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Innovation Governance and Intellectual Property Strategy as Drivers of Organizational Transformation: Evidence from Indonesia's Dairy Industry

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Abstract

The Indonesian packaged milk industry faces increasing pressure from technological disruption, changing consumer preferences, and intensifying market competition. Despite the sector's strategic importance for food security and economic development, many dairy manufacturing firms still rely on conventional managerial practices that limit their capacity to innovate and respond to market dynamics. This study examines how innovation governance and intellectual property management contribute to organizational transformation in the Indonesian packaged milk industry. A qualitative case study approach was employed to analyze innovative practices within the sector, focusing on PT Ultrajaya Milk Industry and Trading Company Tbk as a representative firm. Data were collected from theoretical literature, industry documents, and regulatory materials and analyzed using thematic coding in Computer-Assisted Qualitative Data Analysis Software (CAQDAS), specifically NVivo 14. The analysis identifies several dominant themes, including product innovation, technological capability, market orientation, and production integration. The results indicate that organizational transformation is driven primarily by an entrepreneurial orientation that prioritizes opportunity exploration and product diversification. Structured innovation governance mechanisms, including stage-based evaluation processes and strategic innovation blueprints, enable firms to manage innovation systematically and reduce research and development risks. The findings also highlight the growing importance of open innovation, digital supply chain integration, and collaboration with external stakeholders in accelerating product development. Furthermore, proactive intellectual property management strengthens competitive advantage by protecting proprietary knowledge and increasing the value of intangible assets.

1. Introduction

The global economy is currently undergoing rapid transformation, marked by technological disruption, shifting consumer preferences, and intensifying competitive pressures across industries. In this environment, entrepreneurship is no longer perceived solely as the activity of establishing new firms, but rather as a central mechanism for generating innovation, economic value, and long-term prosperity. Innovation-driven entrepreneurship enables organizations to transform knowledge into marketable products, services, and business models that contribute to economic development. In emerging economies such as Indonesia, this transformation is particularly important in food production and processing sectors, including the dairy and packaged milk industries. These sectors play a critical role in national food security while also facing structural challenges related to productivity, technological adoption, and institutional coordination.

The Indonesian dairy sector is characterized by a complex ecosystem that includes smallholder farmers, cooperatives, processing companies, financial institutions, and government agencies. Despite the sector's strategic importance, domestic milk production remains insufficient to meet national demand. Previous studies indicate that local milk production supplies only a fraction of Indonesia's total consumption requirements, forcing the country to rely heavily on imports and creating structural vulnerabilities in the domestic dairy supply chain (Hidayat, 2025). These structural limitations are further complicated by fragmented coordination among stakeholders within the dairy innovation ecosystem. Research on the Indonesian dairy industry highlights that actors within the ecosystem often operate in isolation with limited institutional integration, which weakens innovation capacity and reduces the effectiveness of policy interventions aimed at improving sectoral performance (Hardiyati et al., 2025).

In addition to institutional fragmentation, technological adoption within the dairy sector also faces substantial challenges. Cooperatives often function as key mechanisms for coordinating production activities and facilitating technology transfer to smallholder farmers. However, weak monitoring systems, limited incentives, and inadequate extension services frequently hinder the sustained adoption of agricultural technologies among cooperative members (Akzar et al., 2024). These challenges demonstrate that technological innovation alone is insufficient to transform the dairy industry without complementary improvements in governance, organizational capability, and institutional coordination.

The need for transformation is further intensified by the broader dynamics of Industry 4.0, which have significantly altered the competitive landscape of manufacturing and agribusiness. The integration of digital technologies, data-driven decision-making, and advanced production systems has created new opportunities for firms to enhance productivity and product innovation. At the same time, these technological advancements require organizations to adopt more agile managerial approaches and to continuously experiment with new ideas and business models. Organizational resilience depends on the ability to adapt quickly to emerging market conditions through systematic learning processes and controlled experimentation. Studies on dairy supply chains during global disruptions demonstrate that firms capable of combining operational continuity with structural innovation are more resilient and better positioned to sustain long term competitiveness (Sitompul & Borbély, 2026).

Within this evolving context, innovation governance has emerged as a crucial mechanism for guiding organizational transformation. Innovation governance refers to the institutional structures, processes, and managerial practices that enable organizations to systematically generate, evaluate, and implement new ideas. Effective innovation governance ensures that innovation activities align with strategic objectives while minimizing risks associated with product development and market uncertainty. One common problem faced by many organizations is the tendency to pursue innovation through unstructured processes that develop numerous ideas simultaneously without rigorous evaluation. Such practices often result in inefficient resource allocation and increased financial risk. To address this issue, many organizations have adopted structured innovation management frameworks that emphasize stage-based evaluation processes, enabling companies to test ideas progressively before committing significant resources to commercialization.

The transformation toward innovation-driven organizations is particularly important for the Indonesian packaged milk industry. The sector faces increasing pressure from evolving consumer preferences that demand healthier products, improved nutritional value, and sustainable production practices. At the same time, firms must compete within a globalized market where multinational corporations operate alongside domestic producers. Research on entrepreneurial marketing among small and medium enterprises in agro-industrial sectors demonstrates that innovation-oriented strategies significantly enhance firm competitiveness and market responsiveness (Sarma et al., 2021). Entrepreneurial approaches encourage firms to adopt flexible marketing strategies, explore new market opportunities, and integrate innovation into their overall business models.

Innovation in the dairy sector also requires strong collaboration among multiple stakeholders within the broader agricultural ecosystem. Cluster-based development has been identified as an effective mechanism for strengthening regional competitiveness by facilitating knowledge exchange, resource sharing, and collective learning among firms and institutions. Empirical studies on dairy farming clusters in Indonesia highlight that networking, partnerships, and access to information play crucial roles in fostering innovation and improving farmers' productivity (Prihartini et al., 2022). These collaborative structures enable stakeholders to overcome resource constraints and to develop shared solutions to industry challenges.

Another critical component of innovation-driven transformation is the strengthening of institutional governance within farmer organizations and cooperatives. Cooperatives serve as important intermediaries, connecting smallholder farmers with processing companies and markets. However, outdated regulatory frameworks and weak governance structures often limit the effectiveness of cooperatives in supporting innovation and economic development. Legal studies on Indonesian cooperatives reveal significant

gaps between existing regulatory frameworks and international governance standards, underscoring the need for reforms to enhance accountability, transparency, and institutional capacity (Asmara et al., 2026). Strengthening cooperative governance, therefore, represents an essential step toward building a more resilient and competitive dairy sector.

Beyond institutional reforms, technological and managerial innovations must also address the socio-economic realities faced by rural communities involved in dairy production. Research on sociopreneurial behaviour among dairy cooperative leaders suggests that empathy, social responsibility, and self-efficacy play important roles in shaping leadership practices that support community development and sustainable agricultural production (Arrasyid et al., 2024). Such sociopreneurial leadership approaches emphasize integrating economic objectives with social impact, enabling organizations to create value not only for shareholders but also for farming communities.

The sustainability of livestock farming systems is further influenced by external support mechanisms such as government policies, access to technology, and institutional partnerships. Empirical studies on livestock farming sustainability in Indonesia indicate that farming performance and external support systems significantly influence the long-term viability of rural agricultural enterprises (Sulistyati et al., 2026). These findings underscore the importance of coordinated policy frameworks and institutional collaboration in modernizing the dairy industry.

Government policy also plays a central role in shaping the dairy sector's development trajectory. Strategic policy interventions aimed at improving human resource capacity, strengthening farmer mentoring programs, and enhancing supply chain infrastructure have been identified as critical priorities for increasing dairy productivity and farmer welfare (Putra, 2025). Such initiatives highlight the need for a comprehensive approach that integrates technological innovation, capacity building, and institutional support to achieve sustainable sectoral development.

In parallel with technological and institutional transformation, the protection of intellectual assets has become an increasingly important strategic consideration for innovation-driven organizations. Intellectual property rights provide legal mechanisms that allow firms to protect their innovations, including product formulations, packaging technologies, and branding strategies. Effective intellectual property management not only safeguards proprietary knowledge but also enhances organizational competitiveness and investor confidence. Research on digital governance and intellectual property rights demonstrates that integrating intellectual property management into broader digital governance frameworks enables organizations to strengthen innovation capacity while supporting sustainable business growth (Wimpertiwi et al., 2024).

Private sector participation also contributes significantly to technological advancement in the dairy industry. Partnerships between multinational dairy processors and local farmers facilitate knowledge transfer, training, and technology adoption that improve production efficiency and product quality. These collaborations often involve contractual arrangements that encourage farmers to adopt modern production practices while ensuring a consistent supply for processing companies (Budiman & Alta, 2022). Such partnerships illustrate how industry collaboration can accelerate technological diffusion within agricultural value chains.

Looking ahead, the Indonesian dairy industry must also prepare for long-term structural changes driven by environmental sustainability and the climate transition. Strategic scenario analyses suggest that the development of the dairy sector will depend on firms' and policymakers' ability to adapt to emerging challenges, such as climate change, shifting regulatory frameworks, and evolving consumer expectations regarding sustainability (Usman et al., 2025). These future-oriented perspectives highlight the importance of proactive strategic planning in ensuring the long-term resilience of the dairy industry.

Considering these diverse challenges and opportunities, the transformation of the Indonesian packaged milk industry requires a comprehensive approach that integrates innovation governance, institutional reform, technological adoption, and intellectual property protection. A structured innovation framework that aligns organizational strategy with long-term business objectives is essential for guiding this transformation. Such a framework must enable firms to systematically manage innovation processes, coordinate stakeholder collaboration, and protect valuable intellectual assets generated through research and development activities.

Therefore, this study aims to examine how innovation governance and intellectual property management can function as key drivers of organizational transformation within the Indonesian packaged milk industry. By integrating insights from innovation management, agricultural economics, and institutional governance, the research seeks to provide a comprehensive framework for understanding how firms can strengthen their innovation capabilities while contributing to the sustainable development of the national dairy ecosystem.

2. Literature Review

2.1 Innovation Governance and Organizational Transformation

Innovation has long been recognized as a fundamental driver of organizational transformation and economic development. In contemporary industries characterized by technological disruption and increasing market competition, firms must continuously develop new products, processes, and business models to sustain competitiveness. Within this context, innovation governance plays an essential role in guiding how organizations structure, manage, and evaluate their innovation activities. Innovation governance refers to institutional arrangements, decision-making mechanisms, and strategic frameworks that enable firms to generate and implement innovative ideas while maintaining alignment with organizational objectives.

In emerging economies, the need for effective innovation governance becomes even more pronounced due to institutional constraints and resource limitations. Research on the Indonesian dairy industry demonstrates that innovation activities often occur within fragmented ecosystems where multiple actors operate independently with limited coordination (Hardiyati et al., 2025). This fragmentation creates systemic inefficiencies that hinder knowledge exchange and reduce the overall effectiveness of innovation initiatives. Without clear governance mechanisms that coordinate stakeholders across the value chain, innovation efforts tend to remain isolated and fail to generate significant sector-wide transformation.

Organizational transformation in the dairy sector also requires integrating technological innovation with managerial adaptation. Sitompul and Borbély (2026) highlight that resilient dairy supply chains depend on organizations' ability to combine operational stability with innovative managerial practices. Their systematic review shows that organizations that integrate technological innovations with adaptive management strategies are better positioned to respond to disruptions, such as global crises and supply chain instability. This finding suggests that innovation governance should not be viewed solely as a technological issue but also as a managerial and institutional challenge.

However, much of the existing literature focuses primarily on technological adoption while neglecting the governance structures that coordinate innovation processes. Studies examining technology adoption among smallholder dairy farmers reveal that technological initiatives frequently fail because cooperative institutions lack effective monitoring and enforcement mechanisms (Akzar et al., 2024). In such cases, the absence of governance structures undermines the sustainability of innovation adoption even when technologies are readily available. These findings indicate that technological innovation must be accompanied by institutional and organizational reforms to achieve meaningful transformation.

The role of institutional governance is further emphasized by research examining the legal and regulatory framework of Indonesian cooperatives. Asmara et al. (2026) argue that the current cooperative regulatory system remains outdated and insufficient to support modern economic activities. The lack of governance standards, transparency mechanisms, and accountability structures limits cooperatives' ability to function effectively as innovative intermediaries. Given that cooperatives serve as critical connectors between farmers and industry actors, weaknesses in cooperative governance can significantly impede the diffusion of innovation across the dairy sector.

Taken together, these studies highlight the importance of innovation governance as a multidimensional concept that encompasses managerial practices, institutional frameworks, and regulatory systems. Organizational transformation therefore requires not only the adoption of new technologies but also the establishment of governance mechanisms that coordinate innovation activities across the entire industry ecosystem.

2.2 Innovation Ecosystems and Cluster-Based Development

Innovation rarely occurs in isolation within individual firms. Instead, it emerges through complex interactions among multiple actors within broader economic ecosystems. The concept of innovative ecosystems emphasizes the role of collaboration, knowledge exchange, and institutional coordination in fostering technological development and economic growth. In agricultural sectors such as dairy production, innovation ecosystems typically involve farmers, cooperatives, processing companies, research institutions, and government agencies.

Empirical studies on the Indonesian dairy industry reveal that the effectiveness of the innovation ecosystem is often constrained by weak coordination among stakeholders. Hardiyati et al. (2025) identify several systemic problems within the dairy innovation ecosystem, including limited integration between actors, fragmented policy interventions, and insufficient collaboration between industry and research institutions. These structural challenges limit the sector's ability to generate and implement innovative solutions that could enhance productivity and competitiveness.

Cluster-based development has been proposed as a potential strategy to strengthen innovation ecosystems in the agricultural industry. Prihartini et al. (2022) demonstrate that dairy farming clusters can improve competitiveness by fostering partnerships, facilitating access to information, and encouraging knowledge sharing among stakeholders. Their research identifies

networking, expertise, and innovation capacity as key determinants of successful dairy clusters. The cluster model provides a platform for collective learning that enables farmers and firms to adopt new technologies and improve production efficiency.

Despite these benefits, cluster-based development also faces several limitations. The effectiveness of clusters depends heavily on the strength of institutional relationships and governance structures that facilitate collaboration among participants. In many cases, clusters fail to generate significant innovation outcomes because participating organizations lack the capacity to coordinate activities or share resources effectively. This limitation suggests that cluster development must be supported by robust governance frameworks that sustain stakeholder collaboration.

Private sector partnerships also play a critical role in strengthening innovation ecosystems. Budiman and Alta (2022) highlight how collaborations between dairy processors and smallholder farmers facilitate the transfer of technology and managerial knowledge. These partnerships often involve contractual arrangements that encourage farmers to adopt improved production practices while ensuring a consistent supply for processing companies. Such mechanisms demonstrate how vertical coordination within value chains can enhance technological diffusion and improve production performance.

However, reliance on private-sector initiatives alone may not be sufficient to address structural challenges in the dairy sector. Without supportive public policies and institutional frameworks, private-sector interventions may only benefit a limited group of farmers, leaving broader systemic issues unresolved. Consequently, a comprehensive approach that integrates public policy, institutional reform, and industry collaboration is required to strengthen the dairy innovation ecosystem.

2.3 Entrepreneurial Orientation and Innovation Capability

Entrepreneurial orientation represents another critical factor influencing innovation and organizational transformation. Entrepreneurial orientation refers to a firm's strategic posture characterized by innovation, proactiveness, and risk-taking. Firms with strong entrepreneurial orientation are more likely to explore new market opportunities, experiment with innovative business models, and adapt to changing environmental conditions.

Research on sociopreneurial behaviour in Indonesian dairy cooperatives indicates that leadership characteristics, such as empathy, social responsibility, and self-efficacy, significantly influence cooperative leaders' willingness to pursue innovative initiatives (Arrasyid et al., 2024). These findings highlight the importance of leadership in shaping organizational culture and promoting innovation within agricultural communities. Sociopreneurial leadership integrates economic objectives with social goals, thereby enabling organizations to address both market demands and community development needs.

Entrepreneurial capabilities are also closely related to marketing strategies and competitiveness. Sarma et al. (2021) demonstrate that entrepreneurial marketing practices significantly enhance the competitiveness of small and medium enterprises in agro-industrial sectors. Entrepreneurial marketing emphasizes innovation-oriented strategies, interactive customer engagement, and flexible market intelligence systems that enable firms to respond effectively to dynamic market conditions. The integration of entrepreneurial marketing with innovation management represents a powerful mechanism for strengthening organizational competitiveness.

Nevertheless, the development of entrepreneurial capabilities within the dairy sector is often constrained by limited human capital and institutional support. Putra (2025) identifies human resource capacity as a critical determinant of dairy sector productivity, emphasizing the importance of farmer mentoring programs and training initiatives. Without adequate education and skill development, farmers and small-scale entrepreneurs may struggle to adopt new technologies or implement innovative business strategies.

These findings suggest that entrepreneurial orientation alone is insufficient to drive sectoral transformation unless it is supported by appropriate institutional structures and capacity-building initiatives. Therefore, policies aimed at strengthening innovation in the dairy sector must simultaneously address leadership development, human capital formation, and institutional reform.

2.4 Institutional Support and Sustainability of Agricultural Innovation

The sustainability of innovation in agricultural industries depends heavily on institutional support systems that facilitate long-term development. Institutional support includes government policies, cooperative organizations, financial institutions, and research networks that collectively influence the performance of agricultural sectors. Empirical evidence from livestock farming systems indicates that external support mechanisms play a significant role in determining the sustainability of agricultural enterprises. Sulistyati et al. (2026) find that farming performance and external support factors significantly influence the sustainability of cattle farming operations in Indonesia. Their findings suggest that agricultural innovation is shaped not only by internal capabilities but also by the broader socio-economic environment in which farmers operate.

Government policies also play a central role in shaping agricultural innovation systems. Strategic policy interventions to improve infrastructure, enhance human resource development, and strengthen supply chain coordination are essential to increase productivity in the dairy sector (Putra, 2025). Such policy initiatives can help overcome structural barriers that limit technological adoption and the diffusion of innovation among farmers.

Furthermore, the long-term sustainability of the dairy industry must also consider environmental and climate-related challenges. Scenario-based analyses of Indonesia's dairy sector highlight the importance of strategic planning to prepare for future uncertainties arising from climate change and evolving regulatory environments (Usman et al., 2025). These studies emphasize the need for proactive strategies that integrate sustainability considerations into industry development plans.

2.5 Intellectual Property and Innovation Strategy

In knowledge-driven industries, intellectual property protection represents a critical component of innovation strategy. Intellectual property rights enable organizations to protect proprietary knowledge, prevent competitors from imitating their work, and secure economic returns from innovative activities. The growing importance of intellectual property management is particularly evident in the context of digital transformation. Research on digital governance frameworks demonstrates that effective integration of intellectual property management within digital systems can enhance organizational innovation capacity and promote sustainable business growth (Wimpertiwi et al., 2024). By protecting technological innovations and brand identities, firms can strengthen their competitive position in increasingly globalized markets.

However, intellectual property management remains underdeveloped in many agricultural sectors, including the dairy industry. Many firms focus primarily on production efficiency while neglecting the strategic value of intangible assets such as product formulations, processing technologies, and branding innovations. This oversight limits firms' ability to capture the full economic benefits of their innovative activities. Consequently, integrating intellectual property management into broader innovation governance frameworks is essential to strengthening the dairy industry's competitiveness. Effective intellectual property strategies not only protect innovative outcomes but also encourage organizations to invest more heavily in research and development.

Although existing studies provide valuable insights into various aspects of the dairy industry, the literature remains fragmented across several domains. Some studies focus on technology adoption among farmers, while others examine institutional governance, entrepreneurial orientation, or innovation ecosystems. Few studies have attempted to integrate these perspectives into a comprehensive framework that explains how innovation governance and intellectual property management jointly influence organizational transformation within the dairy sector.

Furthermore, many studies emphasize production-level challenges faced by farmers while paying little attention to the strategic management practices of dairy processing firms. Given the increasing importance of innovation in maintaining competitiveness within global food markets, understanding how firms manage innovation processes and protect intellectual assets becomes essential.

Therefore, this study aims to bridge these gaps by examining how innovation governance and intellectual property strategy function as key drivers of organizational transformation within the Indonesian packaged milk industry. By integrating insights from innovation management, institutional economics, and agricultural development, this research seeks to contribute to a more comprehensive understanding of how firms can strengthen their innovation capabilities while supporting the sustainable development of the dairy ecosystem.

3. Materials and Methods

3.1. Research Design

This study adopts a qualitative case study approach to examine how innovation governance and intellectual property management contribute to organizational transformation in the Indonesian packaged milk industry. A qualitative design was selected because the research objective requires an in-depth understanding of managerial practices, institutional arrangements, and strategic processes that cannot be adequately captured by quantitative measurement alone. The case study approach allows the exploration of innovation management practices within the real industrial context of the dairy sector.

To support systematic and transparent analysis, the study employed Computer Assisted Qualitative Data Analysis Software (CAQDAS), specifically NVivo version 14. The use of NVivo facilitates structured coding, thematic analysis, and visualization of relationships among key concepts related to innovation governance, entrepreneurial orientation, and intellectual property strategy.

3.2. Data Collection

The research relied on multiple sources of qualitative data to obtain a comprehensive understanding of innovation management practices in the Indonesian packaged milk industry. The dataset consists of three main document categories. First, theoretical literature was used to establish the conceptual foundation of the study. This literature includes key works related to

innovation management, entrepreneurship, and organizational transformation. These sources provide the theoretical framework that guides the interpretation of empirical findings.

Second, industrial documents were examined to capture practical insights into innovation governance practices within the dairy industry. These documents include strategic innovation blueprints, internal innovation management modules developed between 2014 and 2024, and industry reports describing market developments in the Indonesian dairy sector.

Third, regulatory and policy documents were analyzed to understand the institutional environment surrounding innovation and intellectual property management. These materials include legal frameworks related to intellectual property protection, food safety regulations, and policy guidelines governing dairy production and processing. Using multiple data sources enables triangulation and strengthens the robustness of the qualitative analysis.

3.3. Data Analysis

Data analysis was conducted through thematic analysis using NVivo. The analytical procedure consisted of several stages designed to systematically identify patterns related to innovation, governance, and organizational transformation. In the first stage, all documents were digitized and imported into NVivo as internal sources. This preparation stage enabled the integration of theoretical literature, industrial reports, and regulatory documents within a single analytical environment.

In the second stage, thematic coding was performed to identify key concepts emerging from the dataset. A hierarchical coding structure was developed based on the research's core constructs: entrepreneurial transformation, innovation governance, stage-gate management, and intellectual property management. Sub-themes were created to capture specific dimensions of innovation practices such as product diversification, risk management, and knowledge collaboration.

In the third stage, cross-thematic analysis was conducted using matrix coding queries. This procedure allowed the examination of relationships between different themes, particularly the interaction between innovative governance mechanisms and intellectual property protection practices. The analysis helped identify how governance structures influence the protection and commercialization of innovation outcomes.

In the final stage, visual analytical tools available in NVivo were used to illustrate conceptual relationships among the identified themes. Project maps and concept maps were developed to represent the transition from unstructured innovation processes toward more systematic innovation management frameworks. Word frequency analysis was also applied to identify dominant themes within the industry discourse, including agility, sustainability, and value creation.

3.4. Validity and Reliability

Several strategies were implemented to ensure the credibility and reliability of the qualitative findings. First, data triangulation was used by comparing insights from the theoretical literature, industrial documents, and regulatory materials. This approach helps reduce potential bias and enhances the robustness of interpretation. Second, an audit trail was maintained throughout the research process. NVivo memo features were used to document coding decisions, analytical reflections, and emerging interpretations. This documentation allows the analytical process to be reviewed and replicated by other researchers.

Third, thematic saturation was used as the criterion for concluding the coding process. Data analysis continued until no new themes emerged from the dataset, indicating that the major patterns relevant to innovation governance and organizational transformation had been sufficiently captured. Through these procedures, the study ensures methodological rigor while providing a comprehensive understanding of innovation governance practices in the Indonesian packaged milk industry.

4. Results

The thematic analysis conducted using NVIVO 14 provides evidence that organizational transformation in the Indonesian packaged milk industry is closely associated with changes in managerial orientation, innovation governance, and intellectual property management practices (see Figure 1). The coding results reveal several dominant themes that illustrate how firms are transitioning from traditional administrative management structures toward innovation-driven organizational models.

4.1 Entrepreneurial Orientation and Strategic Adaptability

The analysis indicates that the transformation toward innovation-oriented organizations is primarily driven by a shift in entrepreneurial agency within firms. The most frequently occurring coding nodes include strategic adaptability and opportunity pursuit, which reflect the industry's response to dynamic market conditions and technological change. Companies that demonstrate successful transformation tend to adopt an entrepreneurial management approach that prioritizes opportunity exploration rather than strict reliance on existing internal resources.

This entrepreneurial orientation allows firms to respond more effectively to evolving consumer demands, particularly the increasing interest in functional dairy products, healthier nutritional formulations, and environmentally friendly packaging. Instead of remaining constrained by established production routines or resource limitations, firms actively seek new market opportunities and experiment with innovative product concepts. The findings suggest that managerial willingness to pursue opportunities beyond current operational constraints is critical to enabling innovation-driven transformation in the packaged milk sector.

4.2 Transition from Unstructured Innovation to Stage-Based Governance

Another key finding concerns the evolution of innovation management structures within the industry. The analysis identifies a clear transition from unstructured innovation processes toward more systematic stage-based governance mechanisms. NVivo cluster analysis reveals a strong relationship between the implementation of stage gate evaluation systems and improved efficiency in research and development activities.

In the Indonesian dairy manufacturing context, the stage-gate approach serves as a structured decision-making process that evaluates innovation projects at multiple checkpoints. These checkpoints assess both technical feasibility and market potential before allocating additional resources to product development. Examples of innovation projects examined in the dataset include new ultra-high-temperature milk variants, plant-based dairy alternatives, and packaging innovations to extend product shelf life.

The adoption of stage gate governance enables firms to filter product ideas more effectively and reduce unnecessary investment in projects with limited commercial viability. By introducing systematic evaluation stages, companies can identify potential weaknesses early in development and discontinue unsuccessful projects before committing significant resources to full-scale production. This approach significantly reduces research and development waste while improving the overall efficiency of the innovation process.

4.3 Strategic Role of the Innovation Blueprint

The results also emphasize the importance of a formal innovation blueprint as a strategic framework for coordinating innovation initiatives across the organization. Matrix coding analysis shows that firms with clearly defined innovation blueprints achieve a significantly higher success rate in launching new products than those that rely on fragmented innovation initiatives.

The innovation blueprint serves as a strategic roadmap that aligns innovation activities with the company's long-term vision and operational objectives. It defines priority innovation areas, establishes performance indicators, and clarifies the roles of different departments involved in the innovation process. In the packaged milk industry, this coordination is particularly important because product development activities involve multiple functional units, including raw material procurement, production engineering, quality control, and marketing.

In the Indonesian context, the blueprint also facilitates compliance with regulatory requirements for food safety, product labeling, and nutritional standards. By integrating these regulatory considerations into their innovation strategy, firms can ensure that new products meet both market expectations and regulatory requirements. As a result, the innovation blueprint contributes not only to improved product development efficiency but also to greater organizational alignment and strategic consistency.

4.4 Open Innovation and Ecosystem Collaboration

The findings further highlight the increasing importance of collaborative innovation practices within the dairy industry. Word frequency analysis identifies collaboration and external knowledge as recurring themes across the dataset, suggesting that firms are increasingly engaging external partners to accelerate innovation.

Leading dairy companies have begun establishing partnerships with universities, research institutions, and technology startups to access specialized knowledge and technological expertise. Universities conduct scientific research in nutrition and food technology, while startups often develop innovative solutions in areas such as smart packaging, digital supply chain systems, and consumer analytics.

The integration of external knowledge sources enables firms to expand their innovation capabilities beyond internal research and development functions. In addition, digital technologies associated with Industry 4.0 allow firms to analyze consumer behavior patterns more effectively, providing valuable insights into regional consumption trends and evolving dietary preferences. These collaborative networks enhance firms' ability to respond to market changes and accelerate the commercialization of innovative products.

4.5 Intellectual Property Management and Competitive Sustainability

Finally, the analysis demonstrates that intellectual property management plays a crucial role in sustaining competitive advantage within the Indonesian packaged milk industry. NVivo project mapping reveals a strong

connection between intellectual property governance and long-term market sustainability.

Firms that actively manage intellectual property assets are better able to protect innovations such as proprietary milk formulations, specialized processing techniques, and distinctive product branding. By securing patents, trademarks, and other forms of intellectual property protection, companies can prevent competitors from imitating their products and preserve the economic value generated by research and development investments.

The findings also suggest that intellectual property management strengthens a firm's intangible asset base, enhancing investor confidence and improving the organization's resilience in highly competitive markets. In the context of the Indonesian dairy industry, where product differentiation is often limited, effective intellectual property strategies provide an important mechanism for maintaining strategic positioning and ensuring long term sustainability.

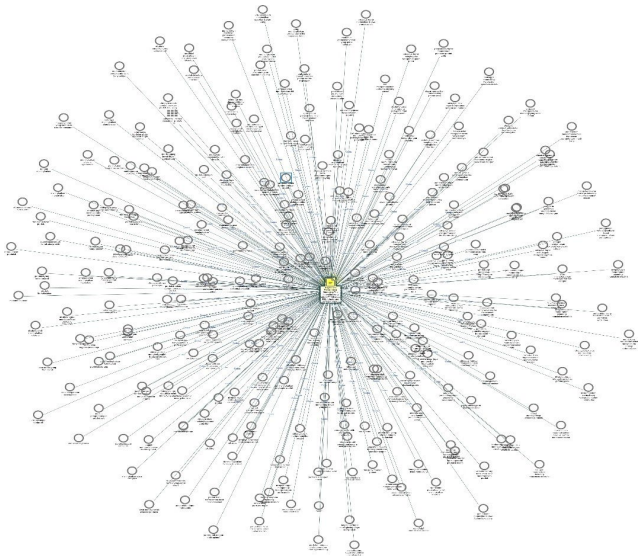

Figure 1. Result of Thematic Analysis using NVIVO-14 software

Figure 2 illustrates the strategic innovation framework implemented by PT Ultrajaya Milk Industry and Trading Company Tbk, which represents a practical manifestation of the innovation governance mechanisms identified in this study. The figure highlights four interconnected strategic pillars that collectively support organizational transformation in the Indonesian packaged milk industry. These pillars include advanced UHT technology, sustainable sourcing and corporate social responsibility, product diversification and nutrition innovation, and digital supply and distribution systems. Together, these components form a systemic innovation architecture centered on the Ultra Jaya Innovation Strategy.

4.6. Ultra Jaya Innovation Strategy within the Indonesian Packaged Milk Industry

Figure 2. Ultra Jaya Innovation Strategy on Indonesia Packaged Milk Industry

4.6.1. Technological Innovation through Advanced UHT Systems

The first strategic pillar focuses on technological leadership through advanced ultra-high temperature processing technology. This technology enables the company to extend product shelf life, maintain product safety, and improve production efficiency through automation. In the context of the results presented in this study, this pillar corresponds to the thematic node on technological capability and innovation governance. The use of advanced processing technology reflects the shift from traditional production management toward innovation-driven manufacturing systems.

The NVivo coding results identified technology-related themes as the dominant driver of innovation in the packaged milk industry, confirming that technological capability is a fundamental enabler of product innovation and operational efficiency. The integration of automation and advanced processing also aligns with the stage-based innovation governance model identified in the results section. By combining technological experimentation with systematic evaluation processes, firms can ensure that product innovations meet both technical feasibility requirements and market expectations before entering full-scale production.

4.6.2. Product Innovation and Market Responsiveness

The second pillar emphasizes product diversification and nutritional innovation. This component reflects the strategic importance of developing new product variants that respond to evolving consumer preferences and market trends. In the Indonesian dairy market,

consumers increasingly demand products that offer additional nutritional benefits, healthier ingredients, and convenient packaging. As a result, dairy producers must continually develop new product variants to meet these changing expectations.

The results of the thematic analysis demonstrate that product innovation represents the most visible manifestation of entrepreneurial transformation within the packaged milk industry. The coding analysis revealed that product-related themes appeared most frequently in the dataset, indicating that product diversification remains a central strategy for maintaining competitiveness. Within the innovation governance framework, product development activities are systematically evaluated through stage gate processes that assess market feasibility and production viability.

The product diversification pillar represents the practical implementation of the innovation funnel model described in the results section. By experimenting with new flavors, nutritional enhancements, and packaging formats, firms can explore multiple innovative pathways while ensuring that only commercially viable products progress toward large-scale manufacturing.

4.6.3. Sustainable Sourcing and Corporate Responsibility

The third pillar highlights sustainable sourcing and corporate social responsibility initiatives. This strategic component focuses on strengthening relationships with local farmers while promoting environmentally responsible production practices. Activities such as partnerships with dairy farmers, eco-friendly packaging development, and waste management programs demonstrate the integration of sustainability considerations into the company's innovation strategy.

From the perspective of the research findings, this pillar aligns with the broader innovation ecosystem framework outlined in literature. The results emphasized that successful innovation within the dairy industry requires collaboration among multiple stakeholders, including farmers, suppliers, research institutions, and regulatory agencies. Sustainable sourcing initiatives serve to strengthen the agricultural supply chain while ensuring long-term access to high-quality raw materials.

In addition, farmer partnerships help improve the productivity and welfare of dairy farming communities. By supporting local farmers through training programs, technological assistance, and long-term supply agreements, companies can enhance supply chain stability while fostering inclusive economic development within rural areas.

4.6.4. Digital Supply Chain Integration

The fourth pillar focuses on digital supply and distribution systems that enhance logistical efficiency and market responsiveness. The integration of digital technologies enables real-time monitoring of supply chain activities, improved inventory management, and more efficient product distribution. These capabilities allow companies to respond more quickly to fluctuations in market demand and optimize the flow of goods from production facilities to retail markets.

The findings of this study highlight that digital supply chain integration represents an important component of organizational transformation in the Industry 4.0 era. The NVivo word frequency analysis identified digitalization-related themes such as agility, real-time tracking, and value creation as emerging trends within the packaged milk industry. Digital supply chain systems enable firms to integrate operational data with market intelligence, improving decision-making processes across the organization.

Furthermore, digital technologies support the open innovation practices identified in the results. By utilizing data analytics and digital platforms, companies can collaborate more effectively with external partners such as research institutions and technology providers. These collaborations accelerate the development and commercialization of innovative products.

4.6.5. Integrated Innovation Architecture

The figure illustrates how technological innovation, product development, sustainability initiatives, and digital supply chain management interact within a unified innovation architecture. The central position of the Ultra Jaya Innovation Strategy within the framework reflects the role of strategic governance in coordinating these interconnected activities. Each pillar contributes to the broader objective of transforming the organization into an innovation-driven enterprise capable of responding to market disruption and technological change.

This integrated framework supports the study's key findings, which demonstrate that successful organizational transformation in the Indonesian packaged milk industry depends on the alignment of innovation governance, entrepreneurial orientation, and intellectual property management. By integrating technological capabilities, collaborative ecosystems, and strategic innovation planning, firms can build sustainable competitive advantages while contributing to the long-term development of the national dairy sector.

4.7. Innovation Management at PT Ultrajaya

Figure 3 presents the histogram of thematic coding results derived from NVivo analysis, illustrating how innovation activities are conceptualized and managed at PT Ultrajaya Milk Industry and Trading Company Tbk. The distribution of coding frequencies provides insight into the dominant themes shaping the company's innovation

strategy and organizational transformation in the Indonesian packaged milk industry.

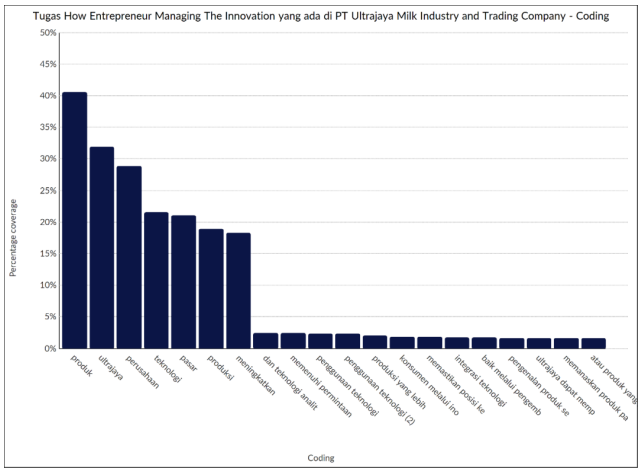

Figure 3. NVIVO Coding of Innovation Management at PT Ultrajaya

4.7.1. Dominance of Product-Oriented Innovation

The histogram indicates that the most dominant theme in the coding results is product, with approximately 40% coverage. This finding suggests that the organization's innovation management is strongly focused on product development as the primary outcome of strategic initiatives. Product innovation represents the most visible and market-oriented dimension of innovation in consumer goods industries, particularly in the dairy sector, where differentiation often occurs through new flavors, nutritional enhancements, and packaging variations.

The prominence of product-related coding aligns with the earlier results on the importance of pursuing entrepreneurial opportunities. Firms continuously experiment with new product concepts to respond to evolving consumer demands and maintain competitiveness in a highly dynamic market environment. The emphasis on product innovation also reflects the application of stage-based innovation governance, where multiple product ideas are evaluated before entering large-scale production.

4.7.2. Role of Technology in Innovation Capability

The second most prominent theme in the histogram is technology, with coverage slightly above 30%. This result indicates that technological capability plays a crucial role in enabling product innovation and operational efficiency within the company. Technological innovation is primarily associated with advanced ultra-high-temperature processing systems, automation technologies, and improvements in production engineering.

The strong presence of technology-related coding demonstrates that product innovation within the dairy industry is closely linked to process innovation. Improvements in processing technologies enable firms to extend product shelf life, enhance food safety, and maintain consistent product quality. In addition, technological investments support experimentation with new product formulations and packaging solutions that address consumer preferences for healthier and more sustainable dairy products.

4.7.3. Market Orientation and Production Integration

The third and fourth dominant themes are market and production, with coding coverage levels slightly below 30% and slightly above 20%, respectively. These findings indicate that innovation management at PT Ultrajaya is not limited to research and development activities but is integrated with market intelligence and operational capabilities.

Market-related coding reflects the company's strong orientation toward understanding consumer behavior, demand patterns, and competitive dynamics. By continuously monitoring market trends, the organization can identify emerging product innovation opportunities and adjust its strategic priorities accordingly. This market-driven approach ensures that innovative initiatives remain aligned with customer needs and industry developments. Production-related coding highlights the importance of operational efficiency in supporting innovative outcomes. The integration of production systems with innovation management ensures that new product concepts can be manufactured efficiently and on a scale. This integration is essential for transforming experimental ideas into commercially viable products.

4.7.4. Supporting Themes in Innovation Governance

Beyond the dominant themes of product, technology, market, and production, several lower-frequency coding categories also appear in the histogram. These themes include consumer demand, integration, logistics, supply chain management, and sustainability initiatives. Although these categories appear less frequently, they provide important supporting mechanisms that enable the overall innovation system to function effectively.

For instance, logistics and supply chain-related coding reflect the increasing importance of digital supply chain integration, which allows companies to track product distribution in real time and respond rapidly to fluctuations in market demand. Similarly, sustainability-related coding indicates growing attention to environmental responsibility and resource management within the company's innovation strategy.

4.7.5. Systemic Innovation Framework

Taken together, the coding results reveal that innovation at PT Ultrajaya is managed through an

integrated system that combines product development, technological capability, market orientation, and operational efficiency. Rather than functioning as isolated activities, these components interact within a coordinated innovation framework that supports the organization's strategic objectives.

The histogram provides empirical evidence supporting the study's broader findings on innovative governance. It demonstrates that successful organizational transformation in the Indonesian packaged milk industry requires aligning technological innovation, product diversification, market responsiveness, and efficient production systems. This integrated approach enables firms to maintain competitiveness while adapting to the rapidly evolving dynamics of the global dairy market.

The qualitative coding analysis indicates that innovation management at PT Ultrajaya Milk Industry and Trading Company Tbk is primarily characterized by product-oriented and technology-driven themes. The coding frequency results show that the most dominant category is product, with approximately 40% coverage. This is followed by references to Ultrajaya at about 32% and company-related discussions at about 29%. The prominence of product-related coding suggests that innovation discourse within the organization is strongly centered on product development as the primary output of strategic management rather than being limited to isolated technological or managerial activities.

A second cluster of dominant themes consists of technology, market, and production, with coverage levels of approximately 21%, 21%, and 19%, respectively. The presence of these themes indicates that innovation within the company is conceptualized as an integrated system that connects technological capability, production efficiency, and responsiveness to market demand. The relatively high frequency of technology-related coding reflects the firm's reliance on advanced processing systems, such as ultra-high-temperature technology and production automation, which are central components of its innovation strategy.

Additional themes with lower coding frequencies, typically between two and three percent, include increasing demand, consumers, integration, and product development. Although these themes appear less frequently, they represent important supporting mechanisms within the innovation system. These elements collectively reinforce the company's strategic emphasis on continuous improvement, customer responsiveness, and operational integration. In this sense, lower frequency codes function as enabling conditions that facilitate the implementation of the firm's broader innovation agenda.

The visual innovation framework further reinforces these findings by placing the Ultrajaya Innovation Strategy at the center of four interconnected strategic pillars. These pillars consist of advanced ultra high temperature technology, product diversification, digital supply and distribution systems, and sustainable sourcing combined with corporate social responsibility initiatives. This configuration illustrates that innovation within the company operates as a systemic and cyclical process rather than a linear sequence of activities. Each pillar contributes to the overall innovation architecture while simultaneously reinforcing the others.

The dominance of product related coding confirms that product innovation represents the most visible manifestation of entrepreneurial innovation within the company. This observation is consistent with classical innovation theory, which identifies product innovation as the most market facing form of innovation in consumer goods industries. In the dairy sector, where product differentiation is often limited by the standardized nature of milk products, innovation through nutritional enhancement, extended shelf life, and flavor diversification becomes strategically important for maintaining competitiveness.

The strong presence of technology-related themes also highlights the importance of process innovation within the company. Technological improvements, particularly through ultra-high temperature processing and automation systems, enable the firm to maintain high standards of product safety and quality while extending product shelf life. From a strategic perspective, this pattern suggests that the company adopts a hybrid innovation approach that combines technology-driven capabilities with market-driven product development. In this configuration, advanced processing technologies ensure operational reliability, while market insights guide product diversification and portfolio expansion.

Market and production-related coding further indicates that innovation management at Ultrajaya extends beyond traditional research and development functions and is embedded throughout the value chain. The integration of digital supply and distribution systems enables real-time monitoring of logistics operations and enhances the company's ability to respond to market fluctuations. Through digital coordination mechanisms, production decisions can be aligned more closely with consumer demand, thereby improving efficiency and reducing operational delays. This integrated approach reflects the principles of systems theory, which suggests that organizational innovation emerges through the interaction of multiple subsystems rather than isolated functional activities.

Although consumer and sustainability-related codes appear less frequently, their presence remains strategically significant. Sustainability initiatives such as environmentally friendly packaging, waste management programs, and partnerships with local dairy farmers represent long term investments that support the resilience of the company's supply chain. Rather than functioning as short-term innovation outputs, these initiatives serve as foundational elements that

strengthen the sustainability of the firm's innovation ecosystem. By incorporating sustainability considerations into its innovation framework, the company aligns its strategic objectives with broader environmental and social responsibilities.

The thematic coding results can be further interpreted through the matrix analysis presented in Table 1. The table identifies four major strategic themes that characterize the company's innovation system. The first theme concerns technological leadership, including subthemes on advanced ultra-high-temperature processing, automation technologies, and analytical production tools. Evidence from the coding analysis indicates that technology-related discussions appear prominently in the NVivo histogram and are reinforced by the presence of advanced processing technology nodes within the strategic innovation map. The strategic objective associated with this theme is to ensure product safety, extend shelf life, and maintain high production efficiency.

Table 1. Result of Thematic Analysis Matrix

Core Theme	Sub-Themes (Coding)	Evidence / Indicators	Strategic Objective
Technological Leadership	Advanced UHT processing, automation systems, analytical technology	High frequency of technology-related coding in NVivo histogram; presence of Advanced UHT node in the innovation strategy map	Ensure product safety, extend shelf life, and maintain high production efficiency
Product Innovation and Diversification	Development of new flavors, nutritional enhancement, health oriented dairy products	Product coding appears as the highest-ranked category (approximately 41 percent); multiple product innovation nodes were identified in the social network analysis diagram	Respond to evolving consumer health preferences and capture diverse market segments
Operational and Supply Chain Excellence	Real-time tracking systems, efficient logistics management, and integrated production and distribution	Digital Supply and Distribution pillar within the innovation framework; strong clustering of production and market-related coding themes	Improve market penetration and ensure seamless product availability across distribution networks
Sustainable Growth and Corporate Social Responsibility	Partnerships with dairy farmers, eco-friendly packaging initiatives, and sustainable sourcing practices	Sustainable Sourcing pillar in the innovation strategy framework; references to farmer welfare and environmental responsibility in coding results	Strengthen raw material supply chains and build long term brand equity through environmental and social responsibility

The second theme relates to product innovation and diversification. Subthemes include the development of new flavors, improved nutritional content, and health-oriented product variations. The coding results show that product-related themes account for the largest share of references in the dataset, consistent with the multiple product innovation nodes observed in the social network analysis diagram. The strategic objective of this theme is to address evolving consumer preferences while capturing new market segments.

The third theme concerns operational and supply chain excellence. This dimension includes subthemes related to real-time tracking systems, logistics efficiency, and digital supply chain integration. Evidence from the coding analysis shows that production and market-related clusters appear closely connected to the digital supply and distribution pillar within the innovation framework. The strategic objective associated with this theme is to improve market penetration and ensure efficient product availability across distribution networks.

The fourth theme focuses on sustainable growth and corporate social responsibility. Subthemes include partnerships with dairy farmers and the adoption of environmentally responsible packaging solutions. These elements are reflected in the sustainable sourcing pillar within the innovation strategy framework and are supported by coding references related to farmer welfare and community engagement. The strategic objective of this theme is to secure a stable supply of high-quality raw milk while strengthening long-term brand reputation through environmental and social responsibility initiatives.

The findings indicate that innovation management at PT Ultrajaya operates through a product- and technology-centered strategy, supported by strong market orientation and supply chain integration. The histogram shows that product-related coding accounts for the largest share of references, confirming that continuous product development remains the central mechanism through which the company sustains its competitive position. The social network analysis diagram further

illustrates that product development activities are closely connected to production technologies and quality management practices.

The transition toward digital supply and distribution systems also reflects a broader shift from traditional manufacturing practices toward data-driven decision-making. Market-related coding indicates that innovation initiatives are increasingly shaped by external demand conditions rather than purely internal operational considerations. Real-time tracking systems and digital logistics management play an important role in aligning production processes with evolving consumer preferences.

Sustainability initiatives represent another important dimension of the company's innovation strategy. By integrating sustainable sourcing practices and local-farmer partnerships into its innovation framework, the company adopts a circular approach to business development. These partnerships not only support the stability of raw material supply but also contribute to the socio-economic development of dairy farming communities.

Thus, the results demonstrate that PT Ultrajaya manages innovation through a centralized and integrated strategic framework. The innovation strategy functions as the central coordinating mechanism that connects technological capability, product development, market intelligence, and sustainability initiatives. This holistic entrepreneurial approach ensures that technological advancements are consistently aligned with market opportunities and social responsibilities. As a result, the company can strengthen its competitive advantage, improve organizational resilience, and sustain long-term growth within the Indonesian packaged milk industry.

5. Discussion

The findings of this study provide important insights into how innovation governance and intellectual property management contribute to organizational transformation within the Indonesian packaged milk industry. The results demonstrate that successful innovation management at PT Ultrajaya Milk Industry and Trading Company Tbk is characterized by an integrated framework that combines entrepreneurial orientation, technological capability, market responsiveness, and sustainability initiatives. These findings extend the understanding of innovation governance by illustrating how strategic coordination among multiple organizational functions can transform traditional manufacturing systems into innovation-driven enterprises.

5.1 Entrepreneurial Orientation as a Catalyst for Organizational Transformation

The first important insight concerns the role of entrepreneurial orientation in shaping organizational transformation. The coding results reveal that product innovation and opportunity exploration dominate the firm's innovation activities. This finding suggests that innovation in the dairy sector is driven primarily by entrepreneurial agency, where firms actively pursue new market opportunities rather than relying solely on existing production capabilities.

This observation is consistent with prior studies that emphasize the importance of entrepreneurial behavior in fostering innovation within agricultural industries. Research on sociopreneurial leadership among dairy cooperatives in Indonesia demonstrates that entrepreneurial motivation and social responsibility can stimulate innovation initiatives that improve both economic performance and community welfare (Arrasyid et al., 2024). Similarly, studies on entrepreneurial marketing indicate that innovation-oriented strategies enable firms to respond more effectively to dynamic market conditions and enhance competitiveness in agro-industrial sectors (Sarma et al., 2021).

The results of this study further suggest that entrepreneurial orientation is particularly important in industries with limited product differentiation. In the dairy sector, where core products such as milk are relatively standardized, innovation often occurs through incremental improvements, such as nutritional enhancements, packaging innovations, and flavor diversification. These forms of innovation allow firms to create unique value propositions while maintaining operational efficiency.

However, entrepreneurial orientation alone cannot guarantee successful innovation outcomes. Without effective governance mechanisms, innovation initiatives may remain fragmented or poorly coordinated. Therefore, the transformation toward innovation-driven organizations requires structured management systems that align entrepreneurial initiatives with long-term strategic objectives.

5.2 Innovation Governance and the Transition to Structured Innovation Systems

A second key finding concerns the transformation of innovation processes from unstructured experimentation to systematic innovation governance. The results indicate that PT Ultrajaya employs a structured innovation framework that integrates product development, technological capability, and market intelligence within a coordinated decision-making system. This finding supports earlier research suggesting that innovation governance plays a critical role in improving organizational efficiency and reducing research and development risks. In the dairy sector,

structured innovation processes enable firms to evaluate product concepts more effectively before committing resources to large-scale production. Such governance mechanisms are particularly important in food manufacturing industries, where product failures can lead to significant financial losses and regulatory challenges.

The importance of governance structures is also highlighted by studies examining the Indonesian dairy innovation ecosystem. Hardiyati et al. (2025) argue that the lack of coordination among industry actors represents one of the major barriers to innovation within the dairy sector. Their research shows that fragmented institutional relationships often prevent effective knowledge exchange and technological diffusion. By implementing structured innovation governance mechanisms, firms can overcome these coordination challenges and integrate innovation activities across organizational units.

Furthermore, the transition toward structured innovation governance aligns with broader trends observed in global supply chains. Sitompul and Borbély (2026) demonstrate that resilient dairy supply chains increasingly depend on integrating technological innovation with managerial adaptation. Firms that combine operational continuity with strategic innovation management are better positioned to respond to market disruptions and maintain long term competitiveness.

5.3 Innovation Ecosystems and Collaborative Networks

Another important dimension of the findings concerns the role of collaboration within the broader dairy innovation ecosystem. The results highlight that innovation at PT Ultrajaya is not limited to internal research and development activities but is supported by partnerships with external stakeholders such as farmers, suppliers, and technology providers. This observation reinforces the concept of innovation ecosystems, which emphasizes that innovation outcomes often emerge from interactions among multiple actors within a networked environment. Studies on the Indonesian dairy sector indicate that effective collaboration among stakeholders can significantly improve productivity and technological adoption (Hardiyati et al., 2025).

Cluster-based development also plays an important role in facilitating innovation within agricultural industries. Prihartini et al. (2022) demonstrate that dairy farming clusters contribute to regional competitiveness by strengthening partnerships, improving access to information, and encouraging knowledge sharing among farmers and industry actors. These clusters foster an environment where innovation can emerge through collective learning and collaboration.

Private sector initiatives further contribute to the development of innovation ecosystems within the dairy industry. Partnerships between multinational processors and local farmers facilitate the transfer of technology and managerial knowledge that improve production efficiency and product quality (Budiman & Alta, 2022). Such collaborations enable farmers to adopt modern production techniques while providing processing companies with reliable sources of high-quality raw materials.

However, the effectiveness of these collaborative systems depends heavily on the strength of institutional governance frameworks. Research on cooperative organizations in Indonesia indicates that outdated regulatory structures often limit cooperatives' ability to support innovation and economic development (Asmara et al., 2026). Strengthening cooperative governance represents a critical step in improving the functionality of the dairy innovation ecosystem.

5.4 Digital Transformation and Supply Chain Integration

The findings also reveal the growing importance of digital technologies in shaping innovation management within the dairy sector. The integration of digital supply chain systems enables firms to monitor logistics operations in real time, improve inventory management, and respond more rapidly to market fluctuations. Digital transformation has become a key driver of innovation across many industries, particularly in manufacturing and agribusiness. Digital governance frameworks enable organizations to integrate data analytics, automation, and market intelligence into their strategic decision-making processes.

In the context of Indonesian SMEs, digital governance and intellectual property management have been shown to enhance innovation capacity and support sustainable business growth (Wimpertiwi et al., 2024). The use of digital technologies also facilitates closer coordination between production systems and market demand. By analyzing consumer behavior and regional consumption patterns, firms can adjust production strategies to meet evolving market preferences. This integration of digital analytics with innovation governance enables organizations to maintain competitiveness in increasingly dynamic market environments.

5.5 Sustainability and Long-Term Industry Transformation

Sustainability considerations represent another important aspect of innovation within the dairy sector. The findings show that sustainable sourcing initiatives and partnerships with local farmers form a key component of PT Ultrajaya's innovation strategy. These initiatives contribute to both environmental sustainability and supply chain stability.

Research on livestock farming systems indicates that the sustainability of agricultural enterprises depends heavily on external support mechanisms such as institutional partnerships and government policies (Sulistyati et al., 2026). Similarly, studies on dairy sector development emphasize the importance of improving human resource capacity and strengthening farmer support programs to enhance productivity and long-term sustainability (Putra, 2025).

Looking ahead, sustainability challenges related to climate change and environmental regulation are expected to significantly influence the dairy industry's development. Scenario planning research suggests that strategic adaptation will be essential to ensuring the long-term resilience of the Indonesian dairy sector (Usman et al., 2025). Firms that integrate sustainability considerations into their innovation strategies are therefore more likely to maintain competitiveness in evolving global markets.

5.6 Intellectual Property Management and Competitive Advantage

Finally, the study highlights the strategic role of intellectual property management in protecting innovation outcomes and sustaining competitive advantage. In industries characterized by rapid technological change, intellectual property rights provide firms with mechanisms to safeguard proprietary knowledge and prevent competitors from imitating it. The findings indicate that intellectual property governance strengthens the company's intangible asset base while enhancing investor confidence and market positioning.

This observation is consistent with research demonstrating that effective intellectual property management contributes to sustainable innovation and long-term business growth (Wimpertiwi et al., 2024). Within the dairy sector, intellectual property protection is particularly important because innovations often involve proprietary formulations, processing techniques, and branding strategies. By securing patents and trademarks, firms can ensure that the economic benefits generated through innovation are retained within the organization.

6. Conclusions

This study examined how innovation governance and intellectual property management contribute to organizational transformation in the Indonesian packaged milk industry, using PT Ultrajaya Milk Industry and Trading Company Tbk as an illustrative case. The findings demonstrate that successful transformation from a traditional manufacturing organization into an innovation-driven enterprise depends on integrating entrepreneurial orientation, structured innovation governance, technological capability, and intellectual property protection within a coherent strategic framework.

The results indicate that product innovation represents the central manifestation of entrepreneurial activity in the packaged milk sector. Firms continuously develop new product variants, nutritional improvements, and packaging solutions in order to respond to evolving consumer preferences and maintain competitiveness in a market characterized by product standardization. At the same time, technological capability plays a crucial enabling role in supporting these innovations. Advanced processing technologies and automation systems allow firms to enhance product safety, extend shelf life, and improve operational efficiency, thereby providing the technological foundation for product diversification.

Another important finding concerns the role of innovation governance in structuring the innovation process. The transition from unstructured experimentation toward systematic innovation management enables firms to evaluate product concepts more effectively and reduce the risks associated with research and development investments. The implementation of a strategic innovation blueprint further strengthens organizational coordination by aligning innovation initiatives with long term business objectives and regulatory requirements. This governance framework ensures that innovation activities are integrated across functional units, including production, marketing, supply chain management, and sustainability initiatives.

The study also highlights the importance of collaboration within the broader dairy innovation ecosystem. Partnerships with farmers, research institutions, and technology providers enhance the organization's capacity to access external knowledge and improve supply chain stability. These collaborative networks contribute to the development of sustainable sourcing practices and strengthen the dairy industry's resilience.

In addition, intellectual property management emerges as a critical mechanism for protecting innovative outcomes and maintaining competitive advantage. By securing patents, trademarks, and proprietary production processes, firms can safeguard their innovations and strengthen their intangible asset base. Effective intellectual property governance complements innovation management by ensuring that the economic benefits of research and development activities are retained within the organization.

Thus, the findings suggest that organizational transformation in the Indonesian packaged milk industry requires a holistic innovation strategy that integrates product development, technological advancement, digital supply chain integration, sustainability initiatives, and intellectual property protection. Such an integrated approach not only enhances the competitiveness of individual firms but also contributes to the long-term development of the national dairy ecosystem. By adopting structured innovation governance and

proactive intellectual property management, dairy companies can strengthen their resilience amid market disruption while creating sustainable value for industry stakeholders and society.

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