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Technopreneurship Adoption and Innovation Value in Private Wound Care Nursing Practices

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ABSTRACT

Advanced wound dressings represent a key innovation in chronic wound management, yet their adoption among independent nursing entrepreneurs in Indonesia remains suboptimal due to systemic and contextual challenges. **This study investigates** nursepreneurs' experiences in adopting technology-driven wound dressing products and examines how innovation value, evidence-based practice, and environmental factors influence adoption and perceived quality of care. **A cross-sectional** survey was conducted with 288 certified wound care nursepreneurs across Indonesia. Data were analysed using **Partial Least Squares Structural Equation Modelling (PLS-SEM)** to evaluate the influence of innovation-related factors, adoption barriers, and clinical expertise on reported care quality. **The findings** indicate that financial constraints, product accessibility, and limited clinical training substantially restrict the adoption of advanced wound care technologies. Evidence-Based Value (β = 0.185, p < 0.000), Enhanced Value (β = 0.162, p < 0.001), and Innovativeness Value (β = 0.219, p < 0.000) significantly improved nursepreneur experiences, which in turn positively influenced perceived care quality (β = 0.367, p < 0.000). Key Opinion Leaders demonstrated no significant moderating effect (β = 0.127, p = 0.302), particularly among more experienced nursepreneurs. **Advancing technopreneurship** in wound care requires more than the availability of innovative products; capacity building, product literacy, and supportive systems are essential to improve service delivery. Addressing adoption barriers can enhance utilisation of advanced wound dressings and strengthen clinical outcomes, thereby elevating care standards in independent nursing practices in Indonesia.

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1. INTRODUCTION

Chronic wounds, such as Diabetic Foot Ulcers (DFUs) and pressure injuries, have become a significant global public health challenge, adversely affecting individuals' quality of life while exerting considerable pressure on healthcare systems worldwide [1]. It is estimated that chronic wounds impact approximately 1-2% of the global population, resulting in extended healing times, increased infection risk, and rising healthcare costs [1]. In Indonesia, the prevalence of type 2 diabetes has reached alarming levels, which has contributed to a notable increase in chronic wounds, particularly DFUs and pressure injuries, heightening the demand for practical and localised wound care solutions [2].

Despite the well-documented benefits of advanced wound care products, their use remains inconsistent, even though it has expanded in Indonesia [3]. In developing countries, this is primarily due to barriers such as affordability, accessibility, and the uneven distribution of healthcare resources, particularly in rural and low-income areas [4], [5]. The increasing global demand for high-quality healthcare services further highlights the challenge of ensuring equitable access to wound care products in resource-constrained environments like Indonesia [6], [7]. The rising burden of chronic wounds and the limitations of current wound care practices in Indonesia expose significant gaps in wound management. Wound care nurses in the region encounter several challenges when using advanced wound dressings, including insufficient training, restricted access to products, financial limitations, and regulatory barriers that hinder the adoption of evidence-based practices [8], [9]. These problems adversely affect patient outcomes, leading to delays in wound healing and increasing the risk of complications such as infections and amputations. Furthermore, healthcare infrastructure, clinician decision-making, and patient-clinician interactions often do not fully address the needs of individuals with chronic wounds.

This study examines these challenges and offers recommendations to improve care quality, mainly through enhanced training for wound care nurses, improved supply chain management, policy reforms, and a focus on technopreneurship in healthcare [10]. This novelty also embeds important considerations of workforce behavior and equitable access to wound care services, recognising that nursing professionals are key drivers of community wellbeing. In the Indonesian context, disparities in product availability, financial ability, and geographic distribution limit access to advanced wound care, particularly for vulnerable populations. Therefore, strengthening nursepreneurial capability and technology adoption is positioned not only to improve clinical outcomes but also to support fair access, expand service reach, and uplift community health and wellbeing across diverse regions. By addressing these gaps, the research aims to enhance both practical and theoretical understanding of chronic wound care. It utilises the Theory of Interpersonal Behaviour [11], [12] and the Donabedian Model [6] to investigate clinicians' experiences with advanced wound care products in resource-limited settings. These theories provide a comprehensive framework for understanding clinician behaviour and the adoption of innovations such as advanced wound care products within healthcare systems [13]. Although these frameworks of product value have been effectively used in other contexts [14], there remains a gap in their application to low-resource environments like Indonesia, where socio-economic factors, healthcare policies, and limited access to training strongly influence the adoption of new technologies [15].

2. LITERATURE REVIEW

The current literature lacks insight into how Indonesian wound care nurses perceive and utilise advanced wound care products. Most studies focus on developed countries where healthcare resources are more accessible [16], [17]. Research on the barriers faced by clinicians in resource-limited settings, such as affordability, product availability, and training constraints, remains limited [9], [18]. This study aims to explore clinicians' perceptions and practices regarding advanced wound care products and assess their impact on the quality of wound care in independent nursing practices in Indonesia.

This novelty advances existing knowledge by examining technopreneurship adoption in wound care within Indonesia, an emerging economy characterised by limited digital health infrastructure, unequal product accessibility, and varying maturity of private nursing practices [19]. Unlike other emerging economies such as India, Malaysia, or Vietnam where innovation ecosystems and technology diffusion are progressing more rapidly, Indonesia continues to face structural, financial, and regulatory constraints that uniquely influence the utilisation of advanced wound care technologies. By integrating the Theory of Interpersonal Behaviour and the Donabedian Model in this low-resource technopreneurship context, this novelty extends existing theoretical applications and provides new evidence on how innovation value, clinician experience, and contextual barriers collectively shape quality of care outcomes in private wound services [10]. The study has four main objectives to address existing gaps: examine wound care nurses' experiences with advanced wound care products in independent nursing practices; identify factors affecting the use of these wound products within Indonesia's healthcare system; assess how wound care nurses' decision-making influences wound care quality and patient outcomes [20].

This study will contribute to theory by broadening knowledge of wound care technology management in low-resource community settings. From a managerial perspective, the findings will help healthcare policymakers, providers, and industry stakeholders develop strategies that improve clinician training, increase

product accessibility, and create policy frameworks to support the implementation of advanced wound care products [21]. Additionally, the recommendations from this study will improve patient care by encouraging evidence-based practices, thereby enhancing the quality of wound care offered in independent nursing practices [22].

3. RESEARCH METHOD

The methodology of this study was systematically designed to ensure the validity, reliability, and rigor of the research process in examining the determinants of advanced wound care innovation adoption among independent nursepreneurs in Indonesia. A structured quantitative approach was employed to test the relationships within the proposed theoretical model and generate empirical evidence that reflects real-world clinical practices [23]. The following subsections describe the study design, sampling and eligibility criteria, measurement instrument development, data analysis procedures, and ethical considerations undertaken throughout the research process.

3.1. Study Design, Setting and Unit Analysis

This study employed an explanatory predictive research design, utilising a quantitative survey approach to examine the relationships among key variables within the proposed conceptual model [24]. Data were collected through a cross-sectional study involving eligible wound care clinicians. The survey was conducted in March 2025 in independent private practices across eastern, western, and northern Indonesia. The unit of analysis was required to meet the following eligibility criteria:

- Possess a valid certification from the Indonesian Ministry of Health in wound care management,
- Actively engage in managing or supervising independent wound care services at home care or outpatient clinical settings, and
- Have direct involvement in the selection and use of wound dressing products.

3.2. Measurement Instrument

The measurement instrument used in this study was a structured questionnaire designed to capture both respondent characteristics and key variables relevant to the research framework. The questionnaire was developed based on an extensive review of prior literature and existing validated measurement scales to ensure content validity and reliability. Overall, the questionnaire is divided into three main sections.

- The first section focuses on respondents' demographic and professional characteristics. This section collects background information such as age, salary level, frequency of patient referrals, and length of professional experience as a wound clinician. These variables are included to provide contextual understanding of the respondents and to support descriptive analysis, as well as potential control variables in subsequent statistical analyses.
- The second section measures the core constructs of the study. The items in this section were primarily adapted from previously validated scales to maintain consistency with established research. Where necessary, additional items were developed and refined to align more closely with the specific objectives and conceptual framework of the present study. All items were carefully worded to ensure clarity and relevance to the context of wound care practice.
- The third section consists of measurement items designed to assess factors influencing wound clinician experience. These items evaluate key dimensions such as the application of evidence-based practice, perceived value enhancement, innovativeness in clinical practice, environmental and organizational factors, and patient-centred value. Respondents were asked to indicate their level of agreement with each statement using a Likert-type scale, allowing for quantitative assessment of perceptions and experiences related to wound care services.

Responses were recorded on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) to ensure nuanced analysis. Content validity was established through an expert panel review, and a pilot test with 30 wound clinicians improved the instrument's clarity and reliability. The independent variables include

evidence-based practice (EBP), enhanced value (ENV), innovativeness value (IV), environmental value (EV), and patient-centred value (PCV). Each variable has direct or indirect effects on wound clinician experience (WCE), a latent construct composed of measurable indicators that influence the dependent variables related to quality of care (QOC). Key opinion leaders (KOL) serve as moderating factors. Figure 1 illustrates the conceptual framework.

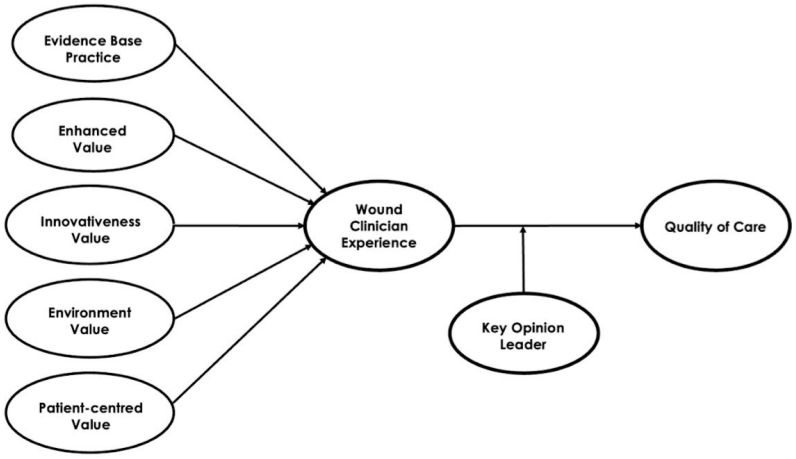

Figure 1. Conceptual Framework

Figure 1 illustrates the proposed conceptual framework examining clinicians' experiences with advanced wound care dressings in Indonesia. The model integrates constructs derived from the Theory of Interpersonal Behaviour and the Donabedian Model, representing five independent variables: Evidence-Based Value (EBV), Enhanced Value (ENV), Innovativeness Value (IV), Environmental Value (EV), and Patient-Centred Value (PCV). These variables, directly or indirectly, influence Wound Clinician (Nursepreneur) Experience (WCX), which, in turn, affects Quality of Care (QOC), the dependent variable. The moderating variable, Key Opinion Leader (KOL), is hypothesised to influence the strength of the relationship between Wound Clinician (Nursepreneur) Experience and Quality of Care [25].

3.3. Statistical Analyses

The PLS-SEM approach was selected for its suitability for analysing complex models in the explanatory survey research [26]. This method is recommended when the primary objective is to evaluate the predictive power of the proposed model [27]. Smart PLS® version 4.1.0.2 was employed for data analysis, as it facilitates comprehensive modelling that includes reliability testing, validity evaluation, and bias assessment. This novelty increases the methodological rigor of the study. The data analysis process followed a stepwise PLS-SEM procedure [28]. First, the measurement model was examined to ensure indicator reliability, internal consistency reliability (Cronbach's Alpha and Composite Reliability), convergent validity (AVE), and discriminant validity using the HTMT ratio. Second, the potential presence of common method bias was assessed through the inner VIF approach to confirm the absence of multicollinearity in the model. Third, the structural model was estimated to evaluate the significance of hypothesised relationships through bootstrapping with 5,000 resamples, including the calculation of beta coefficients, t-statistics, p-values, confidence intervals, and the model's predictive relevance (R^2 and Q^2 values). These additional details reinforce the robustness, transparency, and replicability of the analytical approach applied in this quantitative study [26].

4. RESULT AND DISCUSSION

This section presents the results of the study based on data collected from 288 certified wound care nursepreneurs in Indonesia. The analysis starts by outlining respondents' demographic and professional profiles to contextualize the findings on technology adoption and perceived care quality.

4.1. Respondent Profile

This research included 288 respondents who met the study criteria. The demographic profile of the participants is shown in Table 1.

Table 1. Respondent Profile

Categories	Frequency (n)	Percentage (%)
Gender		
Male	145	50.3%
Female	143	49.7%
Age group (years old)		
25 – 35	104	36.1%
36 – 46	147	51.0%
47 – 57	28	9.8%
$\geq$ 58	9	3.1%
Occupation		
Government	79	27.5%
Non-Government	117	40.6%
Entrepreneurs	85	29.9%
Education		
Associate Degree	61	21.2%
Bachelor	129	44.8%
Magister	51	17.7%
Doctoral	25	8.7%
Specialist	22	7.6%
Competency		
CWCCA (Wound Care Clinician Associate)	89	30.9%
CWCC (Wound Care Clinician)	56	19.4%
WOC(ET)N (Enterostomal Therapy Nurse)	143	49.7%
Professional Experience in group		
1 – 5 years	68	23.6%
6 – 10 years	145	50.4%
11 – 15 years	30	10.4%
16 – 20 years	27	9.4%
$\geq$ 21 years	18	6.2%
Number of Patients Referrals/day		
1 – 5 patients	39	13.5%
6 – 10 patients	152	52.8%
11 – 15 patients	66	22.9%
16 – 20 patients	17	5.9%
$\geq$ 20 patients	14	4.9%
Place of Private		
West	207	71.9%
East	30	10.4%
North	51	17.7%
Wound Dressing Product		
Global Brand	86	29.9%
Asian Brand	202	70.1%
Most Cases – wound treated at clinic		
Diabetic Foot Ulcer	265	92%
Pressure Injury	204	71%
Venous Ulcer	167	58%
Malignant Wound	83	29%
Stoma Care & others	65	21%

Note: Number of respondents: 288

Table 1 presents the 288 respondents were mostly mid-career, highly educated wound clinicians using Asian-brand products, with common cases including diabetic foot ulcers, pressure injuries, and venous ulcers.

4.2. Descriptive

This study involved 288 respondents from diverse backgrounds in chronic wound care practices across Indonesia. Most respondents were aged 36-46 years (51%), with an almost equal split between male (50.3%) and female (49.7%) participants. The majority had 6-10 years of professional experience in wound care (50.4%), with the rest having varying levels of experience. Regarding education, a large proportion held a bachelor's degree (44.8%), followed by those with master's degrees (17.7%) and doctoral degrees (8.7%). Concerning wound care competencies, nearly half of the respondents were Enterostomal Therapy Nurses (WOC(ET)N) (49.7%), followed by Wound Care Clinicians (CWCC) (19.4%) and Wound Care Clinician Associates (CWCCA) (30.9%) [29]. Most respondents were based in western Indonesia (71.9%), and the majority managed 6 to 10 patient referrals daily (52.8%). The most commonly treated wounds were diabetic foot ulcers (92%) and pressure injuries (71%). The wound care products used were mainly Asian brands (70.1%) rather than global brands (29.9%). This profile offers a comprehensive overview of the experiences and challenges faced by healthcare professionals in Indonesia, providing important context for the study's investigation into the adoption of advanced wound care products in their practices [30].

4.3. Data Outer Model

The outer model assessed construct reliability and validity, showing all indicators met OL thresholds (0.40–0.708) except PCV5, which was excluded due to low loading [26]. Composite Reliability (CR) and Cronbach's Alpha (CA) were assessed to determine the internal consistency of the constructs, with all values exceeding the minimum acceptable of 0.7 but remaining below the upper limit of 0.95. This confirms reliable constructs, with all AVE values above 0.5, indicating adequate indicator variance and convergent validity (Table 2).

Table 2. Construct Validity and Reliability*

Variable	Code	Construct	OL	CA	CR	AVE
Evidence Base Value	EBP1	Wound dressing products supported by clinical evidence and aligned with clinical research findings reinforce their superiority and effectiveness.	0.906	0.818	0.921	0.701
	EBP2	Wound dressing products' access to clinical research sources can enhance their credibility and support their efficacy.	0.677			
	EBP3	Wound dressing products follow guidelines agreed upon by consensus regarding the correct product use.	0.722			
	EBP4	Wound dressing products used instructions on how to misuse the product.	0.884			
Environment Value	EV1	I prefer wound dressing products that ar e manufactured using environmentally friendly materials.	0.891	0.859	0.923	0.709
	EV2	I prefer wound dressing products that are biodegradable and help reduce medical waste.	0.952			
	EV3	I use wound dressing products that are manufactured with minimal energy consumption.	0.797			
	EV4	I prefer wound dressing products that are committed to environmental sustainability.	0.814			
	EV5	I tend to choose environmentally friendly wound care products, even if they are priced higher.	0.739			
Enhanced Value	ENV1	The wound dressing product I use has the advantage of reducing peri-wound skin maceration.	0.741	0.876	0.909	0.668
	ENV2	The wound dressing I use has the advantage of adapting to various types of wounds.	0.772			
	ENV3	The wound dressing product I use has the advantage of being easy to apply, even in complex cases.	0.909			
	ENV4	The wound dressing product I use offers unique benefits compared to similar products.	0.759			

	ENV5	The wound dressing product I use has the advantage of requiring less frequent dressing changes.	0.890			
Innovativeness Value	IV1	The wound dressing product I use integrates the latest technology that is not yet available in similar products.	0.836	0.879	0.911	0.673
	IV2	The wound dressing product I use introduces an innovative approach that reduces wound care time in clinical settings.	0.713			
	IV3	The wound dressing product I use features an innovative design that is compatible with Negative Pressure Wound Therapy (NPWT).	0.736			
	IV4	The wound dressing product I use incorporates a novel concept that facilitates wound care for clinicians.	0.934			
	IV5	The wound dressing product I use contains novel bioactive molecules that accelerate the wound healing process.	0.864			
Patient Care Value	PCV1	Using wound dressing products enables me to better understand patient needs and preferences throughout the wound care process.	0.912	0.888	0.922	0.749
	PCV2	Using wound dressing products allows me to provide clearer and more easily understandable information to patients about the wound care process they receive.	0.855			
	PCV3	Using wound dressing products helps ensure patient satisfaction by considering comfort and preferences.	0.746			
	PCV4	Using wound dressing products helps me maintain empathetic communication during wound care.	0.937			
Nursepreneuere Experience	WCX1	When interacting with wound dressing products, I believe that the product I use provides benefits for both patients and clinicians.	0.763	0.767	0.841	0.517
	WCX2	I have easy access to information on wound dressing product usage whenever I need it.	0.661			
	WCX3	I feel confident using wound dressing products because I consistently receive educational support from the provider.	0.819			
	WCX4	Wound dressing products are always available whenever I urgently need them.	0.670			
	WCX5	I receive information on wound dressing product solutions whenever there are side effects from its use.	0.664			
Key Opinion Leader	KOL1	Wound dressing products require credible Key Opinion Leaders (KOLs) to provide valuable insights on wound care.	0.769	0.717	0.824	0.540
	KOL2	Wound dressing products require Key Opinion Leaders (KOLs) in wound management to serve as a reference for clinicians.	0.755			
	KOL3	Wound dressing products require Key Opinion Leaders (KOLs) who can engage in interactive communication to enhance confidence in product effectiveness.	0.725			
	KOL4	Wound dressing products require Key Opinion Leaders (KOLs) who can provide recommendations and solutions for complex cases.	0.687			
Quality of Care	QOC1	I am committed to continuing the use of my current wound dressing product to enhance the quality of wound care.	0.650	0.745	0.838	0.517
	QOC2	I intend to recommend the modern wound dressing I use to enhance the quality of advanced wound care.	0.874			
	QOC3	I will continue using the wound dressing product whenever I have a new wound care patient.	0.778			

QOC4	I am committed to making greater efforts to continue using this wound dressing product as my primary choice.	0.691

*Construct validity and reliability running by SMART PLS 4.0

The discriminant validity as presented in Table 2 of the constructs was evaluated using the Heterotrait-Monotrait ratio (HT/MT), a more precise method for detecting validity issues [26]. The results indicated that all construct values remained below 0.9, confirming that each construct was clearly separate from the others. This ensured that the model's constructs did not significantly overlap, thereby confirming adequate discriminant validity. The data demonstrate that the measurement model is reliable and valid, making it suitable for further analysis of clinicians' experiences and perceptions of wound dressing products.

4.4. Inner Model

The evaluation of the inner model incorporated an assessment of multicollinearity using the inner variance inflation factor (VIF), which is essential for ensuring the stability and accuracy of the structural path estimates in PLS-SEM [31]. Inner VIF values serve as an important diagnostic tool to detect potential common method bias (CMB) and redundancy among predictor constructs that may distort the interpretation of causal relationships within the model [32]. In this study, all constructs demonstrated inner VIF values below the accepted threshold of 3.3, indicating that the predictors did not exhibit problematic multicollinearity and that the structural paths are unlikely to be influenced by CMB or measurement-related errors. These results confirm that the inner model is statistically robust, allowing the subsequent interpretation of path coefficients, effect sizes, and explained variance to be considered reliable and valid within the context of this analysis [26]. The robustness of these results further strengthens confidence in the model's predictive relevance, ensuring that the identified relationships among constructs genuinely reflect underlying behavioural and clinical dynamics rather than artefacts of measurement.

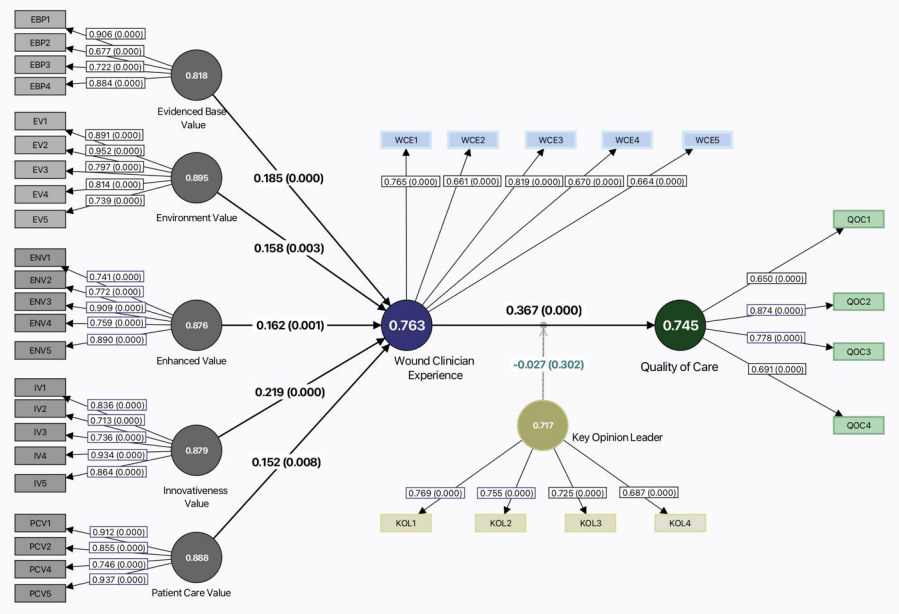

Figure 2. Inner Model Results used PLS-SEM 4.1.0.2.

This Figure 2 presents the results of the Partial Least Squares Structural Equation Modelling (PLS-SEM) analysis, conducted with Smart PLS software (v.4.1.0.2). The model illustrates the structural relationships among the latent constructs and their corresponding measurement items. The path coefficients (β), p-values, and R2 values are displayed to indicate the magnitude, significance, and explanatory power of the relationships. Solid arrows denote statistically significant paths ($p < 0.05$), while the dashed arrow represents a non-significant path.

The results of the path analysis in this study were assessed using bootstrapping [26]. They offered insights into the relationships among various factors affecting wound care quality. The Variance Inflation Factor

(VIF) analysis indicated no evidence of Common Method Bias (CMB), as all VIF values stayed below 3.3, confirming the lack of measurement bias. Afterwards, the path coefficients, Standard Deviations (SD), p-values, and Confidence Intervals (CI) were analysed to determine the significance and strength of the relationships between constructs in Table 3.

Table 3. Path Analyses Results

Path	**Coefficient**	**SD**	**P-values**	**Confidence Interval**	
				5.0%	**95.0%**
Enhanced Value → Nursepreneuere Experience	0.162	0.054	0.002*	0.072	0.249
Environment Value → Nursepreneuere Experience	0.158	0.060	0.003*	0.039	0.236
Evidenced Base Value → Wound Clinician Experience	0.185	0.058	0.000**	0.056	0.246
Innovativeness Value → Nursepreneuere Experience	0.219	0.055	0.000**	0.127	0.308
Key Opinion Leader → Quality of Care	0.122	0.055	0.013*	0.048	0.227
Patient Care Value → Nursepreneuere Experience	0.152	0.008	0.010*	0.046	0.266
Wound Clinician Experience → Quality of Care	0.367	0.058	0.000**	0.182	0.373
Key Opinion Leader × Nursepreneuere Experience → Quality of Care	-0.004	0.054	0.302^{NS}	-0.094	0.082

Note: SD = standard deviation, NS = not significant, ** = significant at 0.000, * = significant at 0.05

Key findings from the path analysis reveal several significant positive relationships as shown in Table 3. First, Enhanced Value (EV) had a significant positive effect on Nursepreneur Experience (WCX), with a coefficient of 0.162 (p = 0.002), indicating that perceived benefits of wound dressings enhance clinicians' experience [33]. Similarly, Environment Value (EV) and Evidence Base Value (EBV) also showed significant positive effects on Nursepreneur Experience, with coefficients of 0.158 (p = 0.003) and 0.185 (p = 0.000), respectively. Innovativeness Value (IV) demonstrated the strongest positive link with Nursepreneur Experience, with a coefficient of 0.219 (p = 0.000), suggesting that integrating innovative technology is crucial for clinicians' experiences. Additionally, Patient Care Value (PCV) also positively influenced Nursepreneur Experience (coefficient = 0.152, p = 0.010). The relationship between Nursepreneur Experience and Quality of Care (QOC) was notably strong, with a coefficient of 0.367 (p = 0.000), highlighting that Nursepreneur experience is a key factor influencing care quality. However, the interaction term Key Opinion Leader x Nursepreneur Experience was not significant (p = 0.302), indicating that the combined effect of KOLs and Nursepreneur experience did not significantly impact care quality in this context.

The results of this study reveal a significant relationship among various factors influencing wound care management, especially in resource-limited settings such as Indonesia [34]. This study provides new insights into the technological and entrepreneurial aspects of wound care practice in Indonesia. The strong influence of Innovativeness Value highlights the importance of advanced technologies, such as AI-enabled decision support tools, integrated wound monitoring, and supply chain visibility systems, in shaping clinicians' adoption behaviour [35]. This novelty reinforces the relevance of resilience theory, where technology acts as a catalyst in strengthening system robustness, improving response agility, and enhancing adaptability amidst supply chain uncertainties [36]. In the context of emerging economies with uneven resource distribution, technology-driven innovations also improve service continuity and system recovery capabilities core elements of resilience frameworks. Thus, the adoption of digital and AI-driven wound care solutions not only improves clinical decision-making but also contributes to greater resilience in healthcare service delivery across Indonesia's private practice ecosystem [37].

The path analysis identified several key factors positively influencing Nursepreneur Experience (WCX), including Enhanced Value (EV), Environment Value (ENV), evidence-based Value (EBV), Innovativeness Value (IV), and Patient Care Value (PCV). Notably, Innovativeness Value (IV) had the strongest positive impact on Nursepreneur Experience, highlighting that incorporating advanced, innovative wound care technologies is vital for enhancing wound care nurses' experiences. This aligns with findings emphasising the growing importance of technological innovation in wound care, especially in resource-limited settings [38].

Furthermore, the positive impacts of evidence-based value (EBV) and environmental value (ENV)

highlight the importance of supporting wound care practices with evidence-based, clinically approved products that encourage sustainable methods [4], [18]. These findings correspond with the global trend in healthcare towards using products that prove clinical effectiveness while minimising environmental impact.

Furthermore, the strong connection between Nursepreneur Experience (WCX) and Quality of Care (QOC) emphasises the vital role of clinician satisfaction and familiarity with wound care products in improving patient outcomes. The notable connection between clinician experience and Quality of Care underlines the importance of adopting technology as a technopreneurial skill. Nursepreneurs who better understand product performance, patient needs, and innovation benefits are more likely to deliver high-quality, consistent care [39, 40]. This supports previous research, which noted that a clinician's confidence in their products directly affects the quality of care they provide. The significant impact of Key Opinion Leader (KOL) guidance on Quality of Care (QOC) further highlights the value of expert recommendations in enhancing care standards.

However, the lack of significance in the interaction between KOL and Nursepreneur Experience indicates that highly experienced clinicians may depend less on external expert input. This finding contrasts with studies in less experienced settings, where KOLs could play a more substantial role in introducing and supporting the adoption of advanced wound care products [9], [27]. Future research should explore the different impact of KOLs across settings with varying levels of clinician expertise, offering valuable insights for targeted interventions across diverse healthcare environments [41]. In addition to these primary findings, this study highlights the wider challenges faced by wound care nurses in Indonesia, especially those working in resource-limited settings.

The strong positive impacts of Evidence Base Value (EBV), Enhanced Value (ENV), Environment Value (EV), and Innovativeness Value (IV) on Nursepreneur Experience (WCX) indicate that clinicians are increasingly choosing products that are not only evidence-based but also innovative and sustainable [42], [6]. Nursepreneur Experience suggests that incorporating advanced, innovative wound care technologies is essential for improving clinician experiences [43]. This aligns with findings emphasising the growing importance of technological innovation in wound care, particularly in resource-constrained settings. Notably, 70.1% of clinicians in this study used Asian-brand wound products, which may be considered less innovative than global brands that have been established in wound management for a longer period. This reveals a potential gap in the adoption of cutting-edge, evidence-based technologies within local healthcare environments.

The study also emphasises the significance of Patient Care Value (PCV) in enhancing the Nursepreneur Experience (WCX). As clinicians develop a deeper understanding of patient needs and preferences, they can tailor care plans more effectively, thereby boosting patient satisfaction and improving clinical outcomes [18]. This finding corresponds with the Donabedian Model, which underlines the connection between care structure, process, and outcomes, suggesting that improvements in clinician experience and patient-centred care are closely linked [44]. It supports the notion that engaging clinicians with advanced, evidence-based wound care products results in better patient outcomes, especially in settings with limited healthcare resources. The study identifies key barriers to adoption: limited product availability, high costs, and inadequate training. Overcoming these challenges is crucial for expanding technopreneurship within Indonesia's wound care ecosystem [45].

There is no significant interaction between Key Opinion Leader (KOL) and Nursepreneur Experience (WCX) regarding the independence of experienced clinicians in making decisions about wound care products. While KOLs are crucial in disseminating evidence-based practices, their influence may weaken when clinicians possess high experience and confidence in their decision-making abilities [14], [46]. This indicates that KOLs might be more effective in supporting clinicians in less experienced environments, where adopting new technologies faces more resistance [47].

These findings highlight the importance of targeted strategies that account for clinicians' varying levels of expertise across different settings. This novelty also supports the achievement of Sustainable Development Goals, particularly SDG 3 (Good Health and Wellbeing) through improved wound care outcomes, and SDG 8 (Decent Work and Economic Growth) by empowering nursing professionals through technopreneurship opportunities [48]. By integrating innovation value into clinical decision-making, the study reinforces how healthcare entrepreneurship can contribute to a more resilient and equitable health ecosystem in Indonesia [49]. This novelty strengthens theoretical contributions by extending the application of the Theory of Interpersonal Behaviour and the Donabedian Model into a low-resource technopreneurship context, where the role of innovation value and clinician experience becomes central to enhancing service outcomes [50]. From a practical perspective, the study informs policymakers, educators, and healthcare product stakeholders on the need to improve technolog-

ical capacity, sustainability considerations, and accessibility of innovative wound care products in Indonesia. By synthesising these insights, the study contributes to both academic discourse and real-world implementation strategies to accelerate technology-enabled improvement in wound care service quality.

5. MANAGERIAL IMPLICATION

Healthcare managers and nursepreneurs managing private wound care practices should adopt a comprehensive managerial strategy that prioritises continuous clinician capacity building to enhance clinical competence, critical evaluation skills, and readiness to integrate advanced wound care technologies into routine practice, while concurrently strengthening the reliability and efficiency of supply chain systems through streamlined distribution channels, digital inventory management, and coordinated regional procurement networks to ensure equitable and uninterrupted access to evidence-based wound care products, and proactively collaborating with policymakers and manufacturers to navigate regulatory complexities, improve licensing and reimbursement mechanisms, align product development with clinical validation, environmental sustainability, and local practice needs, and ultimately address contextual barriers to technology adoption, improve quality of care delivery, and support the long-term sustainability of technology-driven wound care entrepreneurship in resource-limited healthcare environments such as Indonesia.

6. CONCLUSION

In conclusion, this study stresses that enhancing nursepreneur experiences with advanced wound care technologies in private nursing practices requires more than merely having effective products available. A comprehensive improvement framework is needed, one that integrates clinician education, product literacy, patient-centred care, supply chain readiness, and environmentally sustainable practices. The empirical findings demonstrate that clinician experience and perceived innovation value play a significant role in determining the use of technology-driven wound care solutions. However, the adoption of such innovations is also shaped and often constrained by structural inequities, financial limitations, and varying levels of wound care competency across different healthcare facilities. These disparities underscore the urgent need for supportive institutional policies, targeted capacity-building programmes, and accessible professional development initiatives to ensure more equitable and effective implementation of advanced wound care technologies.

This novelty contributes to current literature by advancing the theoretical integration of the Theory of Interpersonal Behaviour (TIB) and the Donabedian Model within a low-resource technopreneurship context. The study provides new perspectives on how behavioural determinants of clinicians, combined with quality-of-care structures, influence decision-making and service outcomes in the adoption of modern wound care technologies. Furthermore, the findings support the relevance of Sustainable Development Goals (SDGs), particularly SDG 3 on Good Health and Well-being and SDG 8 on Decent Work and Economic Growth, through the empowerment of nursing professionals and improvements in community-based healthcare accessibility. Thus, the research strengthens both scholarly significance and practical advancements in Indonesia's evolving wound care ecosystem.

Future research should expand this line of inquiry by involving broader and more diverse samples across regions and healthcare settings, as well as incorporating mixed-method approaches to gain a deeper understanding of the emotional, cultural, and organizational drivers influencing adoption behaviour. In addition, longitudinal research designs are required to examine how perceived innovation value evolves over time and translates into sustained improvements in both clinical outcomes and business performance. Further exploration of digital platforms, AI-enabled wound monitoring technologies, structured entrepreneurial training models, and supportive regulatory frameworks may also contribute to improving the effectiveness, scalability, and sustainability of nursepreneur-led wound care services at a national level. By pursuing these research directions, future studies can provide stronger empirical evidence to support innovation-driven transformation and long-term resilience within Indonesia's healthcare sector.

7. DECLARATIONS

7.1. About Authors

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7.2. Author Contributions

Conceptualization: WS; Methodology: FA; Software: RT; Validation: WS and FA; Formal Analysis: RT and FA; Investigation: RT; Resources: FA; Data Curation: WS; Writing Original Draft Preparation: WS and RT; Writing Review and Editing: WS and FA; Visualization: RT; All authors, WS, RT, and FA, have read and agreed to the published version of the manuscript.

7.3. Data Availability Statement

This study received approval from the Ethics Committee of the University of Pelita Harapan in Indonesia, under reference number 003/DRM/EC/III/2025, dated 1 March 2025. All participants (wound clinicians) provided informed consent before participation. Patient consent was not required in this study; only wound care nurses were respondents.

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7.5. Declaration of Conflicting Interest

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