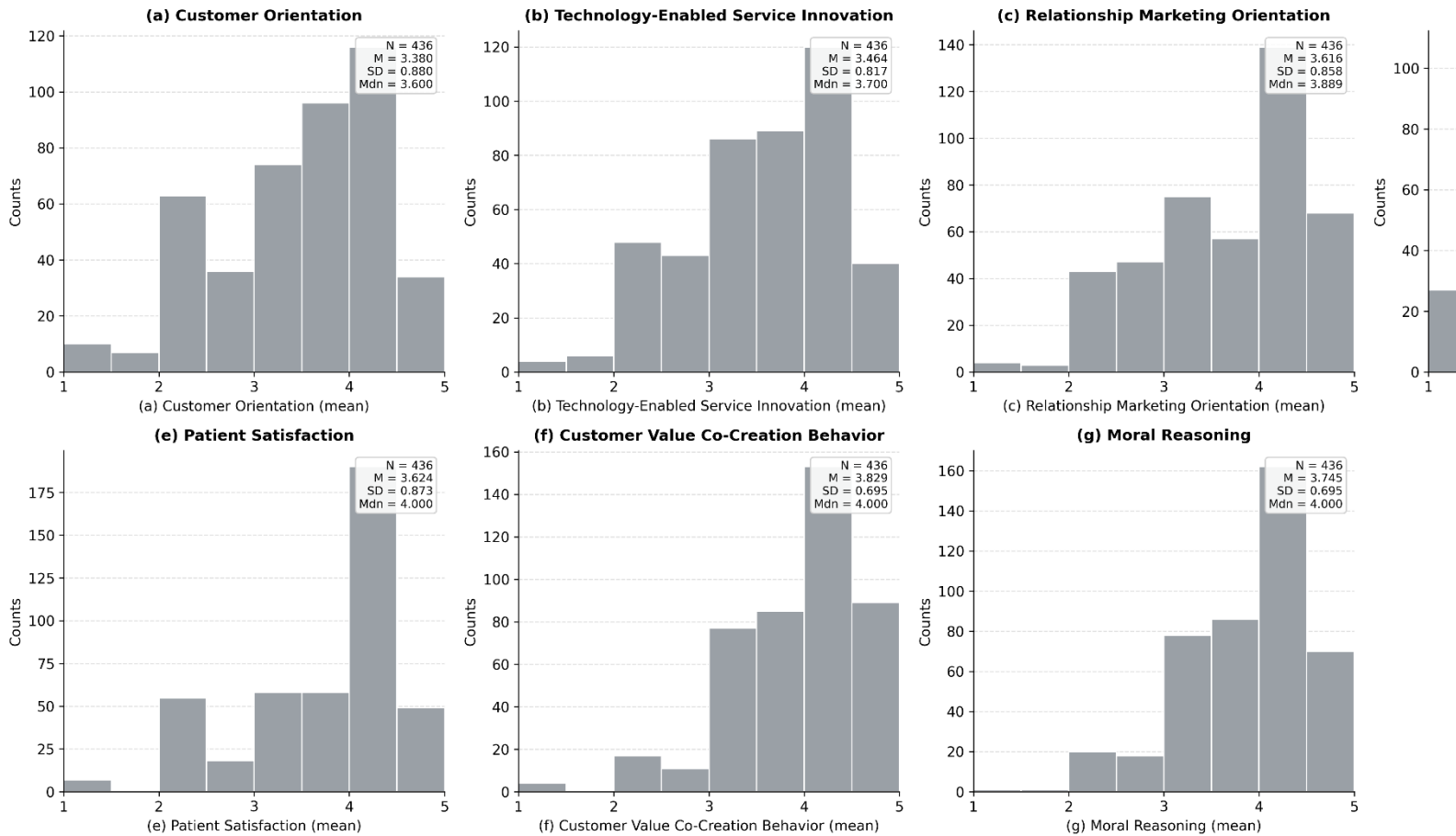


Figure B.21 : Distribution of construct mean scores. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Construct	Abbreviation	Mean	Median	Std. Deviation	Skewness	Kurtosis	Min	Max
Customer Orientation	CO	3.38	3.6	0.88	-0.596	-0.228	1	5
Technology-Enabled Service Innovation	TESI	3.464	3.7	0.817	-0.51	-0.21	1	5
Relationship Marketing Orientation	RMO	3.616	3.889	0.858	-0.514	-0.273	1	5
Customer Engagement	CE	2.63	2.625	0.777	0.201	-0.295	1	5
Patient Satisfaction	PS	3.624	4	0.873	-0.829	0.193	1	5
Customer Value Co-Creation Behavior	CVCB	3.829	4	0.695	-1.077	1.673	1	5
Moral Reasoning	MR	3.745	4	0.695	-0.724	0.393	1	5

Table B-7: Descriptive statistics of the grouped questionnaire constructs (436/459 valid). Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Confirmatory Factor Analysis

Factor loadings ▼

Factor	Indicator	Std. estimate
CO	CO1	0.899
	CO2	0.894
	CO3	0.921
	CO4	0.880
	CO5	0.852
	CO6	0.869
	CO7	0.902
	CO8	0.853
	CO9	0.915
	CO10	0.901
TESI	TESI1	0.750
	TESI2	0.905
	TESI3	0.884
	TESI4	0.856
	TESI5	0.891
	TESI6	0.918
	TESI7	0.890
	TESI8	0.914
	TESI9	0.924
	TESI10	0.917
RMO	RMO1	0.875
	RMO2	0.913
	RMO3	0.900
	RMO4	0.951
	RMO5	0.918
	RMO6	0.915
	RMO7	0.928
	RMO8	0.906
	RMO9	0.907
MR	MR1	0.671
	MR2	0.746
	MR3	0.855
	MR4	0.993
PS	PS1	0.947
	PS2	0.915
	PS3	0.909
	PS4	0.957
	PS5	0.945
CVCB	CVCB1	0.825
	CVCB2	0.885
	CVCB3	0.861
	CVCB4	0.930
	CVCB5	0.956
	CVCB6	0.831

Chi-square test

Model	X ²	df	p
Baseline model	812611.026	946	
Factor model	2996.353	888	

Note. The estimator is DWLS. The test statistic is standard. The standard error method is robust sem.

Other fit measures

Metric	Value
Root mean square error of approximation (RMSEA)	0.074
RMSEA 90% CI lower bound	0.071
RMSEA 90% CI upper bound	0.077
RMSEA p-value	0.000
Standardized root mean square residual (SRMR)	0.050
Hoelter's critical N ($\alpha = .05$)	140.1
Hoelter's critical N ($\alpha = .01$)	144.6
Goodness of fit index (GFI)	0.996
McDonald fit index (MFI)	0.089
Expected cross validation index (ECVI)	

Fit indices ▼

Index	Value
Comparative Fit Index (CFI)	0.997
Tucker-Lewis Index (TLI)	0.997
Bentler-Bonett Non-normed Fit Index (NNFI)	0.997
Bentler-Bonett Normed Fit Index (NFI)	0.996
Parsimony Normed Fit Index (PNFI)	0.935
Bollen's Relative Fit Index (RFI)	0.996
Bollen's Incremental Fit Index (IFI)	0.997
Relative Noncentrality Index (RNI)	0.997

Factor variances

Factor	Std. estimate	Std. Error	z-value	p	95% Confidence Interval	
					Lower	Upper
CO	0.196					
TESI	0.116					
RMO	0.116					
MR	1.000					
PS	0.152					
CVCB	1.000					
Second-Order	1.000					

Second-order factor loadings

Factor	Indicator	Std. estimate	Std. Error	z-value	p	95% Confidence Interval	
						Lower	Upper
SecondOrder	CO	0.897					
	TESI	0.940					
	RMO	0.940					
	PS	0.921					

Table B-8: Results of Confirmatory Factor Analysis. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Intergrated Correlation Matrix

Table 6-X: Integrated Spearman correlation matrix for the study constructs

Construct	CO	TESI	RMO	CE	PS	CVCB	MR
CO	—						
TESI	$\rho = 0.839$ $p < .001$ $N = 436$	—					
RMO	$\rho = 0.781$ $p < .001$ $N = 436$	$\rho = 0.844$ $p < .001$ $N = 436$	—				
CE	$\rho = 0.542$ $p < .001$ $N = 436$	$\rho = 0.514$ $p < .001$ $N = 436$	$\rho = 0.449$ $p < .001$ $N = 436$	—			
PS	$\rho = 0.764$ $p < .001$ $N = 436$	$\rho = 0.787$ $p < .001$ $N = 436$	$\rho = 0.804$ $p < .001$ $N = 436$	$\rho = 0.518$ $p < .001$ $N = 436$	—		
CVCB	$\rho = 0.610$ $p < .001$ $N = 436$	$\rho = 0.653$ $p < .001$ $N = 436$	$\rho = 0.704$ $p < .001$ $N = 436$	$\rho = 0.379$ $p < .001$ $N = 436$	$\rho = 0.675$ $p < .001$ $N = 436$	—	
MR	$\rho = 0.594$ $p < .001$ $N = 436$	$\rho = 0.640$ $p < .001$ $N = 436$	$\rho = 0.657$ $p < .001$ $N = 436$	$\rho = 0.384$ $p < .001$ $N = 436$	$\rho = 0.632$ $p < .001$ $N = 436$	$\rho = 0.629$ $p < .001$ $N = 436$	—

Table B-9: Correlation Matrix for all constructs. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Mediation Analysis

Parameter estimates

Direct effects

						95% Confidence Interval	
						Lower	Upper
Std. estimate	Std. error	z-value	p				
RMO_mean	→	CVCB_mean	0.648	0.029	22.16	< .001	0.585 0.702

Note. Estimator is ML. Not all bootstrap samples were successful: CI based on 4999 samples.

Indirect effects

						95% Confidence Interval				
						Lower	Upper			
					Std. estimate	Std. error	z-value	p		
RMO_mean	→	CE_mean	→	CVCB_mean	0.039	0.017	2.251	.024	0.005	0.073

Note. Estimator is ML. Not all bootstrap samples were successful: CI based on 4999 samples.

Total effects

						95% Confidence Interval		
			Std. estimate	Std. error	z-value	p	Lower	Upper
RMO_mean	→	CVCB_mean	0.686	0.024	29.18	< .001	0.636	0.728

Note. Estimator is ML. Not all bootstrap samples were successful: CI based on 4999 samples.

Path coefficients

						95% Confidence Interval	
						Lower	Upper
		Std. estimate	Std. error	z-value	p		
CE_mean	→ CVCB_mean	0.082	0.036	2.280	.023	0.010	0.152
RMO_mean	→ CVCB_mean	0.648	0.029	22.16	< .001	0.585	0.702
RMO_mean	→ CE_mean	0.472	0.031	15.19	< .001	0.407	0.530

Note. Estimator is ML. Not all bootstrap samples were successful: CI based on 4999 samples.

R-Squared ▼

R ²	
CVCB_mean	−0.086
CE_mean	−0.290

Table B-10: Results of Mediation Analysis for Hypothesis H5a. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Parameter estimates

Direct effects

						95% Confidence Interval	
						Lower	Upper
			Std. estimate	Std. error	z-value	p	
RMO_mean	→	PS_mean	0.769	0.022	35.16	< .001	0.723 0.809

Note. Estimator is ML.

Indirect effects

								95% Confidence Interval		
								Lower	Upper	
				Std. estimate	Std. error	z-value	p			
RMO_mean	→	CE_mean	→	PS_mean	0.078	0.013	5.964	< .001	0.053	0.105

Note. Estimator is ML.

Total effects

						95% Confidence Interval		
			Std. estimate	Std. error	z-value	p	Lower	Upper
RMO_mean	→	PS_mean	0.847	0.014	58.49	< .001	0.816	0.873

Note. Estimator is ML.

Path coefficients

						95% Confidence Interval	
						Lower	Upper
			Std. estimate	Std. error	z-value	p	
CE_mean	→	PS_mean	0.165	0.027	6.200	< .001	0.114 0.216
RMO_mean	→	PS_mean	0.769	0.022	35.16	< .001	0.723 0.809
RMO_mean	→	CE_mean	0.472	0.031	15.25	< .001	0.403 0.527

Note. Estimator is ML.

R-Squared ▼

R ²	
PS_mean	0.656
CE_mean	-0.290

Table B-11: Results of Mediation Analysis for Hypothesis H5b. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Parameter estimates

Direct effects

						95% Confidence Interval		
			Std. estimate	Std. error	z-value	p	Lower	Upper
TESI_mean	→	PS_mean	0.708	0.031	22.95	< .001	0.645	0.765

Note. Estimator is ML.

Indirect effects

								95% Confidence Interval		
								Lower	Upper	
					Std. estimate	Std. error	z-value	p		
TESI_mean	→	CE_mean	→	PS_mean	0.087	0.017	5.111	< .001	0.055	0.122

Note. Estimator is ML.

Total effects

						95% Confidence Interval	
						Lower	Upper
			Std. estimate	Std. error	z-value	p	
TESI_mean	→	PS_mean	0.795	0.020	39.93	< .001	0.753 0.832

Note. Estimator is ML.

Path coefficients

						95% Confidence Interval	
						Lower	Upper
			Std. estimate	Std. error	z-value	p	
CE_mean	→	PS_mean	0.175	0.035	5.058	< .001	0.109 0.244
TESI_mean	→	PS_mean	0.708	0.031	22.95	< .001	0.645 0.765
TESI_mean	→	CE_mean	0.498	0.031	15.90	< .001	0.433 0.555

Note. Estimator is ML.

R-Squared ▼

R ²	
PS_mean	0.546
CE_mean	-0.247

Table B-12: Results of Mediation Analysis for Hypothesis H6. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Moderation Analysis

Model Summary - CVCB_mean

Model	R	R ²	Adjusted R ²	RMSE	R ² Change	df1	df2	p
M ₀	0.000	0.000	0.000	0.695	0.000	0	435	
M ₁	0.732	0.537	0.533	0.475	0.537	3	432	< .001

Note. M₁ includes RMO_mean, MR_mean, RMO_mean:MR_mean

ANOVA

Model		Sum of Squares	df	Mean Square	F	p
M ₁	Regression	112.8	3	37.61	166.7	< .001
	Residual	97.48	432	0.226		
	Total	210.3	435			

Note. M₁ includes RMO_mean, MR_mean, RMO_mean:MR_mean

Note. The intercept model is omitted, as no meaningful information can be shown.

Coefficients

Model		Unstandardized	Standard Error	Standardized	t	p
M ₀	(Intercept)	3.829	0.033		115.0	< .001
M ₁	(Intercept)	0.500	0.410		1.220	.223
	RMO_mean	0.607	0.128	0.748	4.753	< .001
	MR_mean	0.533	0.120	0.533	4.453	< .001
	RMO_mean * MR_mean	-0.062	0.034	-0.442	-1.828	.068

Descriptives

	N	Mean	SD	SE
CVCB_mean	436	3.829	0.695	0.033
RMO_mean	436	3.616	0.858	0.041
MR_mean	436	3.745	0.695	0.033

Part And Partial Correlations

Model		Partial	Part
M ₁	RMO_mean	0.223	0.156
	MR_mean	0.209	0.146
	RMO_mean * MR_mean	-0.088	-0.060

Note. The intercept model is omitted, as no meaningful information can be shown.

Table B-13: Results of Moderation Analysis for Hypothesis H7. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Model Summary - PS_mean

Model	R	R ²	Adjusted R ²	RMSE	R ² Change	df1	df2	p
M ₀	0.000	0.000	0.000	0.873	0.000	0	435	
M ₁	0.853	0.727	0.726	0.457	0.727	3	432	< .001

Note. M₁ includes RMO_mean, MR_mean, RMO_mean:MR_mean

ANOVA

Model		Sum of Squares	df	Mean Square	F	p
M ₁	Regression	241.3	3	80.43	384.3	< .001
	Residual	90.41	432	0.209		
	Total	331.7	435			

Note. M₁ includes RMO_mean, MR_mean, RMO_mean:MR_mean

Note. The intercept model is omitted, as no meaningful information can be shown.

Coefficients

Model		Unstandardized	Standard Error	Standardized	t	p
M ₀	(Intercept)	3.624	0.042		86.66	< .001
M ₁	(Intercept)	-0.477	0.395		-1.207	.228
	RMO_mean	1.006	0.123	0.988	8.181	< .001
	MR_mean	0.353	0.115	0.281	3.057	.002
	RMO_mean * MR_mean	-0.061	0.033	-0.350	-1.884	.060

Descriptives

	N	Mean	SD	SE
PS_mean	436	3.624	0.873	0.042
RMO_mean	436	3.616	0.858	0.041
MR_mean	436	3.745	0.695	0.033

Part And Partial Correlations

Model		Partial	Part
M ₁	RMO_mean	0.366	0.206
	MR_mean	0.145	0.077
	RMO_mean * MR_mean	-0.090	-0.047

Note. The intercept model is omitted, as no meaningful information can be shown.

Table B-14: Results of Moderation Analysis for Hypothesis H8. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Empirical Regression Models

Model Summary - PS_mean

Model	R	R ²	Adjusted R ²	RMSE
M ₀	0.000	0.000	0.000	0.873
M ₁	0.867	0.751	0.750	0.437

Note. M₁ includes TESI_mean, RMO_mean, CE_mean

ANOVA

Model		Sum of Squares	df	Mean Square	F	p
M ₁	Regression	249.2	3	83.07	435.1	< .001
	Residual	82.49	432	0.191		
	Total	331.7	435			

Note. M₁ includes TESI_mean, RMO_mean, CE_mean

Note. The intercept model is omitted, as no meaningful information can be shown.

Coefficients

Model		Unstandardized	Standard Error	Standardized	t	p	95% CI	
							Lower	Upper
M ₀	(Intercept)	3.624	0.042		86.66	< .001	3.542	3.707
M ₁	(Intercept)	0.211	0.099		2.144	.033	0.018	0.405
	TESI_mean	0.239	0.050	0.223	4.791	< .001	0.141	0.336
	RMO_mean	0.603	0.047	0.593	12.94	< .001	0.512	0.695
	CE_mean	0.154	0.031	0.137	4.916	< .001	0.092	0.215

Regression Equations

Model	Equation
M ₀	PS_mean = 3.624
M ₁	PS_mean = 0.211 + 0.239 TESI_mean + 0.603 RMO_mean + 0.154 CE_mean

Collinearity Diagnostics ▼

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Intercept)	TESI_mean	RMO_mean	CE_mean
M ₁	1	3.914	1.000	0.003	0.001	0.001	0.004
	2	0.045	9.301	0.073	0.023	0.032	0.991
	3	0.033	10.89	0.924	0.066	0.072	0
	4	0.008	22.26	0	0.909	0.895	0.005

Note. The intercept model is omitted, as no meaningful information can be shown.

Table B-15: Linear Regression of PS on TESI, RMO, and CE. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Model Summary - CVCB_mean

Model	R	R ²	Adjusted R ²	RMSE
M ₀	0.000	0.000	0.000	0.695
M ₁	0.690	0.476	0.473	0.505

Note. M₁ includes RMO_mean, CE_mean

ANOVA

Model		Sum of Squares	df	Mean Square	F	p
M ₁	Regression	100.1	2	50.05	196.6	< .001
	Residual	110.2	433	0.255		
	Total	210.3	435			

Note. M₁ includes RMO_mean, CE_mean

Note. The intercept model is omitted, as no meaningful information can be shown.

Coefficients

Model		Unstandardized	Standard Error	Standardized	t	p	95% CI	
							Lower	Upper
M ₀	(Intercept)	3.829	0.033		115.0	< .001	3.763	3.894
M ₁	(Intercept)	1.738	0.112		15.57	< .001	1.518	1.957
	RMO_mean	0.525	0.032	0.648	16.41	< .001	0.462	0.588
	CE_mean	0.073	0.035	0.082	2.071	.039	0.004	0.142

Regression Equations

Model	Equation
M ₀	CVCB_mean = 3.829
M ₁	CVCB_mean = 1.738 + 0.525 RMO_mean + 0.073 CE_mean

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Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Intercept)	RMO_mean	CE_mean
M ₁	1	2.931	1.000	0.005	0.005	0.007
	2	0.043	8.276	0.304	0.073	0.943
	3	0.026	10.54	0.691	0.922	0.05

Table B-16: Linear Regression of CVCB on RMO, and CE. Source: Michail, M (2026) “Technology-enabled service innovation and relationship marketing in healthcare equipment provision: An empirical study in the Greek healthcare context”

Author’s Statement:

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