

Business Model Innovation to Optimize Revenue Growth in the B2C Sector of Research Service Providing Institution: Case Study at Nano Riset Indonesia

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ABSTRACT: This research explores business model innovation at Nano Riset Indonesia NRI, a leader in nanotechnology research, focusing on enhancing revenue growth in the Business-to-Consumer (B2C) sector. The thesis presents an in-depth narrative of NRI's business model, critically examining its internal operations and external market environment. Employing a holistic methodology, it blends quantitative and qualitative analyses, utilizing frameworks like VRIO, Porter's Five Forces, and the Business Model Canvas to evaluate NRI's position and identify areas for innovation. Key focuses include improving consumer value propositions and strengthening customer relationships, all while maintaining cost efficiency. Central to the thesis is a strategic vision for a reimagined business model, tailored to the unique demands of the B2C market. This proposed model aims to financial improvement but also to cultivate a sustainable business growth and adaptability in the dynamic field of research services.

KEYWORDS: Business Model Innovation, Integrated Research Services, Market Transition, Revenue optimization, Value Innovation.

I. INTRODUCTION

Nanotechnology is not a new innovation, its adaptability and versatility have become increasingly prominent over the past decade (Malik, Muhammad, & Waheed, 2023). The dynamic evolution of this technology has resulted in widespread applications in sectors ranging from agriculture, food, cosmetics, medicine, healthcare, automotive, oil and gas, chemical, and mechanical industries (Rickerby & Morrison, 2006). The Ministry of Research and Technology in Indonesia, now known as the Ministry of Education, Culture, Research, and Technology, has played a key role in advancing nanotechnology research in the country. They introduced a national research plan in 2005-2025, emphasizing the importance of advanced materials and nanotechnology. This plan aims to coordinate resources across various sectors for effective development. In 2010, the Ministry of Industry launched a nanotechnology roadmap, focusing on enhancing domestic industries, especially in Textile & Ceramics, Chemical, and Polymer sectors. To support nanotechnology research, the National Standards Agency introduced standards between 2011 and 2012, many of which were influenced by global standards (Joni, Muthukannan, Hermawan, Camellia, & Panatarani, 2018).

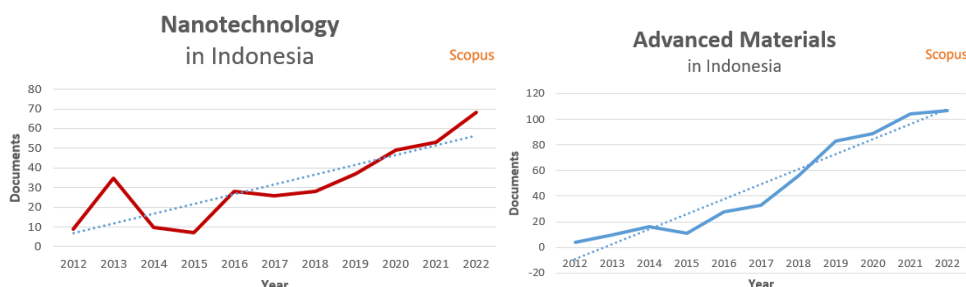


Figure 1. The rise in Scopus-published of documents per year “nanotechnology” and “advanced materials” in Indonesia

Source: Scopus with Indonesia-filtered "nanotechnology" AND "advanced materials" search keywords (Scopus, 2012-2022)

In Indonesia, addressing nanotechnology and advanced materials research challenges requires collaboration between research institutions and service providers. Most services are offered by universities and government bodies like the National Research and Innovation Agency (BRIN). The private research center, Nano Riset Indonesia NRI, is a pioneer in this sector, focusing on R&D and



technological solutions. Nanotechnology adoption in Indonesia is still emerging, with few products listed on www.statnano.com, and a market characterized by high entry barriers. NRI, collaborating with national institutions, has developed four Centres of Excellence, contributing to various industries. NRI is adapting to a growing demand for research services from smaller entities like academics and independent researchers, indicating a shift towards a B2C market alongside traditional B2B. (PT Nanotech Indonesia Global Tbk 2022) . Nano Riset Indonesia (NRI) is a research institute established in 2012 with the legal entity of Foundation, functioning as a research-based technology business incubator in the field of nano technology produced by research and development.

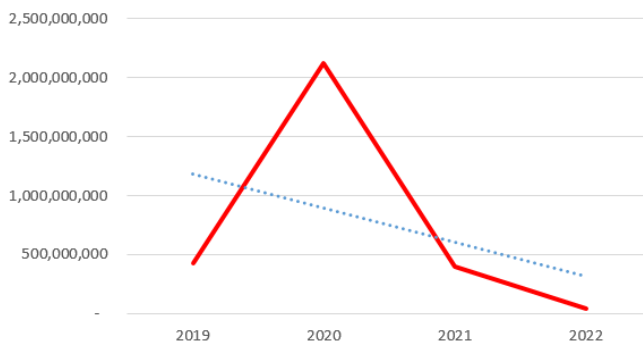


Figure 2. the revenue of Nano Center Indonesia (2019-2022)

Source: Internal consolidated financial statement

NRI’s shift from the B2B to B2C market necessitates a different strategy due to the B2C market's dynamic nature, diverse needs, and faster buying cycles. The institution must adapt to the B2C clients' distinct expectations for quality, speed, and price, especially in an era where information technology allows consumers to easily compare services. NRI needs a better understanding of the B2C market dynamics and a redesigned business model to optimize revenue and maintain its competitive edge. Currently lacking a clear plan for targeted industry and market size, NRI will work with researchers to innovate its business model, enhancing its performance in the B2C sector. Therefore, this research focuses on evaluating Nano Riset Indonesia's external and internal business dynamics as a nanotechnology research service provider. The aim is to understand its market position and operational strengths and weaknesses. Based on this analysis, the study will propose strategic business model innovations to optimize institution's revenue in the competitive nanotechnology sector.

II. LITERATURE REVIEW

A. Business Model Innovation

Table 1. Prominent definitions of Business Model Innovation in the scholarly literature

Author(s)	Focus	Definitions	Year
Yunus, Moingeon, & Ortega	Corporate Strategy	Business Model Innovation as the process of creating new profit avenues through the exploration of unique combinations of value propositions and value constellations	2010
Osterwalder & Pigneur	Value Chain Viewpoint	The notion of altering nine specific aspects of the business model — including value propositions, customer relationships, channels, customer segments, key activities, key resources, key partnerships, revenue streams, and cost structures — as a method for innovation	2010
Frankenberger, Weiblen, Csik, & Gassmann	Value Chain Viewpoint	This category emphasizes innovation through the modification and adaptation of various business model elements, offering a novel approach to creating and capturing value by changing one or more components of the business model.	2013
Matzler, Bailom, von den	Revenue	Increase customer value and simultaneously creating a new value creation and revenue model. This category emphasizes innovations that	2013



Eichen, and Kohler		specifically enhance customer experiences and develop new revenue streams.	
Yunus, Moingeon, & Ortega	Revenue	Generate new sources of profit by finding novel value proposition/value constellation combinations. This category is centered on innovating the core propositions of a business to unlock new profit avenues	2010

Latifi and Bouwman's analysis of 37 scholarly articles identified 20 moderating factors impacting business model dynamics, categorized into Firm Characteristics, Industry Characteristics, Business Model Implementation, and Business Model Practices. Additionally, they noted ten mediating factors in three subcategories: Revenue Growth, Efficiency Growth, and Organizational Capability Improvement. This research offers a framework for understanding factors that influence business model changes. The research focuses on business model innovation (BMI) as a strategy for increasing revenue. BMI is seen as a tool for capitalizing on opportunities during both economic upturns and downturns, adapting to industry changes. Researchers like Teece (2010) and Guo et al. (2017) have emphasized BMI's role in value creation and opportunity recognition, while Zott and Amit (2007) suggest BMIs help firms access new market niches, aiding in revenue growth and strategic adaptation in various economic contexts.

B. Value Innovation – Four Action Framework

Value innovation focuses on creating overall value, often leading to simpler and more desirable products or services, differing from technology-based innovation. The Eliminate-Reduce-Raise-Create (ERRC) Grid is a crucial tool for this, helping companies reconfigure industry factors to achieve a unique value proposition and cost-effectiveness. This approach enables the creation of new market spaces, enhancing customer satisfaction and sustainable organizational growth. The process involves four key steps. Firstly, companies reassess elements that have been competitive advantages, discarding those that are no longer relevant or negatively impact value. Secondly, they evaluate potential over-enhancements in products or services that increase costs without real benefits. Thirdly, the process involves identifying customer compromises due to industry norms and eliminating these constraints. Finally, it involves exploring new ways to add value for customers, potentially creating new demand and altering the industry’s approach to pricing. This method encourages recognizing and adapting to shifts in consumer priorities and industry norms (kim & mauborgne, 2017).

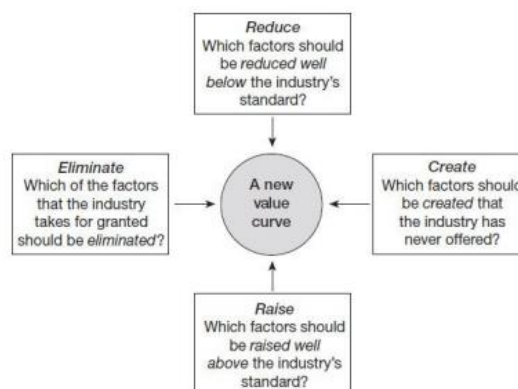


Figure 3. The four actions framework (Mauborgne and Kim 2004)

C. Integrating ERRC framework into Business Model Canvas

Osterwalder's Business Model Canvas, as described in his 2010 book, is a strategic management tool divided into two main sections: the right part focusing on value and customer orientation, and the left part concentrating on costs and infrastructure. This framework highlights the interplay between these sections, where changes in Value Proposition, Channels, or Customer Relationships (right side) impact Resources, Activities, Partnerships, and Costs (left side). The Blue Ocean Strategy, integral to this model, aims to simultaneously enhance value and reduce costs. This involves critically reassessing the Value Proposition to eliminate or minimize low-value features while enhancing or introducing high-value features without significant cost increases. Integrating the Blue Ocean Strategy with the Business Model Canvas provides a holistic approach to business model innovation.

Using the Four Actions Framework (eliminate, create, reduce, improve) across various business model elements enables a detailed understanding of how value modifications affect cost structures.

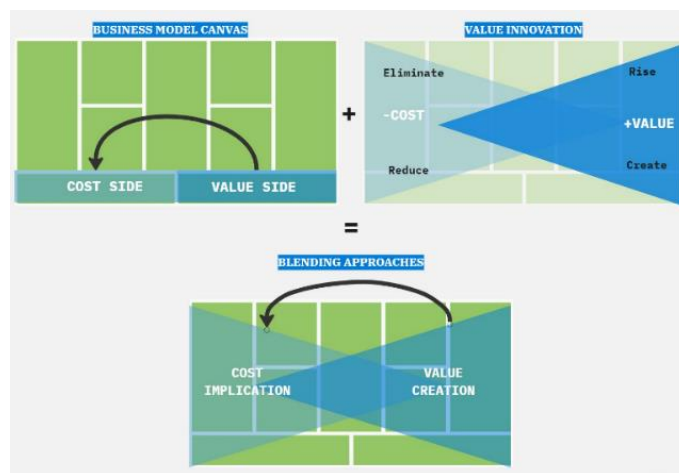


Figure 4. Conceptual Framework

III. METHODOLOGY

A. Research Design

The research design is a strategic framework aimed at dissecting key business issues through established Research Objectives, involving both Internal and External Analysis. Initially, the organization's strategic competencies and assets are examined using the VRIO Framework and Business Model Canvas. The external analysis includes Market Size assessment, competitive analysis through Porter's Five Forces and 7P Competitor Analysis, and customer perceptions via Perception Maps. A central component is the SWOT Analysis, identifying Strengths, Weaknesses, Opportunities, and Threats, followed by a TOWS Analysis for generating actionable initiatives. The methodology advances to Value Innovation, incorporating Customer Validation and the 4 Actions Framework, to develop Business Model Innovation. The final phase involves creating an Implementation Plan to operationalize the strategy, reflecting the dynamic and evolutionary nature of business analysis.

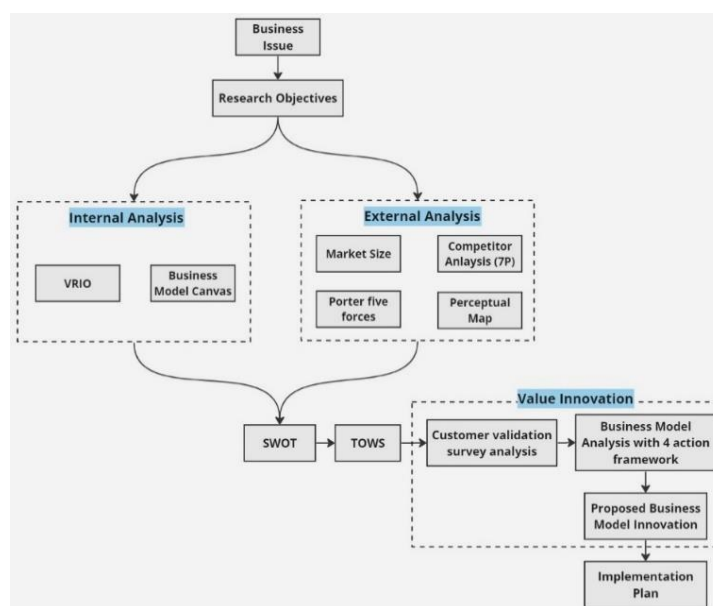


Figure 5. Research Design



B. Data Collection and Analysis

The research adopts a mixed methods approach as outlined by Saunders et al (2023) in “Research Methods for Business Students.” This approach combines quantitative and qualitative techniques in a synergistic manner, not merely as a combination but to leverage their strengths for a more comprehensive understanding of the research subject. The specific methodology is a Concurrent Embedded Design, where either quantitative or qualitative data forms the primary basis, with the other type enriching the analysis. This enables in-depth exploration of complex questions, with quantitative surveys complemented by qualitative interviews or observations for a well-rounded perspective.

Table 2. Percentage decrease in the number of academics by Market Segment

Segment	Students	Lecturer	Number of Academics	Percentage of Reduction
Indonesia	1,916,056	112,709	2,028,765	-
Java Island	1,182,673	51,421	1,234,094	39.17%
DKI Jakarta, Banten, and West Java	716,361	29,848	746,209	39.53%

Table 3. The final total population used in the research

Segment	Percentage of Reduction	Total Population
Indonesia	-	4,090
Java Island	39.17%	2,488
DKI Jakarta, Banten, and West Java	39.53%	1,504

In this study, questionnaires were used for internal stakeholders at Nano Riset Indonesia, assessing perceptions of the five forces on a Likert scale. Key respondents included the Founder and Business Director, who provided insights on industry challenges and competition. For prospective clients, the focus was on higher education students and academics in Indonesia, particularly in nanotechnology and advanced materials. The population was segmented by regions and provinces, with a target of 316 respondents; however, 320 were successfully surveyed, aiding in perceptual analysis and customer validation. Secondary data collection involved an extensive analysis of internal documents from YP3N and PT Nanotech Indonesia Global, and digital sources such as websites, scholarly articles, and business publications, providing a broad perspective on business operations, strategies, and current trends in innovation and business.

Table 4. The summary table of data collection and data analysis method

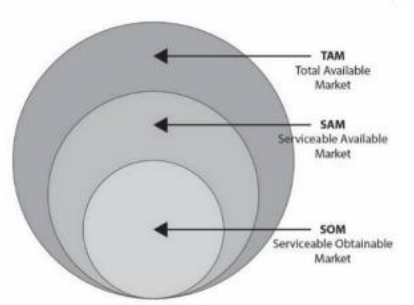
Research Objectives	Type of Analysis	Data Analysis Method	Strategic Management Tools	Type of Data	Data Collection Method	Data Source
Evaluate External and Internal analysis of Nano Center Indonesia	Quantitative	Describing Data	Porter five forces	Primary	Questionnaire	Founder of Nano Center Indonesia, and Business Director of PT Nanotech Indonesia Global, tbk
		Describing data	Perceptual Map	Primary	Questionnaire	320 academics interested in the field of nanotechnology and advanced materials, spread across three target provinces
		Describing data	Customer Validation	Primary	Questionnaire	
		Content Analysis	Market Sizing	Secondary	Desk Study	Official Website, Report, Research paper, and E-publishing
	Qualitative	Content Analysis	Competitor Analysis (7P)	Secondary	Desk Study	Official Website, Company Profile, and Business Director of PT Nanotech Indonesia Global, tbk
		Thematic Analysis	VRIO Analysis	Primary	Interview	
		Content Analysis	Business Model Canvas	Primary & Secondary	Desk Study & Discussion	Outcome of Previous Analysis
		Content Analysis	SWOT Analysis	Secondary	Desk Study	
Propose Business Model Innovation to Nano Center Indonesia		Template Analysis	Four Action Framework – Eliminate, Reduce, Rise, and Create	Secondary	Desk Study	

IV. ANALYSIS

A. Market Size

Table 5. Market Size Segmentation

Segment	Definition
TAM	The universe of potential users or customers.
SAM	Future-users in a market that presents with rapid and predictable growth that one can serve.
SOM	The opportunity to attract active users and customers or the “target market.”



The Total Addressable Market (TAM) represents the ultimate revenue a business can achieve by selling its products or services, typically used as a strategic tool for assessing market expansion potential. Subsequently, the Serviceable Addressable Market (SAM) is a more focused segment that a firm can realistically target, determined by factors like specialization, geographic reach, and resource allocation. Even more specific is the Serviceable Obtainable Market (SOM), which reflects the actual market share a company can expect to capture, accounting for its unique capabilities and competitive environment. Additionally, Bottom-up Market Sizing, as detailed by Buchko and Fairbanks (2018), is an analytical approach used to estimate market size when data is limited, involving segment identification, scale approximation, and expert review to refine estimates for strategic planning and decision-making (York, 2018).



Table 6. Market Population

Segment	Total Market Size
TAM	4,090
SAM	2,488
SOM	1,504

The market population is calculated based on previous estimates, considering that only about half of the Service Obtainable Market (SOM), or 752 academics, are likely to conduct research. This figure is used to determine the total market size in sales value. Additionally, the potential market for services assisting in pre-commercialization is estimated by considering the decrease in interest and capability among academics, as per Radyum Ikono's 2020 research. Using its current business model, the institution's maximum profit from the existing market is approximately IDR 1.11 billion. However, by adding services to its business model innovation, the company could potentially increase its profits by 191%, reaching around IDR 3.22 billion.

Table 7. Market sizing for current services

Service Category	Average Service Price	Reasonable SOM	Potential Revenue (IDR)
Research (Material Synthesis & Characterization)	201,683	752	151,702,236.17
IP Protection	3,500,000	273	955,645,108.92
TOTAL			1,107,347,345.09

Table 8. Market sizing for proposed services

Service Category	Average Service Price	Reasonable SOM	Potential Revenue (IDR)
Research (Include new services)	1,762,802.33	752	1,325,945,235
Invention	2,000,000	468	936,992,000
IP Protection	3,500,000	273	955,645,109
TOTAL			3,218,582,343.43

B. Porter's Five Forces

In strategic management, Michael Porter's Five Forces model, as elaborated in Rothaermel's "Strategic Management, 6th edition" (2024), is essential for analyzing an industry's competitive dynamics. It includes five critical forces: Entry Barriers (difficulty for new entrants), Supplier Power (suppliers' influence), Buyer Power (consumers' leverage), Substitution Threat (ease of finding alternatives), and Competitive Rivalry (intensity of competition among existing players). This model extends beyond direct competition, providing a comprehensive perspective for strategic leaders to assess the external environment and develop effective competitive strategies.

In investigating the industry dynamics for the Institution, researchers employed a questionnaire focused on Porter's Five Forces. The questionnaire was strategically distributed, with the founder of Nano Riset Indonesia responding to questions about the Threat of New Entrants, and the Director of Business and Marketing addressing the Bargaining Power of Suppliers and Buyers, Threat of Substitutes, and Industry Rivalry. The findings suggest that the scientific research services industry for academics presents a balanced mix of opportunities and challenges, characterized by moderate competition. This competition is primarily shaped by the significant bargaining power of buyers and a notable threat of substitutes. Institutions poised for success in this field are those adept at innovation, keenly responsive to customer needs, and flexible to market changes. To maintain



competitiveness, research institutions must focus on fulfilling buyer requirements and distinguishing themselves from competitors.

Table 9. The result of Porter’s Five Forces in Research Service Industry

1	Bargaining power of suppliers/Partners	Moderate
	<ul style="list-style-type: none"> Suppliers/Partners have some influence but are not dominant. Suppliers/Partners include research equipment and technology platform providers. Important for institutions to maintain good relationships with suppliers. Necessary to seek alternatives to reduce dependency. 	
2	Bargaining Power of Buyers	Moderate to High
	<ul style="list-style-type: none"> Customers have significant influence over service providers. Customers include academics and research institutions. Customers may have many options and can easily switch providers. Institutions should focus on differentiating services, understanding customer needs, and offering added value. 	
3	Threat of Substitutes	Moderate to High
	<ul style="list-style-type: none"> Other products or services could replace scientific research services. Substitutes could be new technologies, alternative research methods, or digital platforms. Institutions need to continuously innovate and update their services. 	
4	Threat of New Entrants	Moderate
	<ul style="list-style-type: none"> Barriers to entry exist, but are not strong enough to prevent new competitors. Potential for innovation and price competition. Existing institutions should improve services, build strong brands, and consider strategic collaborations or alliances. 	
5	Industry Rivalry	Moderate
	<ul style="list-style-type: none"> Some competition exists, but it's not overly intense. Institutions can focus on innovation, improving service quality, and marketing strategies to stand out. 	

Source: Internal stakeholder Questionnaire

C. Competitor Analysis

In Indonesia, the few institutions that commercialize research services in the field of nanotechnology are mostly under the auspices of universities, even if they have complete infrastructure. In addition, the National Research and Innovation Agency (BRIN) also has research services in various fields, one of which is Nanotechnology. Most research and laboratory service providers in the field of nanotechnology and advanced materials in Indonesia are under the auspices of universities and the government. If we compare Nano Riset Indonesia's products with its competitors, it can be seen that the types of services are not much different. Therefore, the institution wants to offer something unique to be different from its competitors, so that it is not trapped in the red ocean market. The institution wants to add new types of services that are not owned by its main competitors in order to enter the untapped market, so that the main goal of increasing revenue that is down can be resolved properly.

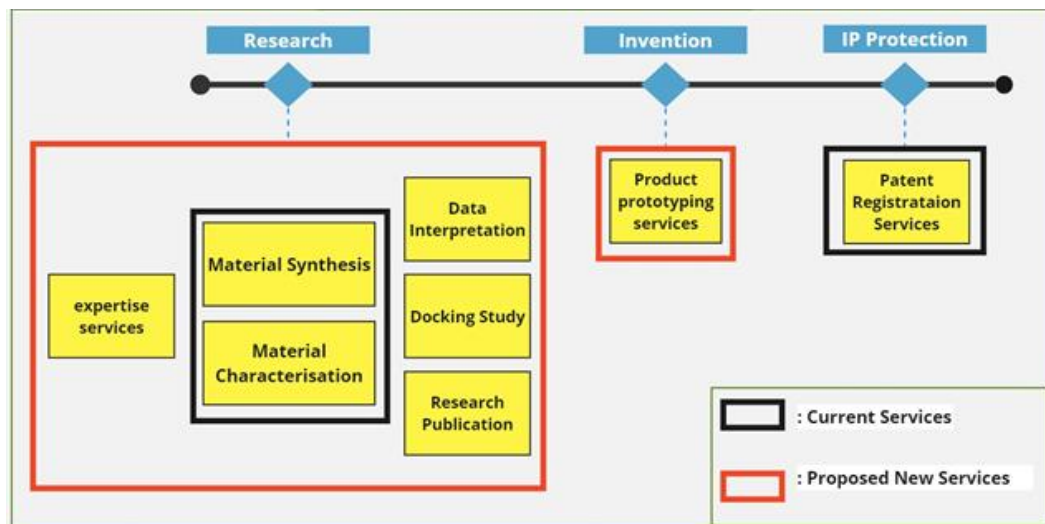


Table 10. Product Comparison among competitors

Provider	Product/Service							
	Expertise & Guidance	Material Synthesis	Material Characterization	Data Interpretation	Molecular Docking Analysis	Research Publication	Product Prototyping	Patent Registration
Nano Riset Indonesia	✓	✓	✓	✓	✓	✓	✓	✓
Elsa Brin	✓	✓	✓	x	✓	x	x	x
ULRU IPB	x	✓	✓	x	✓	x	x	x
ILRC - UI	x	✓	✓	x	x	x	x	x
FiNder U-CoE UNPAD	✓	✓	✓	x	x	x	x	x
SIPA PPNN ITB	x	✓	✓	x	x	x	x	x

D. Perceptual Map

According to Giagauri's (2019), perceptual mapping is highlighted as a key marketing tool that visually represents consumer perceptions of brands or products. This method is crucial for comparing brands against competitors and shaping marketing strategies. The map's effectiveness depends on the selected attributes and subjects, as well as respondent evaluations. Perceptual mapping is pivotal for uncovering consumer insights, essential for effective brand positioning and marketing.

In assessing potential clients' perceptions of Nano Riset Indonesia and its competitors, this study involved a questionnaire distributed to 320 academics in the field of nanotechnology and advanced materials in the three target provinces. The research focused on two key indicators: brand familiarity and service perception. A weighting scheme was applied to each response for these indicators to calculate the average, thus facilitating the creation of a perception map (two-axis chart). Data collected from respondents was analyzed by multiplying the initial score by the total number of responses, as detailed in tables 10 and 11 in the appendix. This method provides a nuanced understanding of the perception of Nano Riset Indonesia's brand and services among potential academic clients.

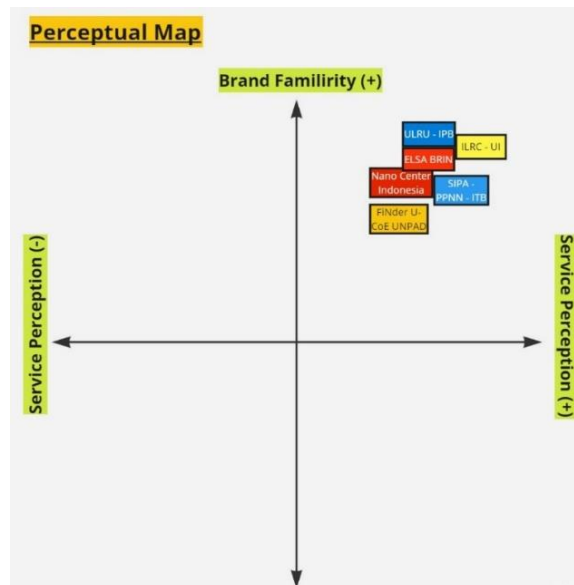


Figure 5. Perceptual Map of NRI and its competitor

The results of this perceptual analysis show that Nano Riset Indonesia (NRI) is in a position that is still below its three main competitors, namely ULRU-IPB, ILRC-UI, and ELSA Brin. However, its position is more or less balanced when juxtaposed with SIPA PPNN-ITB, except that both have their own advantages. NRI excels in brand familiarity, while SIPA PPNN-ITB excels in service perception. The bottom position is occupied by Finder U-CoE UNPAD. Although NRI is not at the bottom, this position is still a serious threat if there is no innovation in its services. Therefore, NRI must be able to design strategies so that it can compete with its three leading competitors in capturing existing market share. In addition, the institution must offer something unique and different from its main competitors, so as not to be trapped in intense competition for the same market.

E. VRIO Analysis

In a strategic management context, the researcher employed the VRIO framework to evaluate the competitive advantages of Nano Riset Indonesia's NRI resources. This analysis involved directing inquiries to NRI's founder, an industry expert, with the interview questions focusing on each key resource of the institution, as detailed in Table 4.10, and transcripts included in the bibliography. The VRIO analysis revealed that NRI's advanced laboratory facilities and equipment are key to its competitive advantage. However, there are opportunities for improvement in human capital, intellectual property, and relational capital management. Strengthening these areas could transform them into significant competitive strengths, enhancing NRI's market position. This finding underscores the importance of enhancing internal capabilities and resource management to leverage both existing and potential competitive advantages.

Table 11. VRIO analysis of NRI

Resources	V	R	I	O	Competitive Consequences
Intangible					
Expertise	✓	✗	✗	✓	Competitive Parity
Intellectual Property	✓	✓	✓	✗	Unused Competitive Advantage
Relational Capital	✓	✓	✓	✗	Unused Competitive Advantage
Research Data and Findings	✓	✗	✓	✗	Competitive Parity
Tangible					
Laboratory Equipment and Facilities	✓	✓	✓	✓	Sustainable competitive advantage

Source: Interview analysis with founder of Nano Riset Indonesia



F. Current Business Model Canvas

Key Partners	Key Activities	Value Propositions	Customer Relationships	Customer Segments
<ul style="list-style-type: none"> - Raw material suppliers of nanomaterials. - Research institutes and universities for joint research - External laboratory providers 	<ul style="list-style-type: none"> - Conducting research and development in four Centers of Excellence - Nanomaterial synthesis for clients - Material characterization for clients - Lab Infrastructure Development and Maintenance - Sales and Marketing 	<ul style="list-style-type: none"> - Research laboratory services for material synthesis and characterisation - Access to leading experts and technologies in the field of nanotechnology and advanced materials 	<ul style="list-style-type: none"> - Technical support and consultation. - Dedicated customer service - Contract research and development with universities. 	Academics consisting of students and lecturers who have research interests in Nanotechnology and Advanced Materials.
	<p>Key Resources</p> <ul style="list-style-type: none"> - Researcher and expert in the four Centers of Excellence - Intellectual Property - Relational Capital - Research Data and Findings - Internal Laboratory Equipment and Facilities - Materials and Supplies 		<p>Channels</p> <ul style="list-style-type: none"> - Website - Instagram - Research partnerships and collaborations with universities 	
Cost Structure		Revenue Streams		
<ul style="list-style-type: none"> - Research equipment - Laboratory maintenance - Researcher and expert monthly salaries - Staff and Laboratory technician monthly salaries - Raw materials and logistics 		<ul style="list-style-type: none"> - Customized nanomaterial synthesis services. - Material characterization services. - Patent application service - Academic grant funding for research and development. 		

Source: Observation and Focus Group Discussion

G. SWOT-TOWS Matrix

<i>Internal</i> <i>External</i>	Strength	Weakness
Opportunity	<p>S/O Strategies:</p> <ul style="list-style-type: none"> • Combine the expertise with growing research trends to develop unique research services or products that are currently not offered by competitors. • Utilize the strategic location and potential collaborations to establish partnerships with local industries, scaling up service to the commercialization stage. • Harness the brand familiarity to explore and capitalize on digital marketing enhancements or other channels. • Exploit moderate brand familiarity and strong connections with suppliers/partners to enhance market position and form strategic alliances. 	<p>W/O Strategies:</p> <ul style="list-style-type: none"> • Increase brand visibility and attract new clients by enhancing digital marketing to address limited promotional information. • Reduce operational costs and gain resources through collaborative research projects. • Diversify and strengthen the supply chain by exploring innovative collaborations.

Threat	S/T Strategies:	W/T Strategies:
	<ul style="list-style-type: none"> • Maintain competitive advantage against competitors and rapid technology changes through strong supplier relationships and academic reputation. • Stay ahead in competitive, technologically advancing fields with a cutting-edge research focus. • Create a nanotechnology innovation hub, leveraging strategic location against rapid technology changes. • Offer unique value in laboratory facilities for complex academic research. • Develop a website-based e-service system using existing digital infrastructure. 	<ul style="list-style-type: none"> • Develop in-house capabilities or diversify suppliers to reduce reliance on external sources and mitigate competitor and market changes. • Implement flexible pricing models to compete in price-sensitive markets. • Improve operational efficiency to withstand competitive pressures and funding uncertainties. • Innovate continually to stay ahead of technological changes and new market entrants.

Source: SWOT-TOWS Analysis from external and internal analysis of NRI

V. BUSINESS SOLUTION

A. Customer Validation

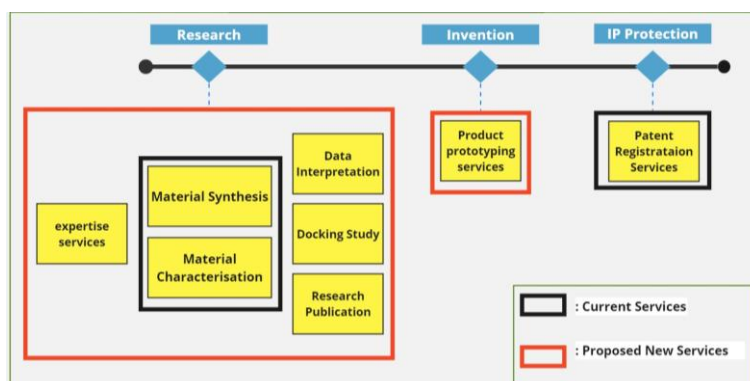


Figure 6. NRI's integrated research service products divided by current and proposed

Source: Internal business development plan

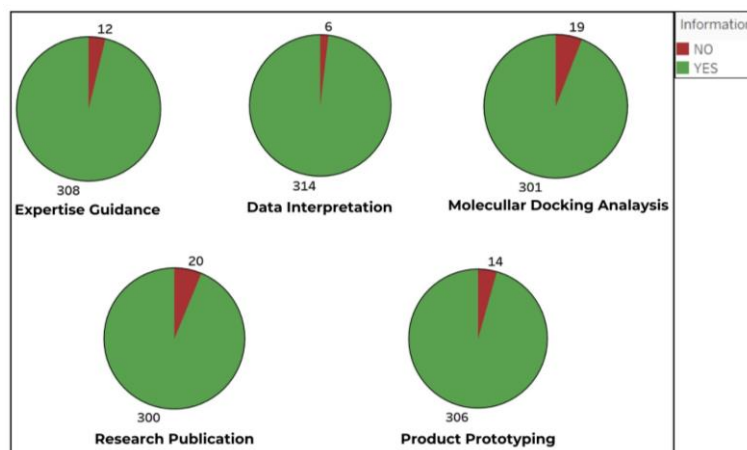


Figure 7. Customer Validation for New Services

Source: Questionnaire to 320 prospective clients

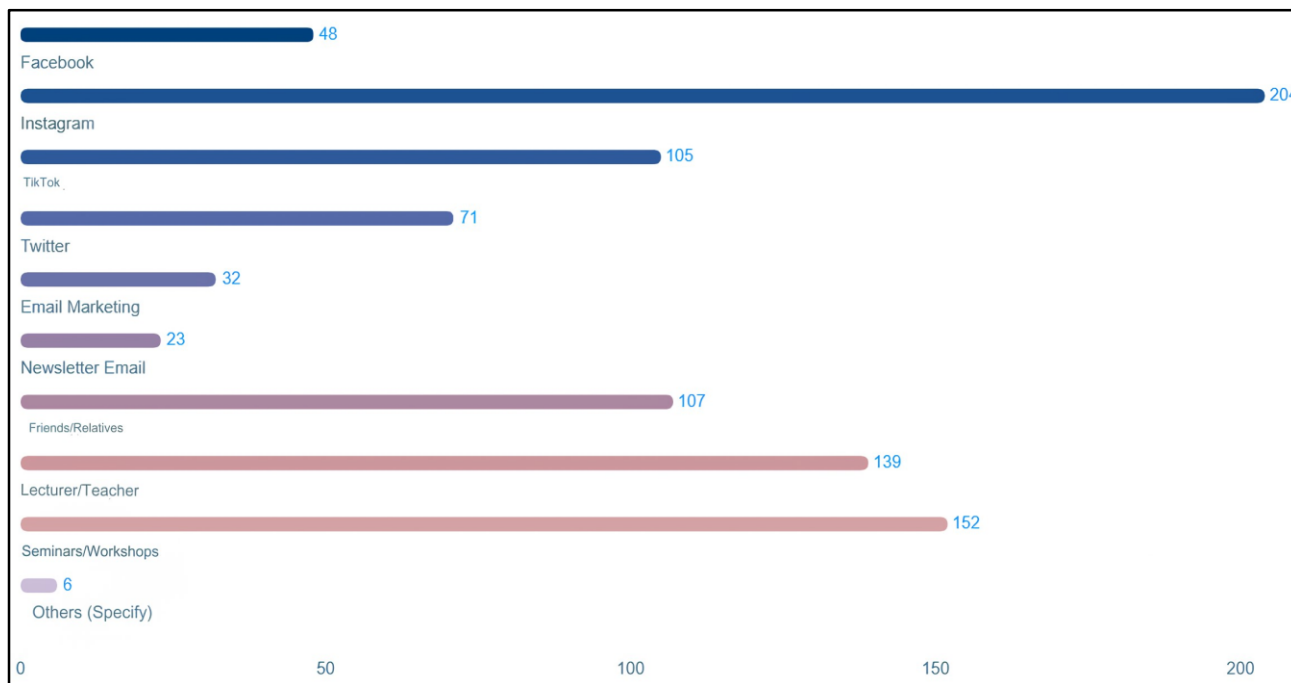


Figure 8. Marketing Channel from Customer Experience

Source: Questionnaire to 320 prospective clients

The data provided is a visual representation of the service structure of Nano Research Indonesia. It displays an integrated service model segmented into three distinct phases, namely Research, Invention, and IP Protection, with current services in black and proposed services in red. The Research phase considers adding four new services and is augmented by one new service in the invention phase. Based on the customer validation survey of the proposed new services, the majority agreed with the new service products, with 'yes' votes outnumbering 'no' votes, indicating positive acceptance from the customer base for the institution's proposed service expansion. Then for marketing channel preference based on customer experience, the majority chose Instagram for the online channel and seminars/workshops for the offline channel.

B. Business Model Analysis with Four Action Framework

Eliminate	Raise
<ul style="list-style-type: none"> Value Propositions The organization offers more than just laboratory services; its value extends to aiding academics in navigating complex research processes and downstream results. Cost Structure Considering fluctuating demand, the monthly salary system for researchers and technicians is inefficient. The organization often needs to hire additional personnel on an as-needed basis, making a fixed pay structure less practical. 	<ul style="list-style-type: none"> Customer Segments Focus on the B2C market to significantly increase revenue and diversify income streams. Channels: Enhance the website to function as a self-service platform beyond basic product information. Key Resources Engage in collaborative research projects to manage operational costs. Stay at the forefront in competitive fields with advanced research. Continuously update internal laboratory equipment for technological advancements. Leverage strong supplier relationships for competitive advantage



Reduce	Create
<ul style="list-style-type: none"> Key Partners Address resource dependency through non-profit collaborations and increased investment in laboratory equipment for sustainable and diversified supply chains. 	<ul style="list-style-type: none"> Customer Relationship Develop a self-service platform, educational content through seminars and social media, workshops, regular newsletters, and a membership program. Channels Utilize omnichannel strategies across digital platforms, host seminars and workshops for direct marketing, and implement affiliate marketing through academic networks. Revenue Streams Offer expertise guidance, data interpretation, molecular docking analysis, research publication support, and product prototyping. Value Propositions Provide integrated research services, facilitate access to commercialization and industry partnerships, and offer e-service capabilities. Key Activities Conduct integrated lab research, analysis, and prototype development for nanotechnology products. Key Resources Maintain a comprehensive online website for e-service support. Key Partners Collaborate with local industries and third-party IT services for commercialization and digital needs. Cost Structure Utilize a project-based salary model for researchers and experts to optimize workforce size and financial commitments, hiring specialized professionals as needed for specific projects.

C. Proposed Business Model Innovation

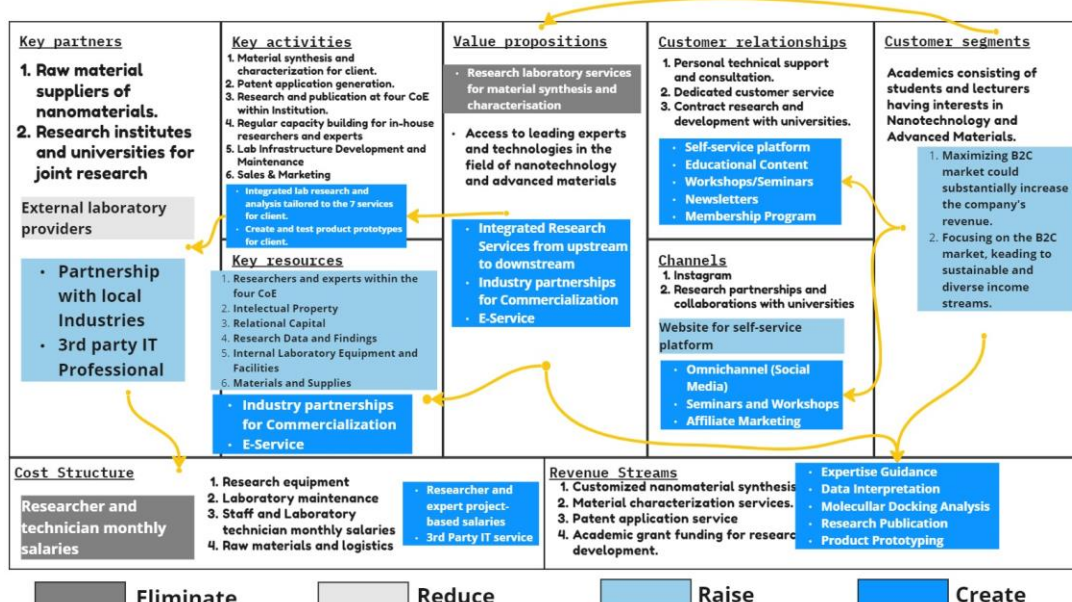


Figure 8. The process of designing a business model innovation using the business model canvas



Nano Riset Indonesia's business model innovation marks a significant shift towards diversifying services and revenue streams, aligning with current trends in nanotechnology and scientific research. This involves expanding service offerings to include prototyping and product development for more commercialization-focused research. Embracing digitalization, the institution is implementing a self-service platform, catering to the digital preferences of the academic community. Customer engagement strategies are also being enhanced with interactive channels like workshops and seminars, fostering long-term relationships and collaboration in the scientific field. The new model strategically promotes partnerships with local industries, bridging academic research and commercialization. Additionally, the institution is revising its cost structure, opting for external IT services for digital platform maintenance, which is more cost-effective than direct IT staff hiring. Adopting project-based salaries for researchers and experts aligns with fluctuating demand and financial efficiency, allowing for flexible engagement of external personnel as needed.

VI. CONCLUSION AND RECOMMENDATIONS

Nano Riset Indonesia's business model innovation represents a strategic and comprehensive response to the changing landscape of academic and commercial research in science and technology. Focused on revenue growth and value maximization, the model incorporates expanded service offerings and stronger customer relationships, with a significant emphasis on digital engagement. This approach acknowledges the importance of technology in the modern research environment. The model is dynamic, designed for adaptability and evolution, aiming to meet current market demands while also preparing for future opportunities. This adaptability is crucial in a sector marked by rapid technological progress and evolving customer needs.

The development of this new business model involved a thorough analysis of the company's strengths, weaknesses, opportunities, and threats, aiming to optimize revenue generation. The implementation plan is meticulously structured in multiple phases, highlighting the importance of strategic planning and extensive preparation. It also emphasizes the need for continual adaptation and improvement, understanding the complexities involved in transitioning both technologically and in terms of human factors. This balanced approach, combining foresight, innovation, and practicality, signifies a significant advancement in Nano Riset Indonesia's pursuit of sustainable growth and industry leadership. The model reflects a proactive, future-oriented strategy, ready to embrace current demands and upcoming opportunities in the ever-evolving field of science and technology.

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Appendix 1 Questionnaire Result for Perceptual Map

Table 10. Brand familiarity data interpretation

Answer	Provider					
	Nano center Indonesia	Elsa Brin	ULRU-IPB	ILRC-UI	Finder U-CoE UNPAD	SIPA-PPNN-ITB
Don't know the product	0	0	0	0	0	0
know at a glance	169	143	135	141	141	139
Know the product well but have not used it	138	166	188	182	142	152
Have experience with the product but limited	81	84	108	90	57	93
Have in-depth experience with the product	64	76	60	68	80	64
Average	90.4	93.8	98.2	96.2	84	89.6

Table 11. Service perception data interpretation

Answer	Provider					
	Nano center Indonesia	Elsa Brin	ULRU-IPB	ILRC-UI	Finder U-CoE UNPAD	SIPA-PPNN-ITB
Highly Negative	-2	-4	-2	-4	-2	-6
Negative	-6	-5	-7	-1	-4	-2
Neutral	0	0	0	0	0	0
Positive	167	160	178	158	156	156
Highly Positive	66	98	88	112	72	110
Average	45	49.8	51.4	53	44.4	51.6



Appendix 2 Questionnaire Result for Porter's Five Forces

<p>Capital required to join this research services industry? *</p> <p>Very low . . . 1 2 3 4 5 . . . Very high . . .</p> <p><input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/></p>	<p>How easy is it to generate sales in this research services industry? *</p> <p>Sangat Rendah . . . 1 2 3 4 5 . . . Sangat Tinggi . . .</p> <p><input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/></p>
<p>Regulatory barriers to entry into the research services industry? *</p> <p>Very low . . . 1 2 3 4 5 . . . Very high . . .</p> <p><input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/></p>	<p>Availability of substitute products from outside that can replace NCI products in the research services industry? *</p> <p>Sangat Rendah . . . 1 2 3 4 5 . . . Sangat Tinggi . . .</p> <p><input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/></p>
<p>NCI's dependence on suppliers/partners in running its research services business? *</p> <p>Very low . . . 1 2 3 4 5 . . . Very high . . .</p> <p><input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/></p>	<p>How easy is it for customers to get these substitute products? *</p> <p>Sangat Rendah . . . 1 2 3 4 5 . . . Sangat Tinggi . . .</p> <p><input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/></p>
<p>Client's bargaining position in service transactions with NCI? *</p> <p>Very low . . . 1 2 3 4 5 . . . Very high . . .</p> <p><input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/></p>	<p>How affordable is the price of the substitute product? *</p> <p>Sangat Rendah . . . 1 2 3 4 5 . . . High Sangat . . .</p> <p><input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/></p>
<p>NCI's bargaining position in service transactions with clients? *</p> <p>Very low . . . 1 2 3 4 5 . . . Very high . . .</p> <p><input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/></p>	<p>NCI's main competitor in this Research Services Industry? *</p> <p>Sangat Rendah . . . 1 2 3 4 5 . . . Sangat Tinggi . . .</p> <p><input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/></p>
	<p>The level of business competition in making sales in this research services industry? *</p> <p>Sangat Rendah . . . 1 2 3 4 5 . . . High Sangat . . .</p> <p><input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/></p>
	<p>Client loyalty to research service products from NCI? *</p> <p>Sangat Rendah . . . 1 2 3 4 5 . . . Sangat Tinggi . . .</p> <p><input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/></p>

Cite this Article: Naufal Bintang Akbar, Eko Agus Prasetyo (2023). Business Model Innovation to Optimize Revenue Growth in the B2C Sector of Research Service Providing Institution: Case Study at Nano Riset Indonesia. International Journal of Current Science Research and Review, 6(12), 8333-8349