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ENHANCING NEW PRODUCT DEVELOPMENT IN R&D UNITS IN A FOOD INGREDIENT COMPANY

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Acceptance Page

This special problem of **JUAN PAULO V. PEDRO** titled "**Enhancing New Product Development in R&D Units in a Food Ingredient Company**" is hereby accepted by the Faculty of Management and Development Studies, U.P. Open University, in partial fulfilment of the requirements for the degree Master of Research and Development Management.

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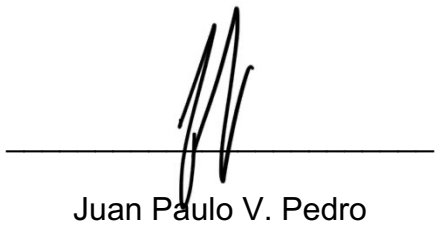
DECLARATION

This is to certify that:

I. The special problem comprises only my original work towards the MR&DM except where indicated in the Preface

II. Due acknowledgment has been made in the text to all other material used

III. The special problem is fewer than 25,000 words in length, exclusive of tables, maps, bibliographies and appendices.



Juan Paulo V. Pedro

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Abstract

The global food ingredient industry is under increasing pressure to respond rapidly to changing consumer preferences, regulatory demands, and sustainability goals. Traditional new product development (NPD) models—such as stage-gate systems—have proven too rigid to meet these evolving demands, particularly in multinational companies managing geographically dispersed innovation teams. This study aims to develop a practical framework to enhance NPD responsiveness, coordination, and consumer alignment in R&D units of a global food ingredient company.

Using a qualitative case study approach, the research draws on structured questionnaires, semi-structured interviews, and internal documentation to identify key barriers and enablers of innovation performance. Data analysis was guided by five thematic enablers: global coordination, consumer insight integration, cross-functional collaboration, lean and agile practices, and digital tools. The findings highlight systemic challenges in fragmented innovation governance, underutilized market insights, rigid processes, and limited digital integration.

The study proposes a framework designed to address these gaps and strengthen innovation effectiveness. While focused on a single case, the results offer practical relevance for other food ingredient companies seeking to accelerate NPD cycles and deliver more market-aligned, scalable innovation in complex global environments.

I. INTRODUCTION

The global food ingredient industry is evolving rapidly due to changing consumer demands, sustainability pressures, and technological advances. Multinational companies are expected to deliver agile, consumer-relevant innovation while managing geographically dispersed R&D teams and aligning with global strategies. In this environment, new product development (NPD) has become a critical capability—but one that faces persistent structural and operational challenges.

Traditional NPD models, such as stage-gate processes, often struggle to support the flexibility and speed required in today's dynamic markets. Within multinational organizations, innovation is further complicated by fragmented coordination, inconsistent integration of consumer insights, and limited collaboration across key functions such as marketing, supply chain, and technical service. These issues undermine the ability to bring scalable, market-aligned solutions to commercialization.

While lean and agile approaches are gaining attention in food innovation, much of the existing literature focuses on startups or centralized R&D environments. Less is known about how these practices can be adapted for large, matrixed organizations with regional and global responsibilities.

This study focuses on enhancing NPD within a multinational food ingredient company by addressing three core challenges: coordinating innovation across regional teams, embedding diverse consumer insights into development cycles, and strengthening cross-functional collaboration. Guided by five thematic enablers—global coordination, insight integration, cross-functional governance, lean/agile practices, and digital tools—the study aims to develop a practical framework to improve

innovation responsiveness, alignment, and execution. The findings aim to support not only the company under study but also other ingredient firms facing similar complexities in managing innovation at scale.

Problem Statement

The global food ingredient industry is rapidly evolving due to shifting consumer preferences, sustainability demands, and technological advancements. To compete, multinational companies must have effective and agile new product development (NPD) across their R&D units. However, NPD efficiency and effectiveness can be hindered by several interconnected challenges: firstly, the complexity of coordinating innovation and ensuring responsiveness across geographically dispersed R&D teams to diverse market demands; secondly, the difficulty of effectively integrating diverse consumer insights into actionable product development strategies across regions; and thirdly, the challenge of fostering seamless collaboration across key functions within a global context. Addressing these challenges is vital for *many* multinational food ingredient companies to optimize its NPD and sustain its leadership. Therefore, this study aims to answer: How can a multinational food ingredient company, and specifically the company under study, enhance its NPD processes to improve coordination and responsiveness across regional R&D teams, effectively integrate diverse consumer insights, and foster seamless collaboration across key functions in a global context?

Objectives of the Study

This study aims to achieve the following objectives within the context of a specific multinational food ingredient company. Firstly, it will analyze the challenges faced by multinational food ingredient companies, with a focus on the company under study, in coordinating innovation and ensuring responsiveness across geographically dispersed R&D teams to diverse market demands. Secondly, the study will evaluate the effectiveness of how these companies, and particularly the company under study, integrate diverse consumer insights into actionable product development strategies across different regions. Thirdly, it will investigate the challenges and strategies involved in fostering seamless collaboration across key functions (e.g., R&D, marketing, production, and supply chain) within a global context to enhance NPD efficiency and effectiveness. Finally, the study will develop a framework, informed by the case study findings, to enhance NPD processes by improving coordination and responsiveness across regional R&D teams, the integration of diverse consumer insights, and collaboration across key functions."

Significance of the Study

This study contributes a practical and context-driven framework to enhance new product development (NPD) processes in multinational food ingredient companies. By focusing on the specific case of a company with globally coordinated but regionally executed innovation activities, the study addresses three critical challenges: coordinating innovation across geographically dispersed R&D teams,

integrating diverse consumer insights into product development, and fostering cross-functional collaboration across key departments.

The proposed framework offers a structured pathway to improve responsiveness, efficiency, and strategic alignment in NPD execution. It is intended for practical use by R&D managers, innovation leads, and cross-functional teams who seek to drive faster, more market-relevant innovation in complex organizational settings.

Beyond its application within the company under study, the findings provide valuable insights and strategies for other multinational food ingredient firms with similar organizational models. The thematic enablers identified—global coordination, consumer insight integration, collaboration, agility, and digital enablement—are widely relevant and adaptable across regions and functions. As such, this research contributes not only to solving an internal organizational problem but also to the broader discourse on agile, insight-led innovation in the global food ingredient industry.

II. REVIEW OF LITERATURE

The evolving landscape of the global food ingredient industry, marked by increasing consumer expectations, regulatory pressures, and the need for speed-to-market, places growing demands on R&D teams. Traditional product development models, such as the stage-gate process, often lack the flexibility and responsiveness required in this dynamic environment. For multinational food ingredient companies, the challenge is further compounded by the need to coordinate innovation across geographically dispersed R&D units, effectively integrate diverse consumer insights, and foster seamless collaboration across technical and commercial functions. To address these demands, the literature offers a range of approaches — from lean and agile innovation methodologies to cross-functional synergy models and data-driven decision frameworks. This review explores key themes that form the theoretical foundation for enhancing new product development (NPD) in food ingredient R&D units, providing the basis for the framework proposed in this study.

Global Coordination in Multinational R&D Settings

Multinational food ingredient companies operate within increasingly complex ecosystems, where innovation must address both global strategic priorities and local market needs. Coordinating new product development (NPD) across geographically dispersed R&D units presents significant challenges, particularly in aligning resources, timelines, and innovation goals. As firms expand regionally, the risk of fragmented innovation pipelines increases, often leading to inconsistent execution, duplicated

efforts, and a lack of visibility into long-term strategic initiatives (Botero Montoya et al., 2024).

Effective global coordination requires a balance between centralization—where innovation governance, standards, and platforms are unified—and decentralization, which empowers regional teams to tailor solutions for their local markets. Trott (2012) highlights that successful global R&D management depends on a company's ability to maintain strategic alignment while allowing operational flexibility. This duality is especially critical in food ingredient development, where regional regulatory requirements, taste preferences, and manufacturing capabilities can significantly influence product design.

Scholars have proposed various models to address these challenges. The concept of a "globally integrated innovation network" (Winby & Worley, 2014) advocates for shared innovation goals, interconnected knowledge platforms, and distributed leadership across R&D locations. Such models promote collaboration through defined roles, joint decision-making structures, and shared digital systems that enhance transparency and knowledge flow. Additionally, the integration of collaborative platforms—such as cloud-based project dashboards—can support real-time coordination and improve visibility into project progress across regions (Niewöhner et al., 2019).

However, despite these frameworks, organizational fragmentation often persists due to structural silos, unclear innovation ownership, and the lack of a formalized global innovation roadmap. Ahmed et al. (2020) note that the absence of cross-regional governance mechanisms can hinder responsiveness and delay the commercialisation of promising ideas. In food ingredient companies, where speed and market relevance are critical, such delays can erode competitive advantage.

To overcome these limitations, researchers have emphasized the role of innovation steering teams, regional innovation champions, and portfolio governance systems. These approaches ensure accountability, drive prioritization, and enable faster decision-making. When combined with clear performance metrics and defined touchpoints between global and regional teams, companies can streamline NPD efforts while remaining responsive to market dynamics (Grimsby, 2024).

In sum, literature on global R&D coordination underscores the need for a hybrid innovation structure—one that leverages the strengths of centralized strategic alignment while enabling local execution. For food ingredient companies navigating rapid consumer shifts and diverse regional demands, building such a structure is fundamental to sustaining innovation effectiveness across borders.

Consumer Insight Integration in Product Development

Integrating consumer insights into new product development (NPD) is increasingly recognized as a critical driver of market-relevant innovation in the food ingredient industry. As consumer expectations shift rapidly—toward clean-label formulations, plant-based diets, and functionality-driven ingredients—R&D teams must develop processes that not only capture these insights but translate them into actionable product strategies. Yet, in many organizations, especially those with B2B business models, the integration of insights into technical formulation remains inconsistent and informal (Solaimani et al., 2019).

Historically, food ingredient innovation was driven more by internal capabilities and customer requests than by direct consumer research. However, the expansion of digital trend-monitoring platforms such as Mintel, Euromonitor, and Innova Market

Insights has enabled faster access to consumer sentiment, competitor benchmarking, and category innovation trends. Despite this availability, the lack of structured frameworks for embedding insights into R&D decisions continues to be a barrier (Mayo-Alvarez et al., 2024). This disconnect often leads to missed opportunities, late-stage product pivots, or launches that fail to meet evolving market expectations.

Effective insight integration requires both systems and culture. Ries (2011) emphasizes the importance of early consumer validation and continuous feedback loops in reducing innovation risk—principles now being adopted in food ingredient companies to co-develop prototypes with customers or simulate end-product applications early in the process. These approaches mirror the “build-measure-learn” cycle from lean innovation, tailored to technical formulation and application testing. However, such practices are only effective when cross-functional teams—especially R&D and marketing—collaborate in framing insights and setting shared project priorities (Rame et al., 2024).

A recurring challenge in ingredient companies is that insights are often filtered through commercial channels such as sales or purchasing teams, which may distort or narrow their strategic relevance. Without early and structured alignment between market intelligence, consumer research, and R&D, companies risk over-reliance on anecdotal input or requests that do not reflect true market potential. Grimsby (2024) notes that companies with formalized insight-to-innovation pathways—often supported by digital dashboards or foresight teams—achieve stronger alignment between product development and category growth opportunities.

To address these gaps, several studies advocate the use of innovation scorecards, consumer opportunity maps, and iterative product validation protocols. When institutionalized, these tools help shift insight integration from a reactive to a

proactive function—ensuring that consumer needs are embedded not just at the start, but throughout the product development process (Botero Montoya et al., 2024).

In summary, while access to consumer insight is no longer a constraint, the ability to act on it systematically and collaboratively remains a critical competency. For food ingredient companies seeking to stay ahead of emerging trends, building structured processes and cross-functional alignment for insight integration is essential for successful and scalable innovation.

Cross-Functional Collaboration and Innovation Governance

In innovation-intensive industries such as food ingredients, cross-functional collaboration is essential for aligning product development with technical feasibility, market relevance, and operational scalability. Yet, many organizations continue to operate in functional silos, where R&D, marketing, supply chain, and production teams pursue parallel objectives with limited coordination. This structural separation undermines efficiency, slows down time-to-market, and contributes to inconsistent innovation outcomes (Cooper, 2008).

Cross-functional synergy enables more effective prioritization of projects, quicker decision-making, and improved adaptability during the product development process. According to Brechner (2015), collaborative innovation models—such as Kanban or Scrum—enhance team transparency, foster shared accountability, and allow iterative learning across departments. These methodologies have been successfully adapted beyond software and manufacturing, into food innovation, particularly where multidisciplinary inputs are required, such as in functional or plant-based ingredient development.

Despite the known benefits, food ingredient companies often face internal barriers to collaboration, including unclear roles in innovation projects, overlapping decision rights, and a lack of shared metrics. Niewöhner et al. (2019) argue that without structured governance mechanisms—such as project steering committees, innovation charters, and cross-functional accountability frameworks—collaboration tends to break down at the interface of technical and commercial teams. This results in late-stage trade-offs or compromises that diminish product impact and delay commercialization.

Innovation governance is a key enabler of cross-functional alignment. When companies define clear ownership for innovation projects, align KPIs across departments, and embed collaboration into standard operating procedures, they create conditions where teams can co-create solutions rather than operate reactively. George (2003) highlights the importance of structured innovation workflows supported by visual project management tools, which improve focus and transparency across dispersed teams.

Importantly, cross-functional collaboration is not only a structural issue but also a cultural one. Organizations with low innovation maturity often struggle to foster open communication, risk-sharing, and trust between departments. As Ahmed et al. (2020) emphasize, leadership plays a critical role in setting the tone for collaboration by establishing shared goals, enabling experimentation, and rewarding joint success.

For food ingredient companies working in diverse regulatory and market environments, fostering cross-functional collaboration supported by strong innovation governance structures is fundamental. It ensures not only smoother project execution but also more relevant, scalable, and differentiated solutions in an increasingly competitive landscape.

Lean and Agile Innovation Methodologies

In response to the limitations of traditional stage-gate frameworks, many R&D organizations are adopting lean and agile innovation methodologies to improve speed, responsiveness, and alignment with market needs. Originally developed for manufacturing and software development, these methodologies emphasize iterative development, rapid feedback loops, and value-driven decision-making—principles that are increasingly relevant in food ingredient R&D, where consumer preferences and regulatory requirements are constantly evolving (Ries, 2011; Solaimani et al., 2019).

The Lean Startup approach, popularized by Ries (2011), introduces the concepts of minimum viable products (MVPs), validated learning, and build-measure-learn cycles. These tools are used to reduce risk in early-stage innovation by focusing on consumer response rather than internal assumptions. In food ingredient companies, MVPs take the form of early prototypes, pilot plant trials, or customer-specific samples co-developed to test functionality, sensory profile, or performance in application. When used effectively, these cycles allow for faster iteration and early failure, avoiding costly downstream reformulations.

Agile methodologies such as Scrum and Kanban have also been adapted to food product development to support transparency, cross-functional communication, and speed. As Winby and Worley (2014) point out, agile teams that operate with shared goals, regular stand-ups, and short development sprints are more responsive to customer feedback and better equipped to manage uncertainty in complex product formulations. These methods are especially valuable in project environments with high uncertainty, such as functional ingredient innovation or clean-label reformulation.

However, adopting lean and agile approaches in food ingredient R&D is not without challenges. Regulatory compliance, safety validations, and shelf-life stability testing can lengthen timelines and reduce flexibility. Rauch et al. (2017) highlight that in regulated industries, lean implementation must be adapted to incorporate necessary checkpoints without sacrificing agility. This has led to the rise of hybrid innovation models that blend agile principles with structured stage-gate gates—ensuring that risk management and responsiveness coexist within the development process.

Organizational mindset also plays a pivotal role. As Niewöhner et al. (2019) argue, lean innovation is not just about tools and processes—it requires cultural shifts, leadership support, and training to embed continuous improvement across teams. In this context, agile and lean serve not only as methodologies but as guiding principles for managing change, uncertainty, and customer-driven innovation.

Overall, literature supports the increasing relevance of lean and agile frameworks in the food ingredient industry. When thoughtfully adapted to regulatory and operational realities, these approaches offer a pathway to more efficient, iterative, and consumer-responsive product development.

Digital and Data-Driven Tools in New Product Development

As food ingredient companies face pressure to accelerate innovation and respond to evolving consumer trends, digital and data-driven tools are becoming critical enablers of more efficient and market-aligned product development. These tools support earlier decision-making, enhance visibility across global teams, and strengthen the integration of real-time consumer insights, contributing to greater agility and responsiveness in the NPD process.

Artificial intelligence (AI), predictive analytics, and digital dashboards are now increasingly used to track market signals, simulate formulations, and monitor project performance. AI-powered trend platforms like Mintel and Euromonitor allow companies to analyze consumer sentiment, identify emerging themes, and benchmark competitors. These insights are most valuable when integrated early in the innovation process, informing concept validation, go-to-market timing, and category-level opportunity mapping (Mayo-Alvarez et al., 2024).

Internally, digital dashboards and collaboration tools improve coordination across geographically dispersed teams by enabling real-time updates, shared timelines, and transparent task ownership. This is especially important in multinational food ingredient companies, where lack of visibility into regional project pipelines can lead to duplication of efforts or delays in project transfer. According to Botero Montoya et al. (2024), embedding digital workflows in R&D functions improves alignment between local execution and global innovation priorities.

Blockchain technology, although still emerging in food applications, has shown promise in supporting traceability and transparency in ingredient sourcing. This is particularly relevant for sustainability-driven innovation, where companies must verify the ethical and environmental attributes of their raw materials. Rame et al. (2024) suggest that distributed ledger technologies can improve supply chain data integrity and enable more credible sustainability claims, which are increasingly demanded by both consumers and regulatory bodies.

Another promising application is in formulation optimization and ingredient performance prediction. Through machine learning, companies can simulate ingredient interactions, predict stability, and accelerate reformulation. However, full adoption of such technologies is limited by skill gaps, high implementation costs, and

the need for integration with legacy systems (Grimsby, 2024). Overcoming these barriers requires targeted investment in digital transformation and cross-functional training to build internal capability.

In conclusion, digital and data-driven tools are not standalone solutions but strategic enablers that must be integrated into the broader innovation ecosystem. When used effectively, they support faster and more accurate decision-making, foster collaboration across regions and functions, and improve the success rate of new product development in the highly dynamic food ingredient industry.

Summary of Key Themes

The literature reviewed highlights five interrelated themes that underpin effective innovation in multinational food ingredient companies. First, global coordination in R&D is essential to balance central strategic priorities with local responsiveness. Without clear governance structures and aligned innovation roadmaps, geographically dispersed teams struggle to drive cohesive innovation outcomes.

Second, the integration of consumer insights into product development has shifted from a marketing-led function to a critical enabler of market-driven innovation. However, many companies lack structured processes to translate consumer intelligence into actionable R&D strategies, resulting in a gap between product development and market needs.

Third, cross-functional collaboration emerges as a foundational requirement for innovation success, particularly in complex environments where technical feasibility, regulatory compliance, and market viability must converge. Literature underscores the

need for both cultural alignment and formal governance mechanisms to foster synergy across R&D, marketing, production, and supply chain teams.

Fourth, lean and agile innovation methodologies offer a response to the limitations of traditional, linear models. When adapted to the regulatory and operational context of food ingredient R&D, these approaches enable faster iteration, reduced development risk, and improved responsiveness to consumer trends.

Lastly, digital and data-driven tools are transforming how food ingredient companies gather insights, coordinate projects, and optimize formulations. While adoption is uneven, these technologies offer significant potential to enhance efficiency, collaboration, and market foresight when embedded in a broader innovation framework.

Together, these themes provide a comprehensive foundation for the framework proposed in this study, which aims to improve the responsiveness, efficiency, and market alignment of new product development in food ingredient R&D units.

Research Framework

This study is guided by a research framework that integrates key theoretical foundations, conceptual themes, and methodological structure to address the central question: *How can a multinational food ingredient company enhance its new product development (NPD) processes to improve coordination and responsiveness across regional R&D teams, effectively integrate diverse consumer insights, and foster seamless collaboration across key functions?*

The framework is informed by relevant theories and practices in innovation management, including lean and agile methodologies (Ries, 2011; Solaimani et al.,

2019), cross-functional governance (Cooper, 2008; Niewöhner et al., 2019), and data-driven innovation (Mayo-Alvarez et al., 2024). These theoretical underpinnings are contextualized through five core themes identified in the review of literature: (1) global coordination of R&D, (2) consumer insight integration, (3) cross-functional collaboration and governance, (4) lean and agile innovation, and (5) digital and data-driven enablers.

The framework operates on the premise that innovation in multinational food ingredient companies is influenced by both structural and behavioral factors. Key challenges identified in the problem statement—such as fragmented R&D coordination, weak insight-to-innovation translation, and process rigidity—are examined through these five thematic lenses. These themes serve as both diagnostic tools and design elements for the proposed framework to enhance NPD.

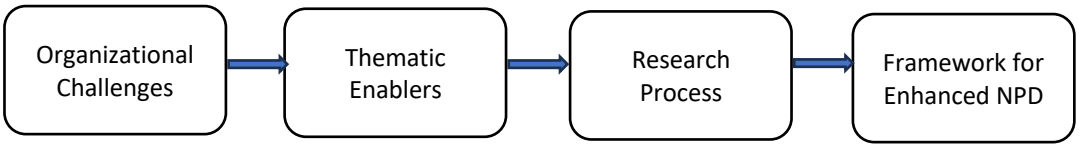
Components of the Research Framework:

1. **Organizational Challenges (Inputs):** Fragmented coordination across global R&D teams, limited integration of consumer insights, ineffective cross-functional collaboration, rigid stage-gate processes, underutilization of digital tools
2. **Thematic Enablers (Analytical Lenses)**: Global coordination structures, consumer insight integration, cross-functional collaboration and governance, lean and agile innovation practices, digital and data-driven tools
3. **Research Process (Methodological Flow)**: Qualitative case study approach, structured questionnaires and semi-structured interviews, thematic analysis of qualitative data, triangulation with company documents and industry reports

4. **Expected Output (Framework for Enhanced NPD)**: A practical and customizable framework that enhances R&D efficiency, responsiveness, and cross-regional alignment, recommendations for integrating agile processes, structured insight mechanisms, and digital enablers into the company's innovation model

This framework links theory to practice and guides the study in identifying root causes, analyzing gaps, and proposing structured improvements to the company's innovation strategy. It is designed to be applicable not only to the company under study but also to other food ingredient organizations facing similar NPD challenges in complex, globalized environments.

Figure 1. Research Framework for Enhancing NPD in R&D Units in a Food Ingredient Company.



This research framework serves as the foundation for the case study methodology discussed in the following section.

III. METHODOLOGY

Research Design

This study uses a qualitative case study approach to examine how new product development (NPD) processes in R&D units can be enhanced to improve coordination, consumer alignment, and cross-functional collaboration. Guided by a research framework grounded in five thematic enablers identified through literature, the study aims to understand current practices and challenges and to propose a framework for more responsive and effective innovation. The case study design is particularly suited for analyzing organizational dynamics, uncovering contextual insights, and translating findings into a practical framework tailored to the company's operations.

Locale of the Study

The study was conducted within a multinational food ingredient company with regional R&D teams operating across Asia and global R&D members supporting a central global role. The research focused on understanding how innovation is managed across these regions, with particular attention to interaction points between regional teams and global technical support functions. The company's technical service, application development, and product innovation functions served as the primary units of observation.

Data Collection Methods

Multiple data sources were employed to gather both technical and organizational perspectives:

a. Structured questionnaires were distributed to regional NPD stakeholders to capture existing practices, perceived gaps, and opportunities for improvement.
b. Semi-structured interviews were conducted with R&D leaders, product developers, and commercial managers, providing deeper insight into cross-functional dynamics, consumer alignment, and coordination practices.
c. Internal documentation such as project tracking tools, innovation governance frameworks, and regional development reports were reviewed to triangulate perspectives and map formal versus actual NPD processes.

Sampling and Participants

Purposive sampling was used to select participants from both regional and global roles directly involved in the company's NPD efforts. Participants represented functions such as R&D, marketing, technical service, supply chain, and commercial teams. The sample was designed to capture cross-functional and cross-regional perspectives, ensuring a holistic view of the innovation process across the company.

Data Analysis

The data were analyzed using thematic analysis, structured around five thematic enablers:

1. global coordination,
2. consumer insight integration,
3. cross-functional collaboration and governance,
4. lean and agile innovation, and
5. digital and data-driven tools.

A hybrid deductive–inductive approach was applied. Initial codes were developed based on the research framework and expanded based on emerging themes from the data. Patterns were examined to identify key gaps, inefficiencies, and opportunities to enhance NPD. Triangulation across interviews, questionnaires, and documents was used to ensure consistency and validity of insights.

Scope and Limitations

This study explores the new product development (NPD) process within a multinational food ingredient company, with a focus on regional R&D operations in Asia and their interaction with global teams. It investigates innovation coordination, consumer insight integration, cross-functional collaboration, agile practices, and digital enablers.

The scope is limited to a single organization, which may affect the generalizability of findings to other contexts. Data collection relied on a qualitative approach involving a relatively small number of purposely selected respondents, which, while yielding rich insights, may not capture the full diversity of perspectives across the company. Additionally, the study reflects practices and viewpoints at a

specific point in time and may not account for future organizational or industry changes.

Despite these limitations, the study offers a practical, context-based framework with relevance for similar firms navigating complex, globally distributed innovation environments.

Ethical Considerations

Participants were fully informed of the study's objectives, and informed consent was obtained prior to data collection. All identifying information was removed during transcription and analysis. The study adhered to ethical research principles, particularly those concerning voluntary participation, confidentiality, and responsible reporting of findings.

Summary of Methodology

In summary, the methodology employed in this study was designed to align with the research framework and objectives. By using a qualitative case study approach and drawing insights from multiple internal stakeholders, the study was able to explore NPD challenges and enabling factors across regional and global R&D roles. The use of thematic analysis grounded in literature-supported themes ensured that findings were not only context-specific but also theoretically informed. The methodology provided a strong foundation for developing a practical framework to enhance innovation performance in a multinational food ingredient company.

IV. RESULTS AND DISCUSSION

The results of the study were analyzed using the five thematic enablers defined in the research framework: global coordination, consumer insight integration, cross-functional collaboration and governance, lean and agile innovation, and digital and data-driven tools. These themes served as analytical lenses for interpreting insights drawn from questionnaires, semi-structured interviews, and internal document reviews. The themes were derived through a structured process in which the research framework provided the basis for analysis, while patterns and perspectives that consistently emerged across data were identified and mapped to the themes. Triangulation of findings from multiple data sources further strengthened the validity of the themes, ensuring they reflected both the intended focus of the study and the practical realities observed in the organization. Below is a synthesis of the findings for each theme:

1. Global Coordination of R&D

Feedback from both questionnaire respondents and interview participants highlighted fragmented coordination between regional and global R&D teams. Regional teams operate independently, with minimal visibility into each other's projects, leading to duplicated efforts and inconsistent project prioritization. One interviewee noted that "there is no single view of our regional pipeline," emphasizing the lack of centralized governance. This was reinforced by the review of internal documents, which showed no structured tool for aligning regional initiatives with global innovation priorities or timelines.

2. Consumer Insight Integration

Questionnaire data revealed that while trend reports and market feedback are accessible, they are often not systematically incorporated into early-stage product development. Interviews further emphasized that insight integration typically happens reactively—once a product has already been developed or during customer trials. A recurring theme was the absence of a structured process to translate consumer insights into actionable technical briefs. Supporting documentation reviewed (e.g., innovation playbooks and project brief templates) showed no formal mechanism for capturing and applying insights during the concept development phase.

3. Cross-Functional Collaboration and Governance

Interviews with technical and commercial leads identified significant challenges in aligning expectations, roles, and timelines across departments. Questionnaire responses echoed these concerns, with 3 of the 5 participants indicating that collaboration between R&D, marketing, and production teams was insufficient and 1 respondent describing it as somewhat adequate. Interviewees including a product developer, a customer innovation manager and regional R&D leads highlighted unclear roles, late involvement of marketing and supply chain, and inconsistent accountability as key barriers. As the product developer cited: “It’s challenging to get all functions on the same page at the same time. A regional R&D lead added: “Communication is the main area to improve”. Internal governance documentation confirmed that while cross-functional reviews occur, they are often late-stage or driven by problem resolution rather than proactive planning.

4. Lean and Agile Innovation Practices

From both survey data and interviews, it became evident that the NPD process is predominantly linear and rigid, with limited opportunities for iteration or early validation. Several interviewees, including a product developer, a customer innovation manager and regional R&D leads, noted that most projects follow a stage-gate-like structure, with long timelines and minimal flexibility once projects begin. Interviewees expressed interest in adopting a more iterative, test-and-learn approach but noted the absence of institutional tools (e.g., sprints, prototypes, rapid feedback loops). No documentation was found suggesting the use of lean/agile rituals or processes in current NPD practice.

5. Digital and Data-Driven Tools

The use of digital tools in innovation management was described by many participants as ad hoc and inconsistent. Questionnaire responses indicated that teams maintain their own trackers, while interviews revealed that there is no centralized dashboard for viewing or prioritizing innovation projects. Several R&D leads expressed the need for shared tools to improve transparency and speed up decision-making. A review of current documentation showed that while project trackers exist, they are not integrated across regions or functions and lack real-time accessibility.

These findings confirm that challenges in the company's innovation process are multi-dimensional, spanning structural, procedural, and cultural gaps. Importantly, the alignment of these challenges with the five enabler themes provides a clear foundation for designing a responsive and fit-for-purpose NPD framework—one that enables more coordinated, insight-driven, agile, and digitally supported innovation.

Broader Implications for the Organization

The findings of this study have implications that extend beyond the internal challenges of a single company and reflect broader structural issues common in the food ingredient industry, particularly within multinational organizations.

At the organizational level, the results demonstrate that innovation performance is not limited by technical capability, but rather by the absence of integrated systems that connect people, insights, and processes. The lack of structured global coordination, fragmented ownership of innovation activities, and weak linkage between consumer insights and product design all point to systemic misalignments that hinder responsiveness and scalability. These gaps, if unaddressed, can result in innovation pipelines that are reactive, siloed, and disconnected from long-term strategic goals.

The thematic alignment of these challenges with the research framework also reinforces the need for a shift in how innovation is managed—moving away from rigid, linear models and toward more agile, iterative, and insight-driven approaches. The findings highlight that lean and agile practices are not yet embedded in the company's NPD model, despite being well-documented as best practices in literature. Similarly, digital enablement—although increasingly available—is underutilized, creating missed opportunities for faster decision-making and cross-functional alignment.

Beyond the case company, these insights are relevant for other food ingredient firms navigating the tension between global standardization and local market responsiveness. As consumer demands evolve rapidly and sustainability, cost, and nutrition become even more critical, companies must rethink how innovation is

operationalized. This includes building integrated systems for real-time insight translation, fostering shared accountability across functions, and adopting agile mindsets to navigate uncertainty.

Ultimately, the study underscores that successful innovation requires not only technical excellence but also organizational readiness. Addressing the identified enablers—coordination, insights, collaboration, agility, and digital tools—can help companies build NPD models that are fit for the future, particularly in increasingly dynamic and fragmented regional markets.

V. SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

This final section summarizes the key findings of the study, draws conclusions based on the research objectives, and presents recommendations for enhancing new product development (NPD) processes within multinational food ingredient companies. These are based on the thematic analysis of data gathered from questionnaires, interviews, and internal documentation, and are organized according to the five enabler themes identified in the research framework. Broader implications and areas for future research are also outlined to guide continued exploration and application of the proposed framework.

The study uncovered systemic inefficiencies within the company's current new product development (NPD) process, highlighting structural, procedural, and cultural barriers to innovation effectiveness. Analysis of questionnaire responses, interviews, and internal documents revealed five key areas aligned with the research framework's thematic enablers:

1. **Global Coordination of R&D**: Innovation efforts are fragmented across regions, with limited alignment on priorities, leading to duplicated work and lack of long-term strategic focus. A regional R&D lead noted that "there is no clear view of the full project pipeline across regions", resulting in teams unknowingly working on similar initiatives. Internal documentation confirmed the absence of regional innovation pipelines or steering teams to govern activities at the regional and global levels.
2. **Consumer Insight Integration**: Insights are not systematically embedded into product development cycles. Most market knowledge is derived from sales or

purchasing functions, reducing the strategic application of consumer intelligence. One commercial stakeholder highlighted that “market insights to guide us are often drawn only from interactions with customer purchasing teams, not their respective market or innovation teams”. Internal documents pointed to absence of a structured approach to harvest consumer insights, with limited evidence of formal processes for validating proof points prior to launch.

3. **Cross-Functional Collaboration and Governance**: Operational silos and unclear ownership across R&D, marketing, and supply chain teams hinder efficient project execution and decision-making. A product developer shared that “it’s challenging to get all functions on the same page at the same time”, while a regional R&D lead noted that “communication is the main area to improve”. Questionnaire data showed that 3 of 4 respondents viewed collaboration between R&D, marketing, and production as insufficient, with gaps in early functional involvement contributing to delayed decisions and handover issues.
4. **Lean and Agile Innovation Practices**: The existing process remains rigid, following a traditional stage-gate model with limited room for iteration or early consumer validation. Several interviewees, including a customer innovation manager and regional R&D leads, expressed interest in adopting a more iterative, test-and-learn approach using tools such as sprints, fast-track systems, and rapid feedback loops. A customer innovation manager emphasized that “agile methodology could help improve flexibility and responsiveness”, while internal documents provided no evidence of institutionalized lean or agile practices in current NPD processes.

5. **Digital and Data-Driven Tools**: There is minimal use of centralized dashboards or predictive analytics, resulting in underutilization of digital capabilities to support insight generation and project visibility. Interviewees highlighted the lack of an integrated platform for tracking development activities, with one respondent noting that “we don’t have an effective and systematic approach to harvest and consolidate insights”. Internal governance reviews similarly showed no established digital tools for managing cross-regional innovation data.

These findings confirm that the challenges are multidimensional and interlinked, requiring a holistic and structured approach to improvement.

Conclusion

This study set out to enhance the responsiveness, coordination, and consumer relevance of new product development (NPD) within a multinational food ingredient company. Through a qualitative case study approach and grounded in a five-theme research framework, the study identified systemic barriers and enablers that influence innovation outcomes across globally distributed R&D teams.

The findings underscore that the organization’s innovation performance is not limited by technical capacity, but by fragmentation in coordination, underutilized consumer insights, siloed collaboration, and rigid development models. These constraints reflect deeper organizational misalignments between strategic ambition and operational execution—common across many global firms navigating complex market demands.

By aligning the observed gaps with the five thematic enablers—global coordination, consumer insight integration, cross-functional collaboration, lean/agile innovation, and digital enablement—this study developed a practical framework designed to improve NPD effectiveness. The proposed framework encourages a shift from traditional, linear approaches toward more flexible, insight-led, and digitally supported innovation systems.

While the research is grounded in a specific company context, its insights offer broader relevance for food ingredient firms seeking to improve innovation responsiveness in complex and dynamic environments. More importantly, it contributes to ongoing discourse in innovation management by illustrating how integrated enablers can be operationalized within R&D-intensive industries.

Ultimately, effective innovation is not only about creating new products—it requires systems that connect strategic vision, consumer understanding, and organizational agility. Building such systems is essential for sustaining innovation performance in a market landscape defined by speed, complexity, and change.

In conclusion, this study provides a grounded and practical contribution to the ongoing challenge of optimizing new product development within multinational food ingredient companies. By uncovering systemic barriers and aligning them with thematic enablers, it offers a clear pathway toward more agile, coordinated and consumer-responsive innovation practices. Although centered on a single organization, the insights and proposed framework hold broader relevance and may serve as a useful reference for firms facing similar complexities in managing innovation. The findings reinforce that sustained innovation performance depends not only on technical excellence, but also on strategic alignment, empowered teams, and a culture of continuous improvement.

Recommendations

Based on the findings of this study, several strategic and operational recommendations are proposed to enhance new product development (NPD) practices within the company and support managers, R&D personnel, and the broader organization in addressing key barriers. These recommendations operationalize the practical NPD framework developed in this study, enabling stakeholders to apply its principles in improving innovation performance.

First, it is recommended that formal global coordination mechanisms be established to ensure alignment of regional projects with long-term strategic goals. This includes the formation of a global NPD steering team with clear roles and accountabilities, and the introduction of centralized project dashboards to provide visibility on regional pipelines and minimize duplication of efforts. These measures will help managers and leaders strengthen portfolio-level decision-making, improve transparency, and foster strategic alignment.

Second, the integration of consumer insights into early-stage development should be institutionalized. This can be achieved through the standardization of insight-to-brief tools, structured validation protocols, and the adoption of digital trend platforms that enable real-time consumer and market intelligence. These tools will support technical and commercial teams in co-creating solutions that are aligned with market needs and reduce the risk of late-stage rework.

Third, cross-functional collaboration should be strengthened by defining shared accountabilities, establishing joint key performance indicators (KPIs), and ensuring

early-stage alignment across R&D, marketing, technical service, and supply chain teams. Regular cross-functional reviews at key project milestones should be formalized to promote shared ownership and improve execution efficiency.

Fourth, the company should adopt more agile and iterative NPD practices by evolving beyond rigid stage-gate models toward sprint-based frameworks that allow for early prototyping, rapid feedback loops, and iterative development. Training programs on agile methodologies for R&D and project managers, combined with pilot initiatives, can help embed these practices effectively across teams.

Fifth, digital enablement must be accelerated through the implementation of integrated collaboration platforms, predictive analytics, and formulation simulators that support data-driven decision-making and faster development cycles. These tools will empower managers and personnel to respond more quickly to market shifts and consumer demands.

Finally, strategic alignment between global innovation platforms and regional execution models should be reinforced. Developing a comprehensive innovation roadmap that links platform-level strategies with regional plans will help ensure that innovation investments translate into scalable, market-relevant outcomes, enabling leaders to connect strategic vision with operational delivery.

Future Research Directions

To build on the findings of this study and extend its applicability, several future research directions are proposed. One area for further investigation is the validation of the proposed NPD framework across different business units, product categories,

or regions. Comparative case studies or longitudinal research could help assess the adaptability and impact of the framework under varying organizational contexts.

A second research opportunity lies in quantifying the contribution of the five thematic enablers to innovation outcomes such as speed-to-market, product launch success rate, or consumer acceptance. Employing mixed-method or quantitative approaches would offer deeper insight into the specific levers that most strongly influence innovation effectiveness.

Third, future studies may examine the role of emerging digital and AI-powered tools in enhancing NPD responsiveness. Areas of interest include the use of AI for trend detection, predictive formulation tools, and cross-regional innovation dashboards. Fourth, there is potential to explore best practices in agile NPD models from adjacent industries—such as pharmaceuticals, personal care, or fast-moving consumer goods—and assess their applicability to the food ingredient sector.

Finally, further research could focus on the development of maturity models or diagnostic tools that evaluate how effectively consumer insights are embedded into the NPD process across functions and project phases. Such tools could help organizations benchmark their practices and identify areas for strategic improvement.

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APPENDICES

Appendix A

Questionnaire Template

Demographics and Role

1. What is your role within the R&D team?
    - Project Manager
    - Product Application
    - Quality Control
    - Other (please specify)

2. How long have you been working in product development at this company?
    - Less than 1 year
    - 1-3 years
    - 4-7 years
    - More than 7 years

Current Product Development Practices

3. Which methods or processes does your team currently use for product development? (Select all that apply)
    - Stage-gate process
    - Adaptive planning methods
    - Rapid prototyping and minimal viable product method
    - Custom in-house methods
    - Other (please specify)

4. How well do you feel these current methods support efficient and timely product development?
    - Very effective
    - Effective
    - Neutral
    - Ineffective
    - Very ineffective

5. What are the main challenges you face in the product development process? (Open-ended)

Responsiveness to Market Trends and Consumer Demands

6. How often are consumer trends or market insights included in product development decisions?
    - Always
    - Often
    - Sometimes
    - Rarely
    - Never

7. How well do you feel the current product development process adapts to market trends and changing consumer needs?

- Very well
- Well
- Neutral
- Poorly
- Very poorly

8. What are the biggest factors that make it difficult for your team to adapt products to meet consumer demands? (Open-ended)

Efficiency and Adding Value

9. How would you rate the efficiency of current practices in product development?
    - Highly efficient
    - Efficient
    - Neutral
    - Inefficient
    - Highly inefficient

10. What strategies or changes do you believe would make your team's product development process more efficient and effective? (Open-ended)

11. Do you think there is enough collaboration between R&D, marketing, and production teams?
    - Yes
    - Somewhat
    - No
    - Please elaborate (Open-ended)

Agility and Improvement

12. How important is flexibility and adaptability (agility) in the product development process for your role?
    - Extremely important
    - Important
    - Neutral
    - Not very important
    - Not at all important

13. Are there any tools, methods, or practices that you think could help improve flexibility and responsiveness in the product development process? (Open-ended)

Appendix B

Interview Questions

Describe Your Development Process

- Could you walk us through a typical product development cycle in your role?
- What are the main steps you follow?

Incorporating Customer Needs

- How do you make sure that new products match what consumers want?
- Are there particular strategies you use to track customer preferences?

Teamwork Across Departments

- In what ways do you work with other departments to develop new products?
- What are the positive outcomes of this collaboration, and what challenges have you faced?

Responding to Market Changes

- How does your team respond to sudden changes in the market or shifts in customer preferences?
- Are there any specific tools or strategies that help with this?

Importance of Feedback

- How important is feedback from customers or other teams in shaping your products?
- Could you share an example of when feedback influenced a product?

Efficiency and Improvement

- Are there areas where the product development process could be more efficient?
- "If you could suggest any changes, what would they be?

Using Data for Better Decisions

- How do you use data, like customer insights or industry research, to improve product decisions?
- Are there certain types of data that you find most helpful?

Tools and Techniques for Improvement

- What changes do you think could improve the product development process in your team?

- Are there any tools or methods that could help improve the speed or quality of product development in your team?

Appendix C

Confidential Innovation Analysis (Confidential)

This appendix contains a detailed innovation analysis report related to the company's practices, challenges, and strategic initiatives. Due to the confidential nature of the content, the full document is not included in this manuscript. Access to the analysis can be granted upon request, subject to confidentiality agreements and approval from authorized personnel.