

CO-CREATING THE OUTCOME OF THE OUTPATIENT EXPERIENCE: THE ROLE OF PATIENT EMPOWERMENT, INFORMATION TECHNOLOGY, AND STAFF SUPPORT IN DRIVING SATISFACTION AND LOYALTY

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ABSTRACT

This study examines the role of value co-creation in shaping patient satisfaction and loyalty within outpatient healthcare services. Grounded in Service-Dominant (S-D) Logic, the research investigates how patient empowerment, information technology (IT) support, and staff support contribute to value co-creation and subsequently influence patient satisfaction and loyalty. A quantitative explanatory research design was employed using a cross-sectional survey distributed to outpatient visitors at two major private hospital networks in Jakarta, Indonesia. Data were collected through structured questionnaires measured using a five-point Likert scale and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal that value co-creation has a strong positive effect on patient satisfaction and patient loyalty. Staff support emerged as the most influential antecedent of value co-creation, followed by patient empowerment, while IT support demonstrated only a minimal effect. Furthermore, patient satisfaction significantly mediates the relationship between value co-creation and patient loyalty. The structural model also demonstrated substantial predictive power, indicating that collaborative interactions between healthcare providers and patients are essential determinants of positive healthcare experiences and long-term patient relationships. This study contributes theoretically by extending the application of S-D Logic within healthcare service ecosystems and empirically validating value co-creation as a central relational mechanism linking organizational resources to patient outcomes. Practically, the findings suggest that healthcare organizations should prioritize relational service quality, staff communication competencies, and patient empowerment strategies alongside digital transformation initiatives to enhance patient satisfaction and loyalty in outpatient services.

Keywords: Value Co-creation; Patient Satisfaction; Patient Loyalty.

INTRODUCTION

Background

The global healthcare landscape is experiencing a major shift from a traditional, paternalistic model where physicians dominated decision-making to a collaborative, patient-centered approach that emphasizes shared decision-making, respect for patient preferences, and attention to emotional and psychosocial needs (Epstein & Street, 2011; Rathert et al., 2013). This transition is fueled by more informed patients, the rising burden of chronic diseases requiring self-management, and strong evidence that patient engagement improves outcomes and care quality.

This philosophical shift aligns with the Service-Dominant (S-D) Logic, which views value as co-created through interactions between provider and beneficiary rather than delivered unilaterally (Vargo & Lusch, 2004). In healthcare, value emerges from collaboration between patients and the healthcare ecosystem, leading to better adherence, improved health, and enhanced care experiences (McColl-Kennedy et al., 2012; Elg et al., 2012).

Despite the widespread acceptance of patient-centered care, prevailing service quality frameworks such as SERVQUAL (Parasuraman et al., 1988) retain a one-directional provider-to-patient perspective (Baron & Warnaby, 2011). These models overlook the patient's active role and the relational processes central to modern healthcare interactions (McColl-Kennedy et al., 2017). As a result, managers relying only on traditional metrics may miss the collaborative dimensions that drive loyalty and long-term outcomes.

Moreover, although value co-creation is known to be beneficial (Choi et al., 2019; Elg et al., 2012), empirical clarity is lacking regarding how it is operationalized in outpatient care, especially in emerging economies. The specific contributions of patient empowerment, IT support, and staff support as interconnected enablers remain underexplored. It is not well understood how digital tools, clinical communication, and patient agency interact to facilitate co-creation in practice.

This gap is particularly evident in emerging economies such as Indonesia, where rapid digital adoption intersects with rising expectations for personalized, efficient outpatient care. Private hospital networks are increasingly pressured to deliver high-quality, patient-centered experiences. Yet, research investigating value co-creation in Indonesian outpatient settings is virtually absent, and studies exploring the integration of empowerment, IT support, and staff support remain scarce. Furthermore, the downstream impact of co-creation on patient satisfaction and loyalty two critical determinants of hospital competitiveness has not been empirically examined in a unified structural model.

To address these gaps, this study develops and tests a predictive model grounded in S-D Logic to examine how patient empowerment, IT support, and staff support affect value co-creation, and how co-creation subsequently drives patient satisfaction and loyalty. By focusing on outpatient services in two major private hospital networks in Jakarta, this research introduces a novel contextual contribution, offering insights from a middle-income country undergoing rapid healthcare digitalization. It also provides theoretical contributions through the integration of three key antecedents and the examination of both direct and mediated pathways to satisfaction and loyalty.

Research Objectives

Building upon the identified gaps in the literature, this study aims to move beyond traditional service quality metrics and empirically test a model of value co-creation in the context of outpatient services. The specific research objectives and the overarching research question are formulated as follows:

1. RO1: To examine the impact of patient empowerment, IT support, and staff support on value co-creation.
2. RO2: To investigate the relationship between value co-creation, patient satisfaction, and patient loyalty.

The findings of this research are expected to yield significant contributions, both theoretical and practical, by addressing the critical gaps in understanding value co-creation in modern healthcare services.

Purpose

For hospital administrators and practitioners at private institutions, this study offers an actionable framework for strategic investment and service design. Instead of relying on generic patient satisfaction surveys, the findings will provide managers with evidence-based insights into how empowerment, technology, or staff training affects loyalty.

LITERATURE REVIEW

Service-Dominant (S-D) Logic and Value Co-Creation

Service-Dominant (S-D) Logic, first introduced by Vargo and Lusch (2004), has dramatically shifted how scholars and practitioners understand the creation of value within service systems. Departing from the older, product-oriented Goods-Dominant (G-D) Logic, which assumes that firms manufacture value and customers merely receive it, S-D Logic frames value as something that emerges through interaction. Service is defined as the application of skills, knowledge, and competencies for the benefit of another. From this perspective, service is the foundational mechanism of all economic and social exchange. Consequently, value cannot be embedded into a product or service ahead of time, it is instead co-created by multiple actors who integrate their respective resources during the process of use (Vargo & Lusch, 2008). This view positions customers not as passive endpoints in the value chain, but as active participants whose contributions are essential to generating meaningful outcomes.

1. Healthcare Through S-D Logic

Applying S-D Logic to healthcare invites a deeper reflection on how service is produced. The traditional biomedical model tends to assume that medical expertise resides solely with providers, who diagnose, decide, and deliver care to patients. This perspective mirrors G-D Logic, treating health services as discrete interventions given to patients.

S-D Logic, however, offers a more relational and realistic view. Healthcare becomes a collaborative process shaped by the interactions among diverse players, such as physicians, nurses, administrative staff, patients, families, and even digital health tools. Each brings unique resources, such as clinical expertise, personal insights, emotional support, or self-management capacity, and value emerges when these resources are integrated effectively (McColl-Kennedy et al., 2012). From this standpoint, health is not something that can be handed over like a product, it is an outcome that depends on the willingness and ability of both patients and providers to work together. This aligns closely with contemporary movements toward patient-centered care and shared decision-making, which recognize that patient experiences, contexts, and choices meaningfully shape health outcomes.

Within this framework, value co-creation refers to the joint efforts and interactions between patients and healthcare providers that lead to outcomes beneficial for both parties. It moves beyond simple participation or compliance by highlighting the interdependence between patient actions and provider expertise (Palumbo, 2016). Through these interactions, value becomes experiential and dynamic, extending beyond measurable clinical

outcomes to include trust, reassurance, empowerment, and emotional comfort. It is visible through several key behaviours:

1. **Information Sharing**
Patients actively communicate their symptoms, preferences, concerns, and lived experiences, not just in response to questions, but also in ways that enrich the provider's understanding of their condition.
2. **Shared Decision-Making**
Patients and providers work together to choose treatment strategies that align with medical evidence as well as the patient's values, goals, and daily. Decisions are not handed down rather they are shaped collaboratively.
3. **Collaborative Interaction**
Effective co-creation requires open dialogue, empathy, and mutual respect. Patients ask questions, express uncertainties, and seek clarification, while providers create a safe and supportive space that invites involvement.
4. **Resource Integration**
Patients integrate clinical guidance with their own resources to implement care in their daily lives. Providers, in turn, integrate patient-generated insights into clinical judgments and care planning.

Antecedents of Value Co-Creation

For value co-creation to shift from a conceptual ideal into a lived reality within healthcare settings, certain enabling conditions must be in place. Co-creation does not occur automatically; it requires structural, technological, and interpersonal foundations that allow patients to engage meaningfully with providers.

1. Patient Empowerment

Patient empowerment is a multidimensional construct that captures the processes through which patients gain the knowledge, confidence, and autonomy needed to take an active role in their health (Fumagalli et al., 2015). Importantly, empowerment is not something providers can simply give to patients, rather a dynamic process that emerges when the healthcare system creates the conditions that allow patients to develop agency. Patient empowerment is reflected through three core dimensions:

1. **Access to Information** → Ensuring patients receive clear, accurate, and comprehensible information about their diagnosis, treatment alternatives, and self-care requirements so they can make informed choices.
2. **Shared Decision-Making** → Actively involving patients as partners in selecting treatment options that balance clinical evidence with their personal preferences, values, and life circumstances.
3. **Self-Management Confidence** → Supporting patients in building the skills and belief in their own capability to manage their condition on a day-to-day basis.

Empowerment is not merely beneficial, rather a foundation to value co-creation. Patients who lack information, feel sidelined in treatment decisions, or doubt their ability to self-manage are unlikely to participate meaningfully in collaborative care activities. Conversely, empowered patients become active contributors where they share information openly, ask questions, clarify concerns, and take ownership of care plans. Within the S-D Logic framework, empowerment transforms the patient from a passive consumer into a resource-integrating actor who actively participates in co-creating value (Anderson & Funnell, 2010).

2. Information Technology (IT) Support

In modern healthcare, digital technologies form a crucial backbone that enables value co-creation beyond the traditional boundaries of the consultation room. IT support refers to the digital tools, platforms, and systems that facilitate communication, information access, and administrative efficiency for patients (Holden & Karsh, 2010). These technologies typically include:

1. Patient portals and mobile applications that provide access to medical records, test results, and educational materials.
2. Online scheduling and refill systems that give patients greater convenience and autonomy in managing routine tasks.
3. Telemedicine platforms and secure messaging systems that allow patients and providers to communicate asynchronously or in real time.

Within an S-D Logic perspective, IT systems act as a resource tool that enhance the ability of patients and providers to collaborate. They lower barriers to participation by giving patients 24/7 access to information, minimizing administrative burdens, and facilitating ongoing communication. This allows patients to come better prepared for appointments, clarify uncertainties outside clinic hours, and remain engaged in their care trajectory (Barello et al., 2020). In doing so, IT support enhances the frequency, quality, and depth of patient-provider interactions, strengthening the environment in which co-creation can flourish.

3. Staff Support

While systems and technologies lay the groundwork for patient involvement, the human dimension of care ultimately determines whether co-creation can occur. Staff support refers to the attitudes, behaviors, and communication practices of healthcare professionals that encourage patient engagement (Rathert et al., 2013). It encompasses several key behaviors:

1. Willingness to Listen → Providers demonstrate genuine interest in the patient's experiences, fears, and expectations.
2. Ability to Explain → Staff communicate clearly and avoid technical jargon, ensuring patients truly understand their health conditions and treatment options.
3. Active Involvement → Providers explicitly invite patients to participate in decisions, self-care planning, and discussions about care goals.

Staff support acts as the relational engine of co-creation. Even when patients are well-informed and have access to technology, unsupportive or paternalistic provider behaviour can inhibit participation. In contrast, empathetic communication fosters trust, psychological safety, and emotional comfort, a condition under which patients feel encouraged to speak openly, ask questions, and contribute to care decisions (Shaw et al., 2022). Staff support signals to patients that their knowledge, preferences, and perspectives matter, reinforcing their role as co-creators rather than passive recipients.

Consequences of Value Co-Creation

The ultimate test of the value co-creation paradigm lies in its ability to produce meaningful and measurable outcomes for both patients and healthcare organizations. While co-creation is often discussed at the level of processes and interactions, its true significance emerges when we examine how those collaborative behaviors translate into affective evaluations and long-term relationships.

1. Patient Satisfaction

Patient satisfaction is widely regarded as a core evaluative construct within healthcare service research. Conceptually, it reflects an affective judgment concerning the extent to which the healthcare experience meets or surpasses the patient's initial expectations (Oliver, 1980). Unlike purely technical measures of clinical quality, satisfaction captures the patient's holistic interpretation of the service encounter. From an S-D Logic perspective, this evaluation is shaped not only by what is done to the patient, but also by what is done with the patient.

Value co-creation directly influences this evaluative process. When patients are invited to participate in their care through shared decision-making, open dialogue, and resource integration, they are more likely to perceive the service as tailored, respectful, and attentive to their personal needs (McColl-Kennedy et al., 2017). Such participation enhances the patient's psychological understanding that is strongly associated with positive satisfaction outcomes.

Moreover, co-creation transforms the care experience into a collaborative achievement rather than a unilateral service delivery. This makes patients feel that the healthcare provider recognizes their individuality, acknowledges their perspective, and engages with them as partners rather than passive recipients. Thus, the act of co-creation itself becomes a source of emotional fulfillment and perceived value (Choi et al., 2019). Taken together, these mechanisms suggest that co-creation is a central driver of affective evaluations in healthcare.

2. Patient Loyalty

Patient loyalty is a critical outcome for hospitals seeking to maintain sustainable operations in increasingly competitive healthcare markets. Loyalty is commonly conceptualized as a willingness to return to the same provider for future healthcare needs and to recommend the provider to others (Zeithaml et al., 1996). These behaviours contribute directly to organizational performance by improving patient retention, strengthening reputation, and reducing acquisition costs.

This logic aligns with the widely accepted cognition–affection–behavior sequence in consumer behaviour theory, where service experiences shape cognitive and emotional evaluations which subsequently influence loyalty. When patients perceive the co-creation process as meaningful, feeling heard, respected, and engaged they are more likely to develop positive emotional responses toward the healthcare provider. These affective reactions, in turn, increase the likelihood that patients will remain attached to the organization and advocate for its services (Auh et al., 2007).

Beyond this mediated relationship, there is theoretical justification for a potential direct effect of co-creation on loyalty. Even in the absence of immediate satisfaction, co-creation may deepen loyalty through mechanisms such as psychological ownership, personal investment, and relational bonding. When patients invest time, emotional energy, and personal information into shaping their care, they often develop a sense of commitment to the treatment plan and to the provider who facilitated its creation (Füller, 2010). This personal investment generates

implicit switching costs and fosters a belief that the co-created approach is uniquely suited to their needs, making them not wanting to seek alternative providers.

METHODS

Research Design

This study employs a quantitative research design with an explanatory purpose. The quantitative approach is chosen because it allows for the objective measurement of variables and the statistical testing of the hypothesized relationships outlined in the conceptual model (Hair et al., 2019). The design is explanatory as it seeks to explain the variance in the dependent variables (value co-creation, satisfaction, loyalty) by examining the causal-predictive relationships with the independent variables (empowerment, IT support, staff support). Data collection is conducted through a cross-sectional survey, where data is gathered from a sample of the population at a single point in time.

Population and Sample

The target population for this study is all outpatient visitors at two major private hospital networks in Jakarta, Indonesia. This population was selected as it represents individuals who have direct and recent experience with the outpatient service process, which is the context for the value co-creation phenomenon under investigation. A non-probability purposive sampling technique will be used to recruit respondents.

1. Inclusion Criteria

- a. The respondent must be 18 years of age or older.
- b. The respondent must have utilized outpatient services (e.g., consultation, treatment, check-up) at either private hospital.
- c. The respondent must have visited the outpatient department at least twice within the last six months.

2. Exclusion Criteria

- a. The respondent is incapable of using digital technology due to any circumstances.
- b. The respondent is impaired cognitively.

3. Sample Size

The sample size will be determined based on the requirements for Partial Least Squares Structural Equation Modeling (PLS-SEM), which is the planned data analysis technique. The most common heuristic for PLS-SEM is the 10-times rule, which stipulates that the sample size should be at least 10 times the largest of two following (Hair et al., 2017):

- a. The number of formative indicators in the most complex formative construct, or
- b. The largest number of structural paths directed at a particular latent variable in the structural model.

In this reflective model, the second condition is most relevant. The construct with the most paths leading to it is Value Co-creation, which has three paths (from H1, H2, H3). Therefore, the minimum sample size based on the 10-times rule would be $10 * 3 = 30$.

However, to ensure robust results, enhance statistical power, and ensure the stability of the PLS-SEM estimates, a more substantial sample size will be sought. A power analysis using software like G*Power will be conducted, aiming for a statistical power of 0.80, a medium effect size ($f^2 = 0.15$), and a significance level of $\alpha = 0.05$ for the multiple regression test relevant to the structural model (Faul et al., 2009). It is anticipated that this will require a sample size of 150-250 respondents. To account for potential incomplete or unusable responses, the survey will be distributed to a target of at least 300 individuals to ensure the final cleaned dataset meets the analytical requirements.

Data Collection Procedure

1. Structured Questionnaire

The primary instrument for data collection was a structured questionnaire, designed to be comprehensive yet user-friendly. It was administered online to maximize accessibility and response rate across different patient demographics. The questionnaire will be distributed as a digital form using professional survey platforms (e.g., Google Forms). Links to the survey were shared through official hospital communication channels where permissible, and via social media groups targeting patients of the respective hospitals.

The questionnaire was structured in three parts:

- a. Part A: A cover page explaining the research purpose, ensuring anonymity and confidentiality, and obtaining informed consent.
- b. Part B: Questions capturing the respondents' demographic and visitation profile (e.g., age, gender, most recent department visited, frequency of visits).

- c. Part C: The main body of the questionnaire, containing multi-item scales for all six latent constructs (Patient Empowerment, IT Support, Staff Support, Value Co-creation, Patient Satisfaction, Patient Loyalty). All items were measured on a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

2. Pre-Test and Pilot Study

Prior to full-scale deployment, the questionnaire underwent a rigorous validation process to ensure content clarity, reliability, and validity. The initial draft of the questionnaire will be reviewed by a panel of three experts in the fields of healthcare management and service marketing. The goal was to assess content validity, specifically the relevance, clarity, and comprehensiveness of each item in measuring its intended construct. Feedback on wording, layout, and logical flow was incorporated into the revised instrument.

The revised questionnaire was then administered to a small, representative sample of 30 respondents from the target population (outpatients from similar private hospitals not included in the main study). The purpose of the pilot study was threefold:

- a. To assess the clarity and comprehensibility of the instructions and items from a patient's perspective.
- b. To conduct a preliminary reliability analysis by calculating Cronbach's Alpha for each construct to ensure internal consistency (with a threshold of > 0.7 considered acceptable).
- c. To estimate the average time required to complete the survey, ensuring it was not overly burdensome.

The feedback and statistical results from the pilot study were used to make final refinements to the wording of ambiguous items and to confirm the robustness of the measurement scales before launching the main data collection.

3. Main Data Collection

The finalized questionnaire will then be distributed to the main sample over a designated period of 8 weeks. A consistent protocol was followed to maintain standardization. All data were then screened for missing values, straight-lining responses, and other potential biases before proceeding to formal analysis.

Measurement Instrument

All constructs in the proposed research model are modeled as reflective constructs. This is because the indicators (items) for each construct are considered manifestations of the underlying latent variable, are expected to be correlated, and are interchangeable (Hair et al., 2019). A change in the latent construct is expected to cause a change in all its indicators.

The measurement items for each construct were adapted from established scales in the literature to ensure content validity. All items were measured using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The following table outlines the constructs, their corresponding measurement items, and the original sources of adaptation.

Table 1. Constructs, Measurement Items, and Sources

Construct & Sources	Measurement Items
Patient Empowerment (Adapted from Spreitzer, 1995; Ouschan et al., 2006)	1. I have significant freedom to decide how to manage my health in relation to the services at this hospital. 2. I am confident about my ability to participate in decisions regarding my treatment. 3. The information provided by this hospital enables me to have a meaningful discussion with my doctor. 4. I feel that I have a great deal of control over my care process at this hospital.
IT Support (Adapted from Parasuraman et al., 2005 - E-S-QUAL)	1. This hospital's website/mobile app is easy to use. 2. This hospital provides well-functioning online services (e.g., appointment scheduling, prescription refills). 3. I can easily access my medical information through this hospital's digital channels. 4. The hospital's IT systems make my interactions more efficient.
Staff Support (Adapted from SERVQUAL; Parasuraman et al., 1988)	1. The doctors and nurses at this hospital give me personal attention. 2. The staff show a sincere interest in solving my health problems. 3. The staff clearly explain the procedures, treatments, and associated risks. 4. The staff encourage me to ask questions and express my concerns.
Value Co-creation (Adapted from Yi & Gong, 2013; McColl-Kennedy et al., 2012)	1. I shared all relevant information with the staff to help them provide the best service. 2. I actively participated in the decisions made about my treatment. 3. My interactions with the hospital staff were collaborative.

	4. Together with the staff, we co-developed a plan for my health management.
Patient Satisfaction (Adapted from Oliver, 1980)	1. I am satisfied with my decision to use this hospital's outpatient services. 2. The experience I had at this hospital was pleasant. 3. My experience at this hospital met my expectations. 4. Overall, I am satisfied with the services provided by this hospital.
Patient Loyalty (Adapted from Zeithaml et al., 1996)	1. I will use this hospital's outpatient services the next time I need medical care. 2. I will recommend this hospital to my friends and relatives. 3. I would say positive things about this hospital to other people. 4. I consider this hospital my first choice for healthcare services.

The Proposed Conceptual Model

Based on the theoretical foundations and hypotheses developed in the preceding sections, this study proposes an integrated conceptual model to explain the mechanisms of value co-creation in outpatient services. The model illustrates the relationships between the antecedents, the core process, and the consequences, as depicted in the figure below.

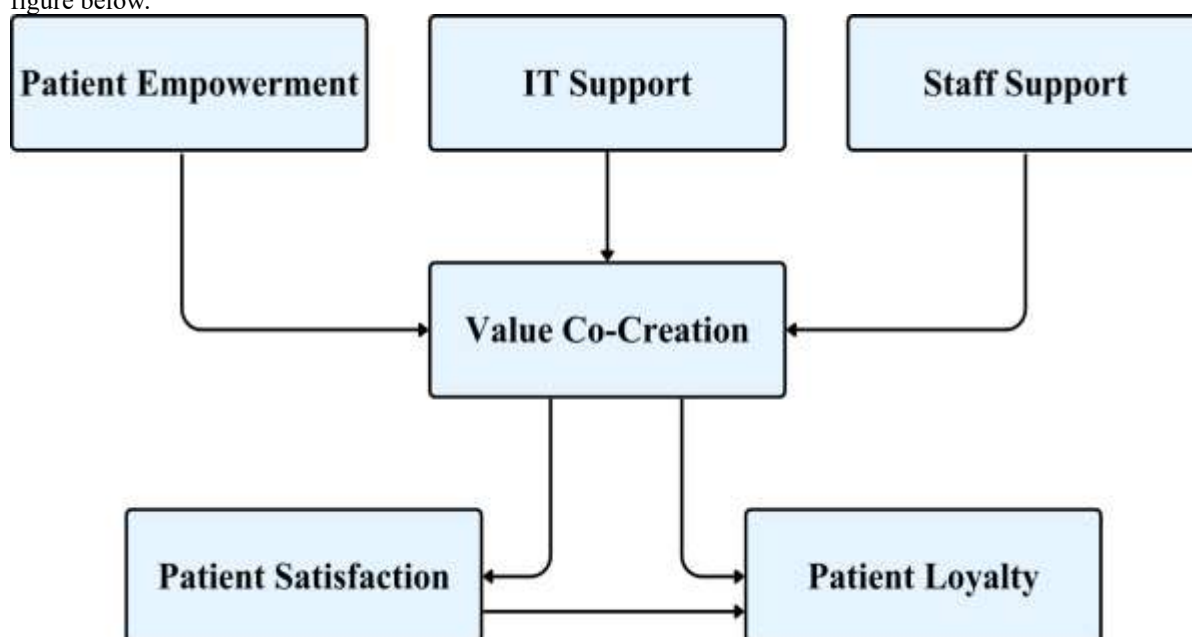


Figure 1. Conceptual Model

This model posits that Patient Empowerment, IT Support, and Staff Support are three critical drivers that directly enable the process of Value Co-creation (H1-H3). Successful Value Co-creation, in turn, directly enhances Patient Satisfaction (H4). Furthermore, while Patient Satisfaction is a key mediator leading to Patient Loyalty (H5), Value Co-creation is also theorized to have a direct effect on fostering Loyalty (H6), capturing the cognitive and relational commitment beyond mere satisfaction.

Hypotheses Pathways

- H1: Patient empowerment influences value co-creation.
- H2: Information Technology (IT) support influences value co-creation.
- H3: Staff support influences value co-creation.
- H4: Value co-creation influences patient satisfaction.
- H5: Patient satisfaction influences patient loyalty.
- H6: Value co-creation influences patient loyalty.

Data Analysis

The data analysis for this study will be conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM), primarily with the SmartPLS software (Version 4 or later). PLS-SEM is chosen because it is a variance-based method ideal for predictive research models focused on theory development, and it performs well with complex models and non-normally distributed data (Hair et al., 2019).

1. Data Screening and Descriptive Statistics

Prior to the main analysis, the collected data will be screened for completeness, missing values, outliers, and potential response biases. Descriptive statistics will be computed for all demographic variables and latent constructs to summarize the sample characteristics.

2. Assessment of the Measurement Model

This step evaluates the reliability and validity of the constructs. Since all constructs are reflective, the following criteria will be assessed:

a. Internal Consistency Reliability

This will be evaluated using Composite Reliability. A value of 0.70 or higher is considered acceptable, indicating that the items consistently represent the same latent construct (Hair et al., 2019).

b. Convergent Validity

This will be assessed using Indicator Loadings and the Average Variance Extracted (AVE). All indicator loadings should be statistically significant and ideally above 0.708. The AVE for each construct should exceed 0.50, indicating that the construct explains more than half of the variance of its indicators (Fornell & Larcker, 1981).

c. Discriminant Validity

This ensures that each construct is distinct from others in the model. It will be assessed using the Fornell-Larcker Criterion and the Heterotrait-Monotrait (HTMT) Ratio of Correlations.

- 1) For the Fornell-Larcker criterion, the square root of the AVE of each construct should be greater than its highest correlation with any other construct.
- 2) For the HTMT, a value below 0.90 (for conceptually distinct constructs) is considered evidence of discriminant validity (Henseler et al., 2015).

3. Assessment of the Structural Model

After establishing a valid and reliable measurement model, the structural model will be evaluated to test the hypothesized relationships (H1-H6).

a. Collinearity Assessment

The Variance Inflation Factor (VIF) values for all sets of predictor constructs in the structural model will be examined. A VIF value below 5 indicates that collinearity is not a critical issue in the path model (Hair et al., 2019).

b. Path Coefficients and Hypotheses Testing

The significance of the path coefficients (ranging from -1 to +1) will be assessed using a bootstrapping procedure with 5,000 subsamples. A path is considered significant if the p-value is less than 0.05 (t-statistic > 1.96 for a two-tailed test). This directly tests hypotheses H1 through H6.

c. Coefficient of Determination (R^2)

The R^2 values for the key endogenous constructs (Value Co-creation, Patient Satisfaction, and Patient Loyalty) will be examined. This indicates the proportion of variance in the dependent variable explained by the independent variables linked to it. Values of 0.75, 0.50, and 0.25 are considered substantial, moderate, and weak, respectively (Hair et al., 2019).

d. Effect Size (f^2)

The f^2 effect size will be calculated to assess the impact of a specific independent construct on a dependent construct by examining the change in R^2 when the predictor is omitted from the model. Values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively (Cohen, 1988).

e. Predictive Relevance (Q^2)

The Stone-Geisser's Q^2 value will be obtained using the blindfolding procedure. A Q^2 value greater than zero for an endogenous reflective construct indicates that the path model has predictive relevance for that construct (Geisser, 1974; Stone, 1974).

RESULTS

Measurement Model Evaluation

1. Indicator Reliability (Outer Loadings)

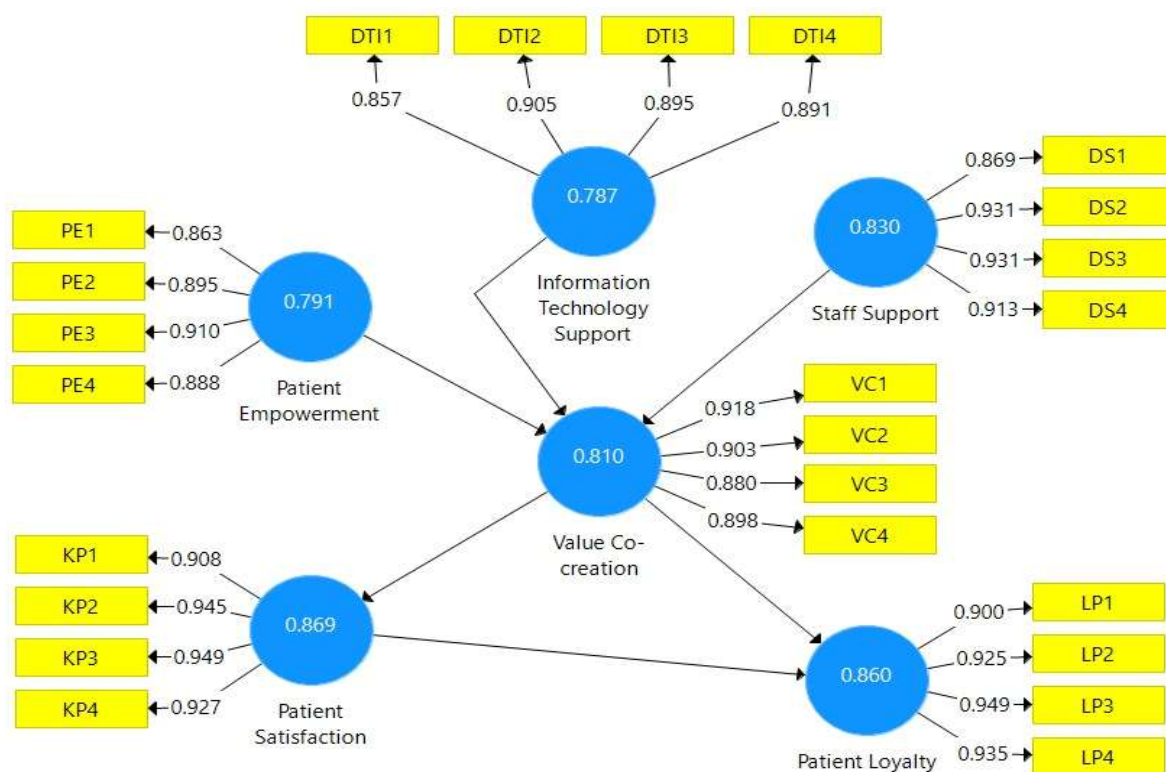


Figure 2. Outer Model

The measurement model assessment based on the outer model illustrated in the figure demonstrates each variable (Patient Empowerment, Information Technology Support, Staff Support, Value Co-creation, Patient Satisfaction, and Patient Loyalty).

Table 2. Validity Test

Variables	Indicators	Outer Loadings	Results
Staff Support	DS1	0.869	Valid
	DS2	0.931	Valid
	DS3	0.931	Valid
	DS4	0.913	Valid
Information Technology Support	DTI1	0.857	Valid
	DTI2	0.905	Valid
	DTI3	0.895	Valid
	DTI4	0.891	Valid
Patient Satisfaction	KP1	0.908	Valid
	KP2	0.945	Valid
	KP3	0.949	Valid
	KP4	0.927	Valid
Patient Loyalty	LP1	0.900	Valid
	LP2	0.925	Valid
	LP3	0.949	Valid
	LP4	0.935	Valid
Patient Empowerment	PE1	0.863	Valid
	PE2	0.895	Valid

Value Co-creation	PE3	0.910	Valid
	PE4	0.888	Valid
	VC1	0.918	Valid
	VC2	0.903	Valid
	VC3	0.880	Valid
	VC4	0.898	Valid

The evaluation of the measurement model shows that all indicators demonstrate strong outer loading values. Most indicator loadings exceed the recommended threshold of 0.70, indicating that the observed variables adequately represent their respective latent constructs. High loading values confirm strong convergent validity, suggesting that the indicators are reliable measures of their underlying constructs such as Staff Support, Information Technology Support, Patient Satisfaction, Patient Loyalty, Patient Empowerment, and Value Co-creation.

2. Internal Consistency Reliability

Internal consistency was assessed using Cronbach's Alpha, and Composite Reliability.

Variable	Cronbach's Alpha	Composite Reliability	Rule of Thumb	Model Evaluation
Staff Support	0.932	0.951	>0.7	Reliable
Information Technology Support	0.909	0.936		Reliable
Patient Satisfaction	0.949	0.964		Reliable
Patient Loyalty	0.946	0.961		Reliable
Patient Empowerment	0.912	0.938		Reliable
Value Co-creation	0.922	0.945		Reliable

The results show that:

- Cronbach's Alpha values range from 0.909 to 0.949
- Composite Reliability values range from 0.936 to 0.964

All values exceed the recommended threshold of 0.70, indicating strong reliability and internal consistency among indicators within each construct.

3. Convergent Validity

Table 3. Convergent Validity Test

	Average Variance Extracted (AVE)
Staff Support	0.830
Information Technology Support	0.787
Patient Satisfaction	0.869
Patient Loyalty	0.860
Patient Empowerment	0.791
Value Co-creation	0.810

Convergent validity was assessed using Average Variance Extracted (AVE). The AVE values for all constructs range from 0.787 to 0.869, which are well above the recommended minimum value of 0.50. These results confirm that each construct explains more than half of the variance of its indicators, supporting strong convergent validity.

4. Discriminant Validity

Table 4. Fornell-Larcker Criterion Test

	DS	DTI	KP	L	PE	VC
Staff Support	0.911					
Information Technology Support	0.782	0.887				
Patient Satisfaction	0.893	0.767	0.932			
Patient Loyalty	0.879	0.746	0.884	0.927		
Patient Empowerment	0.777	0.772	0.762	0.751	0.889	
Value Co-creation	0.810	0.755	0.885	0.859	0.795	0.900

The Fornell-Larcker criterion indicates that the square root of the AVE for each construct is higher than its correlations with other constructs. This demonstrates adequate discriminant validity, meaning that each construct is empirically distinct from the others.

Structural Model Evaluation

1. Coefficient of Determination (R^2)

The R^2 values indicate the predictive power of the structural model:

- **Patient Satisfaction:** $R^2 = 0.783$ This indicates that 78.3% of the variance in patient satisfaction is explained by the predictor variables, demonstrating substantial explanatory power.
- **Patient Loyalty:** $R^2 = 0.808$ This suggests that 80.8% of the variance in patient loyalty is explained by the model, which represents a strong level of prediction.
- **Value Co-creation:** $R^2 = 0.848$ This indicates that 84.8% of the variance in value co-creation is explained by the antecedent constructs, demonstrating very strong explanatory capability.

Overall, these values indicate that the model has strong predictive relevance.

Path Coefficient Analysis

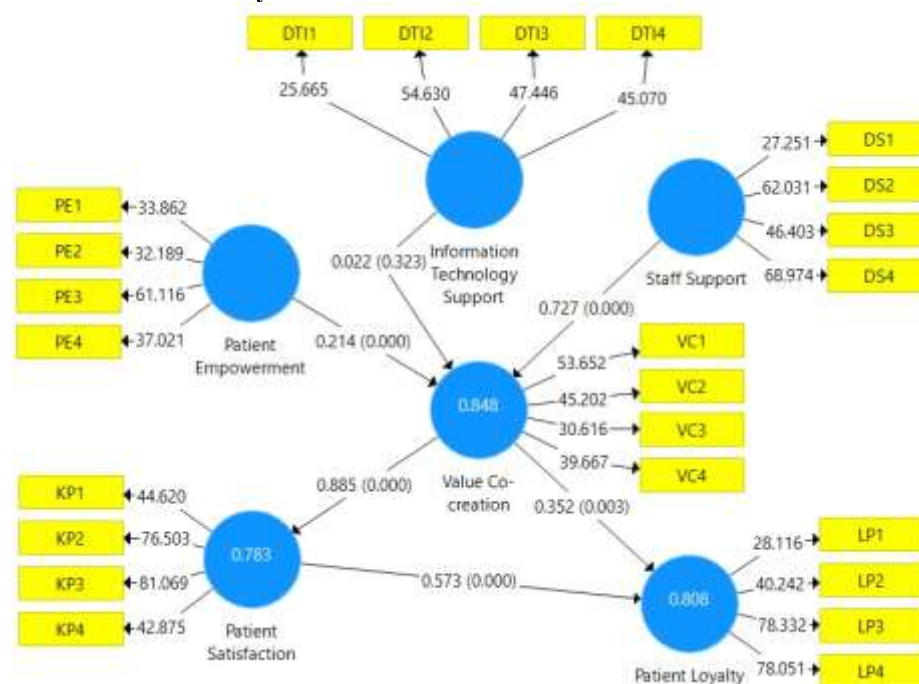


Figure 3. Path Coefficient

1. Direct Effects

The structural model results reveal several important relationships:

- **Value Co-creation $\rightarrow$ Patient Satisfaction ($\beta = 0.885$)**
This relationship shows a very strong positive influence, indicating that higher levels of value co-creation significantly enhance patient satisfaction.
- **Patient Satisfaction $\rightarrow$ Patient Loyalty ($\beta = 0.573$)**
This result demonstrates that patient satisfaction plays a crucial role in increasing patient loyalty.
- **Value Co-creation $\rightarrow$ Patient Loyalty ($\beta = 0.352$)**

Value co-creation directly contributes to patient loyalty, although its effect is weaker compared to its effect through patient satisfaction.

d. **Staff Support → Value Co-creation ($\beta = 0.727$)**

Staff support strongly promotes value co-creation, suggesting that staff involvement and assistance play a critical role in enhancing collaborative service value.

e. **Patient Empowerment → Value Co-creation ($\beta = 0.214$)**

Patient empowerment moderately contributes to value co-creation, indicating that empowering patients supports collaborative value generation.

f. **Information Technology Support → Value Co-creation ($\beta = 0.022$)**

The influence of IT support on value co-creation is very weak, suggesting that technology alone may not significantly drive value co-creation without complementary human or relational factors.

2. Indirect Effects

The model also demonstrates mediating relationships through value co-creation and patient satisfaction:

- Staff Support → Patient Satisfaction (Indirect $\beta = 0.643$)
- Staff Support → Patient Loyalty (Indirect $\beta = 0.624$)

These results indicate that staff support enhances patient satisfaction and loyalty indirectly through value co-creation mechanisms.

- IT Support → Patient Satisfaction (Indirect $\beta = 0.020$)
- IT Support → Patient Loyalty (Indirect $\beta = 0.019$)

These effects are minimal, suggesting limited mediating impact of IT support.

DISCUSSION

The findings of this study provide strong empirical support for the central role of value co-creation as a transformative mechanism in healthcare service delivery. By demonstrating that value co-creation significantly influences patient satisfaction and loyalty, the results extend the theoretical assumptions of Service-Dominant (S-D) Logic, which conceptualizes value as collaboratively generated through interactions among multiple actors rather than being embedded solely within service outputs (Vargo & Lusch, 2008, 2016). The present study not only confirms the relevance of S-D Logic in healthcare but also deepens the understanding of how organizational resources and patient capabilities interact to produce relational and experiential value outcomes.

Value Co-creation as a Foundational Mechanism in Healthcare Service Ecosystems

The strong influence of value co-creation on patient satisfaction highlights the transition from provider-centric service delivery to patient-centered service ecosystems. Within S-D Logic, value emerges through the integration of operant resources, such as knowledge, skills, and relational capabilities, contributed by both providers and consumers (Vargo & Lusch, 2016). The findings demonstrate that healthcare value is co-produced through continuous interaction, shared decision-making, and collaborative problem-solving between patients and healthcare providers.

These findings align with Grönroos and Voima's (2013) service logic perspective, which distinguishes between provider-driven value facilitation and customer-driven value creation. The strong relationship observed in this study suggests that healthcare organizations that facilitate active patient participation enable patients to become co-creators of their own service experiences, thereby increasing satisfaction levels. Furthermore, McColl-Kennedy et al. (2012) emphasized that patients engage in multiple co-creation practices, including information sharing, decision involvement, and emotional engagement, all of which enhance perceived service outcomes.

Critically, this study advances the theoretical discourse by empirically demonstrating that value co-creation functions as a structural integrator connecting organizational support mechanisms to patient outcomes. While previous research has often conceptualized co-creation as a behavioral or experiential phenomenon, the present findings highlight its systemic role within healthcare service ecosystems.

Patient Satisfaction as a Relational Outcome and Loyalty Catalyst

The strong relationship between patient satisfaction and patient loyalty reinforces relationship marketing theory, which suggests that satisfaction is a key precursor to long-term relational commitment (Oliver, 1999). However, from a deeper theoretical perspective, satisfaction should be understood not merely as a cognitive evaluation but as a relational and emotional construct shaped by interactive service experiences.

The findings suggest that satisfaction mediates the relationship between value co-creation and loyalty, supporting the notion that collaborative service experiences generate emotional attachment and trust. According to Payne et al. (2008), co-creation processes strengthen relational bonds by integrating customer experiences across multiple service touchpoints. This relational bonding subsequently fosters loyalty behaviors such as service repurchase and positive word-of-mouth.

Moreover, the results contribute to the expanding literature on healthcare relationship quality by demonstrating that loyalty is not solely driven by clinical outcomes but also by experiential and relational dimensions of care. This finding resonates with Berry and Bendapudi's (2007) argument that healthcare services are characterized by high levels of emotional vulnerability, making relational trust and interaction quality critical determinants of patient retention.

The Strategic Role of Staff Support in Facilitating Value Co-creation

One of the most significant findings of this study is the dominant influence of staff support on value co-creation. This result reinforces the centrality of frontline employees as key actors in service ecosystems. Within S-D Logic, employees function as resource integrators who facilitate the exchange of knowledge, empathy, and relational support necessary for co-creation (Karpen et al., 2012).

The findings support the service interaction capability framework, which suggests that employee relational competence, communication effectiveness, and responsiveness significantly influence customer engagement in value co-creation processes. Sweeney et al. (2015) demonstrated that supportive employee behavior enhances customer confidence and willingness to participate in service processes. Similarly, McColl-Kennedy et al. (2017) emphasized that healthcare professionals play a crucial role in enabling patient participation through information transparency and emotional support.

From a critical perspective, the strong influence of staff support suggests that healthcare digitalization initiatives may be insufficient if not accompanied by relational service competencies. These findings challenge technology-centric healthcare transformation models and underscore the enduring importance of human interaction in service value creation.

Patient Empowerment as an Enabling Operant Resource

The positive relationship between patient empowerment and value co-creation reflects empowerment theory, which posits that individuals who possess knowledge, self-efficacy, and decision autonomy are more likely to engage actively in collaborative processes (Zimmerman, 2000). In healthcare contexts, empowerment transforms patients from passive recipients into active participants in treatment and service design.

Empirical evidence supports this relationship. Aujoulat et al. (2007) argued that patient empowerment enhances patient engagement and improves healthcare outcomes by fostering shared responsibility between providers and patients. Similarly, Fumagalli et al. (2015) highlighted that empowered patients demonstrate higher levels of participation, adherence to treatment, and satisfaction.

However, the moderate effect size observed in this study suggests that empowerment alone may not fully drive co-creation processes. Instead, empowerment may function as a conditional resource that requires organizational facilitation through staff interaction and supportive service environments. This insight contributes to the theoretical refinement of empowerment theory by emphasizing its interdependence with organizational and relational factors.

The Limited Influence of Information Technology Support: A Socio-Technical Perspective

The minimal influence of information technology support on value co-creation presents an important theoretical implication. While digital health technologies are widely promoted as catalysts for patient engagement, the findings suggest that technology may function primarily as an enabling infrastructure rather than a direct driver of collaborative value creation.

This result aligns with socio-technical systems theory, which emphasizes that technological systems must be integrated with social and organizational processes to achieve optimal outcomes (Orlikowski, 2007). Eysenbach (2001) argued that e-health technologies enhance information accessibility, but their effectiveness depends on user engagement and interaction quality. Similarly, Baird and Parasnis (2011) highlighted that digital platforms facilitate customer interaction only when supported by relational and experiential service strategies.

The findings therefore challenge deterministic views of healthcare digitalization and support a more integrative perspective in which technology complements human-centered service delivery.

Mediating Role of Value Co-creation and Satisfaction in Healthcare Service Transformation

The mediating roles of value co-creation and patient satisfaction provide strong support for multi-layered service process models. The results indicate that organizational resources such as staff support, empowerment, and technology do not directly influence patient loyalty but operate through relational and experiential mechanisms.

This finding extends Payne et al.'s (2008) co-creation framework by empirically demonstrating the sequential transformation of organizational resources into experiential value and relational outcomes. It also supports McColl-Kennedy et al.'s (2017) argument that co-creation operates as a dynamic process linking service provider actions to customer behavioral outcomes.

This study contributes to the literature in several important ways. First, it extends S-D Logic by empirically validating value co-creation as a structural mediator within healthcare service ecosystems. Second, it

integrates empowerment theory and relationship marketing perspectives, demonstrating that patient engagement and relational interaction jointly shape service outcomes. Third, it provides critical insights into the socio-technical integration of digital health services, highlighting the complementary roles of technology and human interaction.

From a strategic perspective, healthcare organizations should prioritize relational service capabilities alongside technological innovation. Investments in staff training, patient education, and collaborative service design may produce stronger loyalty outcomes than technology adoption alone. Additionally, empowerment initiatives should be integrated into patient-centered care models to enhance engagement and participation.

CONCLUSION

This study provides robust empirical evidence highlighting the pivotal role of value co-creation in shaping patient satisfaction and loyalty within healthcare service ecosystems. The findings demonstrate that value co-creation operates as a central relational and experiential mechanism through which organizational resources and patient capabilities are transformed into positive service outcomes. Specifically, the results confirm that value co-creation significantly enhances patient satisfaction and directly and indirectly strengthens patient loyalty, reinforcing its strategic importance in contemporary healthcare service delivery.

The study further reveals that staff support serves as the most influential driver of value co-creation, emphasizing the critical importance of human interaction, relational competence, and patient-centered communication in healthcare services. This finding underscores that despite increasing healthcare digitalization, frontline employees remain key facilitators of collaborative service experiences. Additionally, patient empowerment contributes positively to value co-creation, indicating that patient knowledge, autonomy, and active participation are essential operant resources in healthcare value creation. However, the relatively limited influence of information technology support suggests that technological infrastructure alone is insufficient to generate collaborative service value without strong relational and organizational support systems.

From a theoretical perspective, this study advances the application of Service-Dominant Logic by empirically demonstrating how value co-creation functions as a structural mediator linking organizational support mechanisms to patient behavioral outcomes. The integration of empowerment theory and relationship marketing perspectives further enriches the understanding of multi-actor resource integration within healthcare service ecosystems. The findings contribute to the growing body of literature by positioning value co-creation as both a relational process and a strategic pathway toward sustainable patient loyalty.

From a managerial standpoint, the results suggest that healthcare organizations should prioritize patient-centered service strategies that foster collaborative interaction, staff relational capabilities, and patient empowerment initiatives. While digital transformation remains essential, its effectiveness depends on its integration with human-centered service practices. Healthcare providers should therefore adopt balanced socio-technical approaches that combine technological innovation with relational service excellence.

Despite its contributions, this study has several limitations that open avenues for future research. Longitudinal studies are recommended to capture the dynamic nature of value co-creation processes over time. Future research should also explore cross-cultural and multi-institutional comparisons to examine contextual variations in co-creation mechanisms. Additionally, incorporating psychological constructs such as trust, emotional engagement, and perceived risk may further enrich theoretical and empirical understanding of healthcare service relationships.

Overall, this study reinforces the paradigm shift from provider-driven healthcare delivery toward collaborative and patient-centered service ecosystems. By demonstrating the strategic role of value co-creation in enhancing patient satisfaction and loyalty, the findings provide important theoretical insights and practical guidance for advancing sustainable and relationship-oriented healthcare service models.

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