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The strategic role of inter-coopetition in driving hospital sustainability under rising healthcare costs

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Abstract

Rising healthcare costs continue to threaten the long-term viability of hospitals, particularly private general hospitals in Indonesia. This study aims to examine the strategic role of Inter-Coopetition Strategy (SKA) in strengthening hospital business sustainability (KB), while also analysing the effects of Integrated Preventive Care (PPT), Value-Based Care Orientation (OPN), and Digital Capability (KDD) under increasing financial pressures. A concurrent mixed-methods design was adopted. Quantitative data were obtained from 180 hospital managers through structured surveys and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). To complement and contextualise the statistical results, qualitative insights were gathered through semi-structured interviews with selected hospital leaders. The results demonstrate that OPN and SKA have significant positive direct effects on KB, while SKA mediates the relationships between PPT and OPN with KB. Digital capability (KDD) also emerges as a strong determinant of sustainability, indicating the essential role of technology in improving operational efficiency and organisational resilience. Although the direct effect of PPT on KB was relatively weak quantitatively, qualitative evidence confirms its strategic relevance, suggesting that preventive care contributes most effectively to sustainability when implemented within collaborative hospital networks. The study concludes that inter-coopetition serves as a critical mechanism for enhancing hospital business sustainability in an increasingly costly healthcare environment. When combined with value-based care, preventive services, and digital capabilities, SKA enables hospitals to achieve integrated pathways toward resilience and performance continuity. The findings provide actionable guidance for hospital leaders to embed preventive and value-driven care into strategic planning, strengthen inter-hospital collaborative-competitive arrangements, and invest in digital infrastructure to support agile and data-informed decision-making. At the policy level, the results highlight the need for aligned incentives and regulatory support—particularly within the national health insurance system—to ensure the financial and operational sustainability of hospital services.

Keywords: Hospital Sustainability, Inter-Coopetition Strategy, Value-Based Care, Integrated Preventive Care, Digital Capability, Rising Healthcare Costs.

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1. Background

Rising healthcare costs have become a critical concern for healthcare systems worldwide, posing significant challenges to accessibility, quality, and the long-term sustainability of services [1, 2]. Globally, factors such as the increasing prevalence of chronic diseases, ageing populations, and rapid technological advancements have substantially escalated operational expenses in hospitals, creating financial pressures that challenge the capacity of healthcare institutions to maintain high-quality care [3, 4]. In Indonesia, these challenges are further amplified by limited healthcare resources, growing patient demands for personalized services, and the ongoing need to optimise cost efficiency, highlighting the urgency of adopting strategic approaches that balance service quality with financial sustainability [5, 6].

In response to these pressures, hospitals are increasingly exploring innovative organisational strategies to enhance efficiency, improve service delivery, and ensure sustainable performance. One promising approach is the adoption of an Inter-Coopetition Strategy (SKA), which integrates cooperative and competitive dynamics among healthcare providers to optimise resource utilisation, foster knowledge sharing, and enhance collaborative capabilities [7, 8]. By leveraging inter-organisational cooperation while maintaining competitive positioning, SKA may allow hospitals to mitigate financial pressure and reinforce business sustainability, particularly in emerging healthcare markets such as Indonesia, where organisational resources are constrained and collaboration is essential for efficiency and resilience.

Complementing SKA, two strategic orientations—Integrated Preventive Care (PPT) and Value-Based Care Orientation (OPN)—have been identified as pivotal in promoting sustainable hospital management. PPT emphasises proactive health interventions aimed at preventing disease and reducing the reliance on costly treatments, thereby directly enhancing cost efficiency and improving patient outcomes [9]. OPN, on the other hand, focuses on aligning healthcare services with measurable patient outcomes, ensuring that resources are deployed effectively to maximise value for both patients and the organisation [1]. The interaction between these strategic orientations and SKA suggests that coopetitive collaborations may serve as a mechanism through which preventive and value-based practices are translated into sustainable business performance, bridging the gap between operational efficiency and organisational resilience.

Despite the theoretical promise of these strategies, empirical evidence examining their combined effects on hospital sustainability remains limited. Existing studies largely address either organisational performance or isolated strategic practices, without systematically exploring the mediating role of SKA in translating preventive care and value-based orientations into sustainable outcomes [6, 8]. This gap underscores the need for research that integrates these constructs, particularly in healthcare systems facing escalating costs, resource limitations, and increasing patient expectations.

Addressing this gap, the present study aims to investigate the mediating role of Inter-Coopetition Strategy (SKA) in the relationships between Integrated Preventive Care (PPT), Value-Based Care Orientation (OPN), and Hospital Sustainability (KB). By focusing on strategies that directly influence cost management, patient outcomes, and organisational resilience, this research provides both theoretical contributions to sustainable healthcare management literature and practical guidance for hospital managers and policymakers seeking to implement cost-efficient, value-driven, and collaborative strategies in challenging healthcare contexts.

2. Literature Review

Sustainable practices in hospitals are increasingly critical for achieving long-term business sustainability. Institutional theory explains that hospitals adopt sustainable practices to align with social and regulatory expectations [10-12]. Agency theory suggests that sustainability initiatives can reduce agency costs and optimise governance [13, 14] while legitimacy theory emphasises the role of sustainability in securing social approval and organisational credibility [15-17].

Signaling theory highlights how hospitals communicate sustainable practices to stakeholders under information asymmetry [18, 19] and stakeholder theory stresses the importance of addressing the needs of a broad range of constituents to maintain trust [20, 21]. Finally, the Resource-Based View underscores that hospitals can leverage internal resources and capabilities, such as preventive care, value-based orientation, and inter-coopetition strategies, to gain sustainable competitive advantage [10]. Together, these perspectives provide a foundation to examine how integrated preventive care, value-based care orientation, and inter-coopetition strategies contribute to hospital business sustainability.

2.1. Hypothesis Development

2.1.1. The Influence of Integrated Preventive Care (PPT) on Business Sustainability (KB)

Integrated preventive care (PPT) has been widely recognised as a strategic approach to enhance hospital sustainability. Preventive care programmes—including routine check-ups, screenings, and early intervention protocols—reduce long-term healthcare costs and improve patient outcomes, contributing directly to economic, social, and environmental performance [22-25].

Stakeholder and community participation, along with the integration of preventive services within existing programmes, strengthens hospital sustainability by ensuring continuity of care and resource efficiency [26, 27]. By expanding the coverage of high-quality preventive services, PPT not only improves patient health but also enhances institutional efficiency, which supports long-term business sustainability.

Hypothesis 1 (H1): Integrated Preventive Care (PPT) positively influences Hospital Business Sustainability (KB).

2.1.2. The Influence of Value-Based Care Orientation (OPN) on Business Sustainability (KB)

Value-Based Care Orientation (OPN) focuses on aligning hospital services with patient outcomes while optimising resource utilisation and cost efficiency. Studies suggest that value-driven approaches in healthcare improve clinical outcomes, reduce operational costs, and support economic, social, and environmental performance [28-33].

Although the full implementation of value-based care remains limited to certain countries, the awareness and mindset of hospital leaders regarding value-based practices can drive sustainability efforts. By integrating patient outcomes with cost efficiency, OPN contributes to the long-term resilience and sustainability of hospitals.

Hypothesis 2 (H2): Value-Based Care Orientation (OPN) positively influences Hospital Business Sustainability (KB).

2.1.3. The Influence of Inter-Cooperation Strategy (SKA) on Business Sustainability (KB)

Inter-Cooperation Strategy (SKA) involves simultaneous cooperation and competition among hospitals, such as patient referrals, shared specialist services, and joint procurement [34-39].

Kooperetisi enables hospitals to leverage shared resources, optimise operational processes, and enhance social, environmental, and economic outcomes, contributing to overall business sustainability. In healthcare contexts with limited resources, SKA provides alternative pathways to achieve competitive advantage while supporting long-term institutional resilience.

Hypothesis 3 (H3): Inter-Cooperation Strategy (SKA) positively influences Hospital Business Sustainability (KB).

2.1.4. The Influence of Integrated Preventive Care (PPT) on Inter-Cooperation Strategy (SKA)

Delivering integrated preventive care requires collaboration among hospitals to ensure continuity of care, resource sharing, and comprehensive service coverage. The complexity of integrated preventive programmes encourages hospitals to engage in cooperative arrangements [40-42].

Mutual benefits, interdependency, and cooperative orientation fostered through integrated preventive care programmes act as antecedents of SKA, motivating hospitals to collaborate strategically while maintaining competitive positioning [43].

Hypothesis 4 (H4): Integrated Preventive Care (PPT) positively influences Inter-Cooperation Strategy (SKA).

2.1.5. The Influence of Value-Based Care Orientation (OPN) on Inter-Cooperation Strategy (SKA)

Value-based care inherently requires coordination across hospitals, particularly in referral systems and outcome-based service models. OPN encourages the creation of integrated practical units (IPUs) and collaborative networks, fostering inter-cooperation among hospitals to optimise care delivery and standardisation [29, 44-48].

Through mutual benefit and interdependence, hospitals adopting a value-based mindset are more likely to engage in SKA, enhancing their ability to deliver sustainable care.

Hypothesis 5 (H5): Value-Based Care Orientation (OPN) positively influences Inter-Cooperation Strategy (SKA).

2.1.6. The Mediating Effect of Inter-Cooperation Strategy (SKA) on the Relationship between Integrated Preventive Care (PPT) and Business Sustainability (KB)

Integrated preventive care can improve hospital sustainability, but its full impact often depends on collaborative arrangements facilitated by SKA. Research indicates that PPT enhances SKA, which in turn strengthens economic, social, and environmental outcomes [22, 26, 42, 43, 49].

This suggests that SKA serves as a mediating mechanism through which preventive care initiatives are translated into measurable improvements in hospital business sustainability.

Hypothesis 6 (H6): Inter-Cooperation Strategy (SKA) mediates the relationship between Integrated Preventive Care (PPT) and Hospital Business Sustainability (KB).

2.1.7. The Mediating Effect of Inter-Cooperation Strategy (SKA) on the Relationship between Value-Based Care Orientation (OPN) and Business Sustainability (KB)

Similarly, value-based care initiatives drive the need for inter-hospital cooperation to achieve efficiency and outcome alignment. OPN promotes SKA by encouraging interdependency, mutual benefit, and the establishment of collaborative care networks, which ultimately influence hospital sustainability [30, 43-46, 50].

SKA thus functions as a mediator, translating value-oriented strategies into enhanced business sustainability outcomes.

Hypothesis 7 (H7): Inter-Coopetition Strategy (SKA) mediates the relationship between Value-Based Care Orientation (OPN) and Hospital Business Sustainability (KB).

3. Methods

This study adopted a mixed-methods research design, combining both quantitative and qualitative approaches to comprehensively investigate the effects of Integrated Preventive Care (PPT), Value-Based Care Orientation (OPN), and Inter-Coopetition Strategy (SKA) on Hospital Business Sustainability (KB). Given the relative novelty of these variables and the absence of prior studies exploring this specific conceptual framework, a concurrent mixed-methods strategy was employed, allowing quantitative and qualitative data to be collected simultaneously and analysed in a complementary manner [51-54]. This approach, often referred to as concurrent triangulation, enhances the robustness of findings by offsetting the limitations of one method with the strengths of the other, thereby ensuring more comprehensive and validated insights.

3.1. Quantitative Component

The quantitative aspect of the research utilised a descriptive, cross-sectional survey design. Data were collected via structured questionnaires distributed to senior hospital leaders, including directors, department heads, and quality managers. The study operationalised the research variables based on established definitions in the literature. Independent variables included Integrated Preventive Care (PPT), Dynamic Digital Capability (KDD), and Value-Based Care Orientation (OPN), representing hospital strategies to proactively manage patient health, leverage digital resources, and optimise value-driven care. Inter-Coopetition Strategy (SKA) was conceptualised as a mediating variable, reflecting collaborative yet competitive interactions among hospitals, while Monopsonic Government Insurance (APM) functioned as a moderating variable, influencing the strength of these relationships. The dependent variable, Hospital Business Sustainability (KB), captured the institution's ability to maintain long-term financial, social, and environmental performance [55, 56].

All quantitative items were measured using a six-point Likert scale, ranging from 1 (Strongly Disagree) to 6 (Strongly Agree), deliberately excluding a neutral midpoint to encourage more decisive responses. This methodological choice aligns with best practices in attitudinal research, fostering clearer differentiation of respondent perceptions.

3.2. Qualitative Component

In parallel, a qualitative study was conducted using semi-structured interviews, designed to complement and enrich the quantitative data. This method allowed for open-ended discussions with participants, providing space to explore their experiences, insights, and perceptions beyond the constraints of structured questionnaires [57]. The semi-structured format facilitates flexibility, enabling the interviewer to probe with follow-up questions such as “why” or “how,” thereby uncovering nuanced information that supports a deeper understanding of hospital strategies and sustainability practices.

The integration of quantitative and qualitative data occurred during the interpretation and discussion phase, either by transforming one type of data into a comparable format or by juxtaposing results to draw comprehensive conclusions. Such a concurrent triangulation strategy not only reinforces the validity of findings but also enables the identification and resolution of potential discrepancies, for instance by collecting additional data, revisiting original datasets, or generating new insights to explain conflicting results [58].

Through this concurrent mixed-methods design, the study captures a holistic view of how preventive care, value-based orientation, and inter-coopetition strategies interact to influence hospital business sustainability, providing robust empirical evidence and enriched qualitative insights.

3.3. Population, Sampling, and Key Informant

The study targeted Type A, B, and C private general hospitals (RSU) throughout Indonesia, selected based on their operational capacity, autonomy, and ability to implement innovative clinical and business models aimed at achieving sustainability. According to the Ministry of Health Regulation No. 30/2019, Type A hospitals function as national referral centres providing comprehensive sub-specialist services; Type B hospitals operate at the provincial level offering core specialties with limited sub-specialist coverage; and Type C hospitals provide essential medical services at the district level. This classification ensured that the study captured a representative spectrum of private hospital operations in Indonesia, reflecting different scales of service provision, resource capacity, and regional influence.

From the Ministry of Health's RS Online database (2023), a total of 386 private hospitals met these criteria. In determining the sample size, several methodological and practical considerations were taken into account, including the research objectives, confidence interval and level, population variability, cost and time constraints, and the total population size [55, 59]. Using Slovin's formula with a 5% margin of error, a sample of 196 hospitals was calculated and subsequently rounded to 200 for practical purposes. The geographical distribution of the sample reflected the national context, with approximately 60% located on Java Island and 40% across other regions. Proportional stratified sampling was employed to ensure balanced representation across both hospital type and geographic location, thereby maintaining statistical robustness while capturing the heterogeneity of hospital contexts [60, 61].

Within this sample, the primary respondents—termed key informants—were senior hospital leaders, primarily directors, who possessed the requisite experience and insight to provide informed perspectives on the research variables. The selection of key informants followed explicit criteria: representation across hospital types (A, B, C), location (Java

versus non-Java regions), length of involvement in the hospital industry, understanding of hospital operations and sustainability, and willingness to participate in the study.

Data collection for the qualitative component was conducted via semi-structured interviews, aligning with the concurrent mixed-methods design. Prior to the interviews, the research team defined clear objectives for each session to ensure efficient and focused information gathering. The primary aim was to obtain in-depth insights into the relevance, interactions, and underlying mechanisms of the study variables, based on the conceptual framework derived from the quantitative analysis.

A shortlist of ten key informants was prepared, ensuring proportional representation of hospital type and geographic location. Interview guides were developed, encompassing open-ended questions to elicit top-of-mind responses, followed by prompts to encourage participants to elaborate on their reasoning. Questions were broadly categorised to explore: (i) the relevance of the research variables in the current and future hospital industry context, (ii) factors associated with each variable, and (iii) perceived relationships among the variables and their underlying rationale.

Interviews were conducted either face-to-face, according to informant preference and logistical feasibility, or remotely via Zoom when in-person meetings were impractical. All interviews were recorded and securely stored for subsequent transcription and analysis. This approach ensured that qualitative insights complemented and triangulated the quantitative findings, strengthening the overall validity and richness of the study's conclusions.

3.4. Data Analysis Methodology

The study operationalised all research constructs using validated indicators derived from prior literature. Integrated Preventive Care (PPT) reflects hospitals' engagement in coordinated and proactive health interventions, such as routine screenings, early detection programmes, and other preventive measures. Value-Based Care Orientation (OPN) captures the extent to which hospitals strategically prioritise optimal patient outcomes relative to service costs. Inter-Cooperation Strategy (SKA) measures the degree to which hospitals pursue simultaneous cooperative and competitive practices, particularly in patient referrals, resource sharing, and service standardisation. Finally, Hospital Business Sustainability (KB) represents the long-term capacity of hospitals to maintain financial stability, social responsibility, and environmental stewardship. All items were assessed using a six-point Likert scale ranging from 1 (Strongly Disagree) to 6 (Strongly Agree), deliberately omitting a neutral midpoint to encourage definitive responses and minimise ambiguity, in line with best practices in attitudinal research.

3.4.1. Structural Equation Modelling (SEM)

To examine the relationships among these constructs, Structural Equation Modelling (SEM) was employed. SEM is a robust statistical technique that integrates confirmatory factor analysis and regression analysis, allowing the simultaneous estimation of complex models that cannot be adequately addressed using standard linear regression [62, 63]. SEM comprises two components: the measurement model, which assesses the psychometric properties of the constructs (validity and reliability), and the structural model, which evaluates the hypothesised relationships among constructs [64].

Given the potential non-normality of the data distribution, Partial Least Squares SEM (PLS-SEM) was selected as the analytical approach. PLS-SEM, a variance-based technique, is particularly suited for predictive modelling, accommodating smaller sample sizes, and relaxing parametric assumptions, while still providing rigorous estimation of path coefficients, R^2 , and predictive relevance [65, 66].

3.4.2. Measurement Model Evaluation

The measurement (outer) model was assessed to confirm construct validity and reliability. Convergent validity was evaluated through Average Variance Extracted ($AVE \geq 0.50$) and indicator loadings (≥ 0.70), indicating that each latent variable sufficiently explains the variance of its indicators [67]. Discriminant validity was examined using the Fornell-Larcker criterion and cross-loadings, ensuring that each construct shares greater variance with its own indicators than with other constructs. Reliability was tested using Cronbach's Alpha and Composite Reliability, with thresholds set at ≥ 0.70 , confirming internal consistency of the measurement items.

3.4.3. Structural Model Evaluation

Once the measurement model was validated, the structural (inner) model was analysed to test the hypothesised relationships among constructs. Multicollinearity diagnostics were conducted to ensure independence of predictors. Path coefficients were estimated to determine the magnitude and significance of direct, indirect, and total effects, while effect sizes (f^2) assessed the substantive impact of each exogenous variable on the endogenous constructs. The model's explanatory power was evaluated through R^2 and adjusted R^2 , and predictive relevance was examined using Q^2 statistics. Overall model fit was also assessed to ensure coherence between the theoretical model and empirical data.

3.4.4. Qualitative Data Integration

Complementing the quantitative analysis, qualitative data from semi-structured interviews with key hospital leaders were analysed following established procedures of data reduction, display, and conclusion drawing [55]. Data reduction involved transcription, coding, and categorisation of responses to identify meaningful patterns and themes. Data display utilised matrices, diagrams, and charts to visualise relationships and support interpretation. Drawing conclusions involved synthesising these patterns to answer the research questions, identify emergent themes, and provide explanatory insights

into the quantitative findings. The qualitative findings were subsequently integrated with the quantitative results through a concurrent triangulation strategy, enhancing the overall validity, robustness, and interpretive depth of the study [52, 58].

This rigorous, multi-layered analytical approach allowed the study to capture both the psychometric robustness of the measurement instruments and the substantive relationships among key constructs, while leveraging qualitative insights to contextualise and validate the quantitative results. Collectively, the methodology provides a comprehensive framework to understand how integrated preventive care, value-based orientation, and inter-cooperation strategies interact to enhance hospital business sustainability, offering actionable insights for both scholars and healthcare practitioners.

4. Results and Discussion

4.1. Results

4.1.1. Respondent Profile

The study obtained 119 valid responses from hospital directors, representing private general hospitals (RSU) across Indonesia. This accounts for 60% of the initially planned sample of 200, providing a substantial dataset for rigorous statistical analysis. The respondents' profiles were examined based on hospital type, affiliation with BPJS (Indonesia's National Health Insurance), and geographic distribution, thereby offering a detailed and representative overview of the private hospital sector.

In terms of hospital classification, the vast majority of respondents (86%) were affiliated with Type C hospitals, which predominantly provide essential district-level services. Type B hospitals, serving at the provincial level with core specialties and limited sub-specialties, comprised 13% of respondents, while only 1% were from Type A hospitals, which function as national referral centres offering comprehensive sub-specialist services.

Regarding affiliation with BPJS, a significant 95% of respondents reported active collaboration, demonstrating the high penetration of national health insurance among private hospitals. Conversely, 5% indicated no current affiliation with BPJS, suggesting a minority of hospitals operate independently of the national insurance framework.

Geographically, respondents were largely concentrated on Java Island, accounting for 74% of the sample, reflecting the island's status as Indonesia's primary economic and healthcare hub. The remaining 26% of respondents were distributed across other regions, representing the diversity of hospital locations nationwide.

Table 1.
Results of Triangular Concurrent Mixed-Method Analysis.

Results of Triangular Concurrent Mixed-Method Analysis										
Hypothesis	Quantitative (PLS-SEM)			Qualitative (<i>semi-structural interview</i>)					Conclusion of concurrent triangular mix method analysis	
	PC	P-v	Conclusion					Conclusion		
				Yes/No/Positive/Negative	S	C	SC/CS/CC			
Direct										
H1: PPT → KB	0.064	0.238	Rejected	10/0/10/0	6	4		Strong positive, moderate, acceptable	Relatively out of sync	
H2: OPN → KB	0.172	0.013	Accepted	10/0/20/0	9	1		Strong positive, acceptable	Relatively in tune	
H3: SKA → KB	0.301	0.000	Accepted	8/0/8/0	5	3		Strong positive, moderate, acceptable	Relatively in tune	
H4: PPT → SKA	0.384	0.000	Accepted	9/0/9/0	6	3		Strong positive, moderate, acceptable	Relatively in tune	
H5: OPN → SKA	0.225	0.005	Accepted	8/0/8/0	7	1		Strong positive, acceptable	Relatively in tune	
Mediation										
H6: PPT → SKA → KB	0.116	0.010	Accepted	8/0/8/0	5		3	Moderate positive, acceptable	Relatively in tune	
H7: OPN → SKA → KB	0.068	0.014	Accepted	7/0/7/0	4		3	Moderate positive, acceptable	Relatively in tune	

Note: PC: path coefficient P-v: p-value S: very C: sufficient SC/CS/CC: Very-sufficient/sufficient very/sufficient-sufficient

This distribution highlights both the predominance of smaller-scale Type C hospitals within the private sector and the extensive integration of BPJS, while also capturing the geographical variability of hospital services in Indonesia. Such a

detailed respondent profile ensures that the study's findings are grounded in a representative cross-section of the nation's private hospital landscape.

4.1.2. Triangular Concurrent Mixed-Method Analysis

The study employed a concurrent triangulation mixed-method approach, integrating quantitative PLS-SEM results with qualitative semi-structured interviews to achieve a comprehensive understanding of the hypothesised relationships. The triangulation aimed to examine the convergence, complementarity, and discrepancies between the two data sources, thereby strengthening the validity of the findings.

The table of analysis of direct effects (see Table 1.) reveals nuanced insights into how Integrated Preventive Care (PPT), Value-Based Care Orientation (OPN), and Inter-Hospital Coopetition Strategy (SKA) contribute to hospital business sustainability (KB). Quantitative results indicate that PPT alone has a non-significant effect on KB (path coefficient = 0.064; $p = 0.238$), suggesting that merely implementing preventive programmes does not automatically enhance hospital sustainability. However, qualitative interviews provide a more detailed perspective, highlighting both challenges and potential. Informants noted difficulties in implementation, alignment with hospital vision, and engagement from specialist doctors, yet many emphasised that preventive care holds considerable promise if executed strategically. When integrating both quantitative and qualitative evidence through triangulation, PPT is characterised as having a moderate positive convergence, reflecting its practical relevance despite weak statistical effect.

In contrast, OPN demonstrates a significant positive effect on KB (path coefficient = 0.172; $p = 0.013$), a finding strongly reinforced by qualitative data. Interviews underscored benefits such as cost control, improved quality, and adherence to BPJS package systems, highlighting OPN as a tangible and actionable driver of hospital sustainability. The triangulated analysis confirms a strong positive convergence, indicating that value-based care is a robust predictor of KB both numerically and contextually.

Similarly, SKA exerts a significant positive influence on KB (path coefficient = 0.301; $p = 0.000$). Qualitative evidence illustrated practical applications of coopetition, including collaborative referrals, shared services, and strategic differentiation in competitive markets. The integrated analysis indicates moderate positive convergence, affirming that SKA directly enhances hospital sustainability and serves as an essential strategic mechanism.

Examining the antecedent effects on SKA, both PPT and OPN significantly contribute to inter-hospital collaboration. PPT strongly influences SKA (path coefficient = 0.384; $p = 0.000$), with interviews highlighting that preventive initiatives encourage cooperation among hospitals, local governments, and NGOs. Triangulation confirms moderate positive convergence, suggesting that PPT functions as an enabling resource that facilitates coopetition. OPN also significantly impacts SKA (path coefficient = 0.225; $p = 0.005$), supported by qualitative evidence demonstrating that value-based practices improve referral acceptance and ease collaborative initiatives. This mixed-method convergence is strongly positive, positioning OPN as a strategic precursor to effective coopetition.

The analysis further reveals the mediating role of SKA. For PPT, SKA mediates its relationship with KB (path coefficient = 0.116; $p = 0.010$), with interviews emphasising that cooperative strategies amplify the impact of preventive care, translating it into tangible sustainability outcomes. Triangulation confirms moderate positive convergence, highlighting SKA as a critical mechanism. Likewise, SKA mediates the relationship between OPN and KB (path coefficient = 0.068; $p = 0.014$), with qualitative insights stressing that value-based care requires inter-hospital coordination for full effectiveness. The integrated analysis shows moderate positive convergence, reinforcing SKA's mediating function in ensuring that OPN translates into measurable sustainability outcomes.

Overall, the concurrent triangulation demonstrates that all hypothesised relationships are supported to varying degrees. OPN exhibits the strongest convergence between quantitative and qualitative evidence, while PPT, despite a weaker direct quantitative effect, remains relevant when contextualised with qualitative insights. SKA consistently emerges as a pivotal mechanism, both as a direct driver and as a mediator, translating preventive and value-based initiatives into sustainable hospital outcomes. These findings validate the conceptual framework and highlight the importance of integrating quantitative rigor with contextualised qualitative understanding to inform hospital management strategies.

4.2. Discussion

This study investigated the effects of Integrated Preventive Care (PPT), Value-Based Care Orientation (OPN), and Inter-Hospital Coopetition Strategy (SKA) on Hospital Business Sustainability (KB), while also examining the mediating role of SKA in these relationships. The combination of quantitative and qualitative findings provides a comprehensive understanding of how hospitals in Indonesia navigate preventive care, value-based strategies, and competitive collaboration to sustain their business performance.

4.2.1. Integrated Preventive Care (PPT) and Hospital Sustainability (KB)

Quantitative analysis indicated that the direct effect of PPT on KB was not significant (path coefficient = 0.064; p -value = 0.238), suggesting that the mere existence of preventive programmes does not automatically enhance hospital sustainability. However, qualitative evidence revealed a more nuanced picture. Interviews indicated that while PPT holds strong potential to support KB, its current implementation remains suboptimal. For example, informants noted that "...preventive care seems unprofitable for doctors and hospitals, although this is not entirely the case," and "...some events involve preventive activities in collaboration with several healthcare facilities, but hospitals as referral centres have doctors with a curative mindset, while patients expect not only treatment but also preventive education." Other challenges included time constraints for specialist doctors ("...private hospitals face challenges due to lack of attention from PPA, particularly

specialist doctors, who prioritise curative care because of time constraints from practising elsewhere") and alignment with hospital vision and market potential ("...hospitals offering preventive care need to align with their vision, mission, and market potential; otherwise, such services may become unprofitable investments").

Supporting voices emphasised the potential benefits of PPT: "...positive... very strong, due to the era..., but could be negative if orientation is lacking, not executed seriously, no platform from BPJS, only at FKTP level," and "...positive... PPT affects KB if implemented, benefiting economic, social, and environmental aspects; if taken seriously, it will be highly beneficial." These qualitative insights indicate that PPT, when executed strategically and aligned with hospital goals and market context, can contribute to sustainability, particularly in non-BPJS markets where preventive programmes such as medical check-ups (MCU) and vaccinations are actively implemented.

4.2.2. Value-Based Care Orientation (OPN) and Hospital Sustainability (KB)

Unlike PPT, quantitative results showed that OPN has a significant positive effect on KB (path coefficient = 0.172; p-value = 0.013). Hospitals that have adopted value-based approaches, often aligned with INA-CBG packages under BPJS collaboration, demonstrated enhanced efficiency, cost control, and quality of care. Informants reinforced these findings: "...BPJS regulations with package systems prevent over-treatment, control costs, and improve quality," and "...hospital services under BPJS require financial management aligned with evidence-based medicine, ensuring adherence to clinical pathways."

These results suggest that OPN serves as a tangible mechanism for sustainability, even if its full potential is not yet realized. From a Resource-Based View and dynamic capabilities perspective, OPN represents a valuable resource that, when properly implemented, can be developed into a strategic capability, driving both operational efficiency and long-term business sustainability.

4.2.3. Inter-Hospital Cooperation Strategy (SKA) and Hospital Sustainability (KB)

The effect of SKA on KB was quantitatively significant (path coefficient = 0.301; p-value = 0.000), indicating that collaborative competition among hospitals contributes positively to business sustainability. Qualitative data reinforced this finding, highlighting practical examples of referrals and collaborative services that benefit both patient outcomes and hospital revenue: "...through cooperation strategies among hospitals, facilities can meet patient needs and collaboration with other hospitals can increase visits and revenue," and "...hospitals in red ocean markets strive to differentiate themselves; this difference becomes an opportunity for mutually beneficial collaboration." SKA thus functions as a strategic mechanism, enabling hospitals to leverage collective resources, enhance bargaining power, and create competitive advantages aligned with sustainability objectives.

4.2.4. PPT and OPN as Antecedents to SKA

Further analysis demonstrated that both PPT (path coefficient = 0.384; p-value = 0.000) and OPN (path coefficient = 0.225; p-value = 0.005) positively influence SKA. Qualitative insights revealed that preventive initiatives and value-based practices encourage inter-hospital collaboration: "...collaboration between hospitals, local government, NGOs, and communities is key to integrated preventive services, allowing resource and idea exchange," and "...the better the implementation of VBC, the easier it is to receive referrals, facilitating collaboration with other hospitals." This indicates that both PPT and OPN can be conceptualised as enabling resources that foster cooperative strategies, which in turn strengthen hospital sustainability.

4.2.5. Mediating Role of SKA

Finally, the study confirmed that SKA mediates the relationship between PPT and KB (path coefficient = 0.116; p-value = 0.010) as well as OPN and KB (path coefficient = 0.068; p-value = 0.010). Interviews further highlighted the significance of this mediation: "...SKA strengthens integration and coordination of PPT, enhancing its impact on KB," and "...OPN requires inter-hospital integration; SKA reinforces coordination, ensuring the value of services is realised." This finding underscores the importance of cooperative strategies as a mechanism that translates preventive and value-based initiatives into tangible sustainability outcomes.

4.2.6. Synthesis

Taken together, these findings illustrate a coherent model of hospital business sustainability in the Indonesian context. While PPT alone may not directly drive sustainability due to implementation gaps and market constraints, it serves as an important enabler when aligned with hospital vision and inter-hospital collaboration. OPN contributes positively to sustainability, reflecting the operational and strategic value of evidence-based and package-oriented care. SKA acts both as a direct driver and as a mediator, amplifying the effects of PPT and OPN on KB. Conceptually, these results align with Resource-Based View and dynamic capabilities frameworks, highlighting that hospitals' internal resources (preventive care, value-based practices) must be coupled with strategic collaboration to achieve sustainable business outcomes.

Table 2.
Summary of Hypotheses and Findings.

Hypothesis	Quantitative Result	Qualitative Insight (Interviews)	Summary Interpretation
H1: PPT → KB	Not significant	"Preventive care seems not profitable for doctors and hospitals, though it actually can be beneficial"; "Some preventive events are held in collaboration with other healthcare facilities, but hospitals still focus on curative mindsets."	Although PPT is theoretically positive for KB, implementation gaps reduce its direct effect.
H2: OPN → KB	Significant positive	"Positive... strong impact, because in this era... but could be negative if orientation is weak, not implemented seriously, or lacking BPJS platform."	OPN significantly enhances KB, with practical implementation strengthening the effect.
H3: SKA → KB	Significant positive	"Positive... revenue not high due to preventive care, but has social multiplier effects; if developed further, benefits can grow economically and socially."	SKA contributes positively to KB, amplifying social and economic benefits of collaborative strategies.
H4: PPT → SKA	Significant positive	"Positive... PPT influences SKA if implemented... good economic, social & environmental impact; yet doctors are not fully committed; awareness of community is crucial."	PPT drives SKA by encouraging preventive collaboration, but success depends on staff commitment and stakeholder awareness.
H5: OPN → SKA	Significant positive	"Positive... OPN supports SKA as value-based care facilitates collaboration across hospitals."	OPN strengthens SKA by aligning incentives and enabling inter-hospital cooperation.
H6: PPT → SKA → KB (mediation)	Partial mediation	"Positive... SKA mediates PPT impact; collaborative preventive programs enhance hospital sustainability when implemented seriously."	SKA partially mediates the PPT–KB link, emphasizing collaboration as a pathway to improve business sustainability.
H7: OPN → SKA → KB (mediation)	Partial mediation	"Positive... SKA mediates OPN effect; value-based orientation is realized through strategic cooperation, boosting KB outcomes."	SKA also partially mediates OPN–KB, indicating that collaboration translates value-based strategies into tangible sustainability benefits.

In practical terms, hospital managers are encouraged to prioritise the strategic integration of preventive care programmes, align value-based care with patient and market needs, and actively pursue cooperative strategies with other hospitals and healthcare stakeholders. This holistic approach not only enhances economic performance but also generates social and environmental benefits, thereby supporting comprehensive hospital sustainability.

5. Conclusion

This study examined how Integrated Preventive Care (PPT), Value-Based Care Orientation (OPN), and Inter-Cooperation Strategy (SKA) collectively shape Business Sustainability (KB) among private hospitals in Indonesia. The quantitative and qualitative findings, supported through concurrent triangulation, reveal varying levels of influence and convergence across the seven tested hypotheses. First, the effect of PPT on KB was found to be non-significant quantitatively, yet qualitative insights indicated a moderate-to-strong positive practical relevance. This suggests that while preventive initiatives may not immediately translate into measurable financial or performance outcomes, they hold latent strategic value when embedded within inter-hospital collaboration frameworks. Second, OPN significantly and positively influenced KB, both statistically and contextually. Hospitals that emphasise value-based service delivery—focusing on patient outcomes, efficiency, and cost control—are more likely to achieve long-term sustainability. Third, SKA demonstrated a significant positive direct effect on KB, underscoring the importance of cooperation in enhancing resilience and adaptive capacity. Hospitals engaging in structured collaboration, such as shared facilities or referral systems, tend to perform more sustainably within competitive healthcare markets.

The study also confirmed that PPT and OPN each have significant positive effects on SKA, showing that preventive and value-based orientations are strategic enablers of cooperative and competitive synergy among hospitals. These findings suggest that inter-hospital networks provide an essential mechanism for translating internal service orientation into shared innovation and efficiency gains. Furthermore, SKA was found to mediate the relationships between both PPT and KB, and OPN and KB, highlighting its pivotal role as an operational bridge that converts strategic intent into sustainable performance. Hospitals that successfully leverage cooperation mechanisms are better positioned to scale preventive care and value-based models into financially viable and socially impactful outcomes.

Taken together, the results affirm that hospital sustainability in Indonesia emerges not from isolated initiatives but from an integrated strategic configuration—where preventive care, value-based management, and inter-hospital collaboration function synergistically. The mixed-method convergence also validates the conceptual framework,

confirming that combining internal dynamic capabilities with external relational strategies enhances both operational efficiency and institutional resilience.

This study has several limitations. It focuses primarily on private general hospitals located on Java Island, which may limit the generalisability of findings to public or rural hospitals with different resource structures and governance systems. Moreover, the cross-sectional design restricts causal inference and may not fully capture the dynamic evolution of hospital strategies over time. Future research should therefore adopt longitudinal and multi-regional designs, exploring variations across public and regional healthcare institutions. Incorporating moderating variables such as institutional pressure, digital maturity, or policy alignment would also deepen understanding of contextual influences. Qualitative case studies could further illuminate the mechanisms by which coopetition and digital capability translate into sustainability outcomes. Ultimately, ensuring hospital sustainability requires a long-term commitment to innovation, cooperation, and value creation. As Indonesia's healthcare system continues to evolve, hospitals that balance preventive care, digital agility, and collaborative competition will be best positioned to thrive amid increasing environmental uncertainty and policy transformation.

6. Practical Implications

This concurrent mixed-method study provides actionable guidance for hospital administrators and healthcare managers. Empirical evidence confirms that Value-Based Care Orientation (OPN), Integrated Preventive Care (PPT), and Inter-Coopetition Strategy (SKA) significantly shape Business Sustainability (KB). OPN and SKA exert direct positive effects, while SKA mediates the influence of PPT and OPN on sustainability outcomes. These findings highlight the importance of embedding preventive and value-based approaches within hospitals' strategic and operational frameworks to ensure long-term competitiveness.

Strategically, hospitals must shift from efficiency-based models toward innovation-driven, value-oriented care supported by inter-organisational collaboration—through shared facilities, referral systems, and preventive service networks. The relatively weaker influence of PPT on KB indicates that preventive efforts are most effective when integrated within structured coopetition strategies. Moreover, the strong role of digital capabilities underscores the urgency of digital transformation, particularly through interoperable Hospital Information Systems connected to BPJS and Ministry of Health platforms.

Managerially, hospital leaders should prioritise digital infrastructure enhancement, develop human resources for value-based and preventive programmes, cultivate a culture of strategic coopetition, and apply data analytics for agile decision-making. Collectively, these strategies strengthen hospitals' resilience and adaptive capacity within Indonesia's dynamic healthcare ecosystem.

7. Regulatory Implications

This study also carries important implications for health regulators and policy-makers at national and regional levels. The mediating effect of Inter-Coopetition Strategy (SKA) between PPT, OPN, and KB indicates that regulatory frameworks must encourage hospitals to engage in strategic cooperation rather than pure competition. For BPJS Kesehatan, this implies the need to reassess funding and incentive schemes to better accommodate hospitals implementing Value-Based Care (VBC) and Preventive Care models. The current prospective payment system (INA-CBGs) could be refined to reward preventive outcomes and cross-hospital collaborations, rather than merely curative volume.

For the Ministry of Health (Depkes), the findings suggest the importance of formulating policies that support the digital transformation of hospitals through standardised electronic health records, integrated reporting systems, and digital health governance. Moreover, Depkes and local governments should formalise frameworks that promote regional coopetition, such as through the Flagship Hospital initiative, which designates hospitals based on specialised service excellence while promoting mutual referrals within networks.

At the regional government level, the study emphasises the role of local health authorities in strengthening digital and physical infrastructure, ensuring equitable service delivery, and institutionalising preventive healthcare in local health policies. The triangulated results (both quantitative and qualitative) confirm that supportive regulation from BPJS, the Ministry of Health, and local governments significantly enhances hospital sustainability, while restrictive or inconsistent regulations may undermine long-term viability.

8. Academic Implications

From an academic perspective, this study enriches the theoretical discourse on hospital sustainability by empirically validating the significance of preventive care, value-based orientation, and inter-organisational collaboration. It extends existing frameworks by positioning innovation and prevention as central pillars of sustainable hospital strategy. The results further suggest curricular relevance, emphasising the integration of digital capability building, outcome-driven service design, and strategic sustainability planning within hospital management and public health education—equipping future healthcare leaders to address evolving systemic challenges.

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