



**UNIVERSITY OF THE PHILIPPINES
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MASTER OF RESEARCH AND DEVELOPMENT MANAGEMENT

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**CAPACITATING RESEARCH AND DEVELOPMENT MANAGERS IN THE FOOD
MANUFACTURING INDUSTRY FOR ENHANCED MANAGEMENT**

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May 15, 2025

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ACCEPTANCE PAGE

This Special Problem titled: “**CAPACITATING RESEARCH AND DEVELOPMENT MANAGERS IN THE FOOD MANUFACTURING INDUSTRY FOR ENHANCED MANAGEMENT**” is hereby accepted by the Faculty of Management and Development Studies, U.P. Open University, in partial fulfillment of the requirements for the degree Master of Research and Development Management.


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BIOGRAPHICAL SKETCH

Filipina L. Purugganan is currently the R&D Director at Big E Food Corporation and has over 35 years of experience in the food industry in the Philippines. She holds a Bachelor of Science degree in Chemistry from Far Eastern University in Manila Philippines, and a Diploma in R&D Management from the University of the Philippines Open University. Throughout her career, Filipina has been at the forefront of innovation in bakeshops, restaurant operations, and the manufacturing of bakery products, focusing on the development of new products and the renovations of product quality. She led numerous successful projects that have resulted in industry-leading bakery products. Her new products were among the best and included in the best dessert by the Philippine Daily Inquirer in 2013 and Asia's 100 Best Desserts in the same year for Caramia. She is also responsible for the flagship product of one of the leading bakeshop shops, the Triple Chocolate Roll. Known for her expertise in product development, manufacturing applications, and R&D Strategies, Filipina was able to increase productivity in her current department, resulting in an increase in sales through its new product launches. She actively participated in local and international industry exhibitions and conferences, and mentors upcoming food researchers and managers.

ACKNOWLEDGEMENT

I would like to extend my heartfelt thanks to my family for their unwavering support and encouragement throughout this journey of writing this paper. Your love, patience, and belief in me have been a constant source of strength. Special thanks to my Special Project Adviser, Professor Jaine C. Reyes, who provided not only technical assistance but also moral support. Her dedication to MRDM is truly admirable, and her insights were invaluable to the completion of this paper. I would also like to express my gratitude to the respondents of my research for their time and valuable input, as well as my colleagues in the industry for their support and guidance. Your contributions have played a vital role in shaping this work, and I am deeply appreciative.

DEDICATION

This work is lovingly dedicated to my family, Eric, my husband and children Joyce and John.

To my children, may you always cherish and enjoy the journey of learning and the limitless possibilities of learning that education brings. Remember that knowledge is a God-given talent that must be treasured and shared, it is a powerful tool, and with dedication and perseverance, you can conquer challenges and achieve dreams into reality. To God be the glory.

Warm regards,

Fil

ABSTRACT

This study investigated the gaps that exist in the organizational structure and professional skill sets of research and development teams in the food manufacturing sector in the Philippines. The study focused on R&D managers whose roles and responsibilities have shifted to meet the growing demands of industrialization and globalization. R&D managers not only have to manage a more diverse team of equals but also lead from within a hierarchy that defies both the vertical and horizontal structures of conventional organizations. In this research, three broad foci within which R&D managers operated were identified. Moreover, their needs in professional skills and competencies were examined, namely, 1) core skills for innovation management, such as leadership and knowledge management; 2) obstacles to skill development, including scant resources and faulty organizational culture; and 3) professional development opportunities. Finally, the research analyzed opportunities for enhancing critical thinking, problem-solving, and stakeholder engagement to strengthen R&D managers' innovation leadership competency. These results highlighted the necessity for strategic interventions, such as leadership development and the transformation of organizational culture, to close these gaps and enhance the overall management of innovation in food manufacturing.

Keywords: *R&D management, innovation, food manufacturing, organizational culture, skill gaps, leadership, professional development.*

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LIST OF ABBREVIATIONS

R&D - Research and Development

NPD - New Product Development

IDI - In-depth Interview

FGD - Focus Group Discussion

Chapter I

THE RESEARCH PROBLEM

Background of the Study

The business landscape has become much more competitive, and the changes sweeping through it have been accelerated by advances in technology. The principal actors in organizations continue to seek ways to enhance their competitive advantage. In this context, growth becomes not only a desirable condition but also a necessary one for the organization's survival. Moreover, organizations strive to achieve sustained growth. In the process, management, which has become the principal means of achieving and maintaining that competitive advantage, has taken on renewed significance. Driving innovation is the job of research and development (R&D) managers as they hold a critical and central role within the organization to ensure the R&D part of the innovation process is performed (Dyer, Gregersen, & Christensen, 2020).

Effective innovation management is foundational to an organization's competitive market position. It is a straightforward but challenging process of overseeing an organization's innovation efforts, ensuring that they move from the first stage of idea generation to the final implementation. A part of this hard work entails supporting idea-generating subunits such as R&D departments. (Ryan & Tipu, 2021).

The critical role of empowerment in innovation management is coming into sharper focus. For instance, a recent study by Lee and Xuan (2021) suggests that granting power to R&D managers can dramatically improve not just their authority but also their ability to manage innovation processes effectively. However, Smith and

Lewis (2022) identify several challenges that these leaders face, starting with the need to manage uncertainty and risk associated with innovation itself and with the kinds of decisions that must be made to keep an innovation process on track.

The daily challenges, needs, and opportunities for improvement of R&D managers were explored in this ethnographic study. The participants selected in this study, all employed as R&D managers, were interviewed to determine these findings. They provided the information needed to understand the phenomenon of managerial empowerment and its association with innovation management. These allowed for the exploration of individual experiences and provided another perspective from which to understand the phenomenon. Focus group discussions with these managers allowed for the common themes of their experiences to surface. These also served as another means of achieving necessary companion collective reflections on the research topic.

Furthermore, the participants' experiences shine a light on the transformative wave of Industry 4.0 that is sweeping over the food industry, bringing with it so-called "smart" technologies: artificial intelligence, big data analytics, the Internet of Things, and blockchain. From another perspective, these developments could be seen as just the latest in a long line of efforts to "modernize" agriculture and the food supply chain.

It is essential to empower research and development (R&D) managers if innovation management within an organization is to improve and if that organization is to be successful. R&D is one of the few departments that needs empowerment because it works in high-tech areas with unclear results, but its power is limited unless it is given the same sort of power that a factory has. This requires a skills upgrade, otherwise, the alternative is to have empowered factories with no place to send the finished products. Skill deficiencies come from not knowing whom to empower, and the foundational frameworks of the R&D power model help us enormously with this.

Statement of the Problem

Research Problems

In this study, the capacity needs of research and development (R&D) managers that would result in the improved ability to lead innovation in the food manufacturing industry were determined. The study focused on R&D managers and their predominant issues and specific skill deficits. From the findings of the study, potential solutions and development strategies were recommended to resolve these identified issues and gaps. The primary research questions guiding the study are as follows:

1. What is the predominant organizational structure and culture within the R&D department of a food manufacturing industry?
2. What specific professional skill does an R&D manager in the food manufacturing industry need to enhance their innovation management capabilities?
3. How can the capacity of an R&D manager be improved in leading and managing innovation within a food manufacturing organization?

Objectives of the Study

The general objective is to analyze the organizational structure, culture, and professional skills of Research and Development (R&D) managers in the food manufacturing industry that could enhance their capacity for innovation management in their organizations.

Specific Objectives:

1. Describe the organizational structure and culture of the R&D organizations in the food manufacturing industry.
2. Determine the professional development skills of R&D managers that will improve their innovation management capabilities.
3. Analyze R&D managers' competency deficiencies for upskilling and re-skilling; and
4. Develop strategies that could enhance the capacity of R&D managers to manage R&D organizations.

Significance of the Study

This study on the empowerment of R&D managers for enhanced management offers benefits to various stakeholders, including R&D managers, researchers, offices, academia, policymakers, and future researchers. It provides insights and adds understanding into overcoming managerial, structural, and cultural barriers to empower managers effectively. R&D Managers can gain guidance on skill development and professional skill growth. The academic community can use the findings to enhance curricula and research settings. Policy makers are encouraged to support R&D and innovation for economic growth. Researchers can use the data presented in this study to conduct follow-up research relating to this topic. Overall, this study aims to enhance practices across multiple areas of the knowledge community for growth and improvement.

Scope and Limitations of the Study

This study used an ethnographic lens wherein the author was immersed in the process of being a research manager herself, the study explored the lived experiences and innovation practices of Research & Development managers in the Philippine food manufacturing industry. Data were gathered through in-depth interviews with two R&D managers and through a focus group discussion with three participants, all of whom have over ten years of experience in bakery snack and bakeshop companies.

Several limitations must be recognized. First, the study focused on a small group of experienced R&D professionals within a specific industry and geographic context, which limits the study's applicability to other sectors. Second, the dependence on interviews and focus group discussions, without direct observation, limited the capacity to analyze the dynamics, professional relationship, and culture of the companies from which the participants come from. Third, the lack of interviews from the lower and upper management may have resulted in a partial and incomplete view of the systemic factors influencing innovation. Future research could expand the ethnographic scope to include these broader organizational dynamics.

Despite these limitations, the study offered valuable insights into how innovation is experienced and interpreted by R&D managers, contributing to a deeper understanding of organizational culture and practices in the Philippine food manufacturing industry.

Chapter II

THEORETICAL BACKGROUND

Review of Literature

Innovation is a factor that drives not only success but also the survival of organizations in today's competitive business world. In the food industry, Research and Development (R&D) departments are the primary drivers of innovation, which create and foster the renewal of new products, services, and processes within the organization. In most cases, R&D departments are composed of upper, middle, and lower-level management, collaborating to attain the company's common goal. Within this hierarchy, the middle management, led by R&D managers, serves a particular role as both intermediaries and leaders who convert innovative ideas to successful outcomes (Chen et al., 2014). As such, the development of their skills and competencies must be empowered. In this review, three main themes are explored: (1) R&D department structures and cultures; (2) skills gaps and professional development needs of R&D departments; and (3) the skills and competency deficiencies of R&D managers.

Several studies have sought to empower R&D managers by investigating the effectiveness of different training methodologies. In a recent study conducted by Liu et al. (2025), case-based learning was used to develop R&D managers' project decision-making capabilities. In this method, case studies based on real-world, practical situations are given to learners to analyze and provide solutions using realistic strategies. Liu et al. (2021) also investigated the use of another method, namely action learning, to develop R&D managers' project problem-solving capabilities.

Organizational Structures and Cultures

Impact of Organizational Structures:

The organizational structure strongly influences the work ethics and patterns of R&D managers. If an organization is hierarchical, its structure limits the flexibility and decision-making speed compared to a decentralized, flat structure that (insert statement). Through cross-disciplinary teams and an organization-wide matrix, barriers to collaboration and knowledge sharing, as well as successful innovation, are identified and overcome (Baer & Frese, 2023).

Role of Organizational Culture:

Innovation outcomes are also critically influenced by organizational culture. Organizations that hold a culture that permits risk-taking, allows for some degree of failure, and supports continuous learning stand the best chance of innovating (Yoo et al., 2023). Types of leadership are associated with organizational culture; thus, it is important to mention those cultures that hold types of leadership that dovetail well with innovation. Transformational leadership dovetails well with culture and innovation because of their positive association (Sosik & Jung, 2020).

Cultural and Contextual Factors:

Cultural and contextual factors of the organization also affect innovation outcomes. Studies show that empowering leadership affects employees much more positively in low-uncertainty environments, where conditions are more stable and expectations clearer (Baerten et al., 2021). Western cultural norms typically dominate the assessment of leadership practices, especially when evaluating how

empowerment might work in developing countries. Such practices may look very different in different cultures, and not all cultures may favor or support those practices. To better understand this variation, more context-specific strategies are needed (Gupta et al., 2022).

Conventional organizations with a hierarchy have multi-level management and a clear command structure. Although this system provides clarity and control, it inhibits flexibility and speed in decision-making. In R&D environments, where rapid adaptation to internal demands and external changes is key, a rigid hierarchical structure can slow down processes and inhibit creativity due to the complex and bureaucratic systems (Lee et al., 2021). Flat organizations have fewer hierarchical levels, which enhances communication and the speed of decision-making, thus promoting a more collaborative environment that allows R&D managers more autonomy in their roles. With fewer bureaucratic barriers, a flat structure can make the R&D process more agile and responsive (Yoo et al., 2023).

Functional and product-based divisions in a matrix organization make it easier for teams to collaborate across functions. Matrix structures in R&D can bolster the integration of diverse expertise necessary for more innovative solutions. With the rise of emerging fields in food research, the R&D departments have become multidisciplinary, which serves to be advantageous in solving problems through various perspectives. However, this can also create complexities in reporting lines and decision-making processes, which affect how rapidly and how efficiently a team responds to a timely opportunity or challenge.

Giving R&D managers a largely autonomous structure not only enables them to make decisions but also makes them realize and embrace project ownership. Autonomy promotes two important aspects of an innovative structure: (1)

experimenting with new ideas, and (2) exploring the boundaries of the idea without restraint or control (Conger & Kanungo, 2020). In a laboratory setting, the freedom to fail is important to overall success. Employees must be comfortable enough to take risks and explore new ideas without the fear of admonition, which leads to generating new knowledge and outcomes, even from mistakes (Joo & Song, 2023).

Emphasizing knowledge sharing and collaboration, R&D teams capitalize on varied and diverse perspectives and expertise. This is the environment in which creativity and problem-solving thrive, which yields more novel and useful ideas for teams to work with (Baer & Frese, 2023). "At NASA, leadership is about being the kind of person who helps others be more competent and effective," said Chang. "That is not only true for NASA but also for space exploration as a whole. And when it comes to the developmental path toward a culture of innovation, it all starts with leadership."

Conversely, transactional leadership, which emphasizes rewards and punishments, can dampen creativity and risk-taking. This form of leadership can create a more controlled environment, but it can also stifle the spontaneity and experimentation that are essential for innovation. Open leadership, in contrast, emphasizes inclusivity and receptivity of a diverse array of viewpoints. It is the kind of leadership that seeks input from all quarters—team members, stakeholders, and others (Baer & Frese, 2023).

Empowering leaders can be effective, especially when operations and workloads are stable. In contrast, directing leaders are more effective when inter- and intradepartmental disputes and issues arise (Yukl, 2010). This difference in leadership style effectiveness can be understood through the following reasoning: one type of leader can create a "context in which subordinates work effectively," while the other type of leader can "establish conditions under which subordinates perform better."

Both types of leadership can find effective ways to lead; they just have different styles on different occasions.

When organizational structures are clear and cultures are collaborative, they provide R&D teams with the operating space that enhances their effectiveness. At the same time, clear structures and cultures that support risk-taking, experimentation, and knowledge sharing reduce the number of obstacles front-line teams face on their journey to successful innovation.

Skills Gaps and Professional Development Needs

Identifying Skills Gaps:

To lead innovation effectively, R&D managers require a diverse and specialized skill set. Among these are the essential abilities of project management, risk management, and intellectual property management. These competencies help R&D managers manage timelines, assess risks, and protect assets. However, when R&D managers cannot effectively deploy these skills, innovation is compromised. (Park et al., 2020)

The Professional Development Needs:

Targeted professional development programs are vital to remedy the skills gaps. R&D managers must have appropriate training to ensure they can manage complex and intricate programs and projects. They must also know how to handle and manage risk. Projects and programs are at risk when there is apprehension about initiating firm and immediate decisions. The skills and competencies gained from these trainings, however, must be effectively passed on to the R&D project teams through the R&D manager to be rendered useful (Davis & Ren, 2023)

Training Methodologies:

Experiential learning is one of the best mediums for instilling knowledge in R&D managers, and it has been shown to be effective for this purpose. It follows learning by doing methodology. This type of learning is relevant as R&D managers are expected to apply this knowledge to practical, real-world issues within the organization. Liu et al. (2021) emphasize that case-based learning serves well in instilling the knowledge and reinforcing the confidence that allows them to lead initiatives with a high probability of success.

It is important to spot and remedy skills that are lacking to improve future R&D managers and make them more effective at driving current innovation processes. R&D managers must possess an array of competencies to carry off the act of managing complex and tricky innovation processes successfully (Ling et al., 2018). Some knowledge areas where such managers often suffer talent deficiencies include project management, risk management, and intellectual property management. Park et al. (2020) underscore the significance of these knowledge areas for successful innovation outcomes. Skills in project management are critical in managing the development of new products, as well as determining the overall direction, progress, and timeline of the project.

Another key area in the skills gap is risk management. Park et al. (2020) highlight the need for risk management training as it deals with preparing and protecting an organization against uncertainties, ensuring long-term success.

Managing intellectual property is vital for protecting and leveraging innovations—that is, ensuring the security around a company's technologies and ideas is well built. In the knowledge economy, this is how firms keep the edge that ensures market success. Cai and Liu (2023) argue that for this reason, concern with intellectual property, especially patents, should be a central focus for all R&D managers. They further contend that several R&D managers lack the basic skills and knowledge necessary to manage intellectual property effectively and, in turn, fail to accomplish the managerial job of protecting their innovations and maximizing their commercial potential.

These skills gaps are narrowed by professional development programs. Targeted training can furnish R&D managers with the principles of project management, risk management, and intellectual property management. There's a

somewhere-between-good-and-bad way of looking at this. The right way is to see these programs for what they can be: useful, even crucial, means of filling in knowledge and skills gaps for individuals and, in some cases, for teams. However, as with any training program, to see professional development as the be-all and end-all is part of what might be a problematic, overly managerial way of looking at things.

Several proposed strategies can address the challenges that R&D managers face. An effective strategy is to ensure that R&D programs are kept up to date with the latest developments in their field through continuous learning opportunities such as workshops, training, and programs. A well-informed organization and workforce are usually better at problem-solving. In addition, creativity in the workplace can significantly contribute to solving R&D problems. Creating a supportive culture for this is a second proposed strategy. Empowering R&D managers with even more autonomy than they currently enjoy is a third strategy. If downsizing has even a slight negative effect on this empowerment, those working to foster a creative culture in R&D certainly have the right tools to make it happen. Technology can also be added to the mix, if the tools and technologies that excite people are as accessible as the other opportunities have been to date, then adding that to the learning culture should enhance productivity.

These strategies have been shown to be effective, as supported by empirical evidence. One case study conducted by Golembiewski et al. (2021) in a leading tech company demonstrated that when R&D managers were empowered through professional development and organizational support, the company saw a significant increase in innovation output. A parallel study in the pharmaceutical industry by Santos, Reis, and Pena (2022) found that when R&D managers had more authority, the industry was more successful in developing new drugs. This is because managers

had more autonomy in research and freedom to pursue innovative ideas and approaches, potentially leading to discoveries and faster decision-making.

Furthermore, programs that involve coaching and mentoring are critical for nurturing the leadership skills that underpin innovation. Individual and team performances can be enhanced by effective coaching that offers guidance and feedback. Knowledge and expertise can flow more effectively in teams when mentoring is part of the program. Cai and Liu (2023) emphasize that such programs in R&D can make managers more effective leaders. They are better at managing eccentric scientists and can create a culture that fosters the kind of innovation that leads to great new products and services.

Filling the skills gaps is vital if R&D managers are to be effective in their current jobs and enhance their abilities to manage innovation. Targeted professional development is seen as the best vehicle for doing this.

Analyzing R&D Manager Skills and Competency Deficiencies:

Based on the findings of this study, R&D manager skills and competency gaps show some areas that need improvement. For instance, R&D managers generally lack the skills for advanced project management. This lack of proficiency holds back a lot of R&D managers. They also tend to lack the types of informal leadership practices that are very conducive to innovation. Team dynamics are part of the overall equation as well. The difficulty in leading an R&D team is that you often have to do it in ways that are not conducive to team leadership. This doesn't mean that the situation is insurmountable. It just means that toxicity can creep in if managers of R&D processes become more like project supervisors (Dutta & Roy, 2023).

It is important to analyze the skill and competency deficits of R&D managers so that the effectiveness of these individuals in managing innovation can be improved. R&D managers must have a diverse skill set to oversee the extremely complex and unfocused projects that R&D teams undertake. Not only must these managers have a high degree of technical and problem-solving ability, but they also have to lead strategically and "think outside the box."

R&D managers must have strategic thinking skills to align their teams with the broader organizational goals beyond the immediate project at hand. Deficiencies in strategic thinking among R&D managers can lead to misalignment between R&D activities and business objectives, resulting in wasted resources and missed opportunities (Cai & Liu, 2023). Effective strategic thinking requires an analysis of not just current market conditions but also of "understanding competitive dynamics and making data-driven decisions to steer strategy" (Hansen, 2022). Another prevalent deficiency that impacts R&D performance is project management. Planning, resource allocation, risk assessment, and progress monitoring are all aspects of project management that effective R&D managers must excel in to avoid delays and inefficiencies. Many R&D managers, however, do not possess these skills (Li et al., 2022). Furthermore, when R&D managers lack project management skills, keeping projects on schedule and delivering specified results within set timelines and budgets can be challenging.

Targeted professional development can help overcome these deficiencies. Moreover, case-based learning, coaching, and mentoring programs can be central to the establishment of effective leadership and strategic thinking within the applied research and development (R&D) area. Effective coaching can allow not only adequate leadership to emerge but also the type of "guiding genius" to emerge that

can really get a team to operate effectively and innovate successfully (Cai & Liu, 2023). In addition, good mentoring can facilitate the knowledge transfer that is crucial to effective teamwork and can also get individuals within teams to operate at their creative highs.

Table 1

Framework

THEME	FINDINGS	AUTHOR/S
Leadership	Effective leadership in R&D requires inspiring, motivating teams, and fostering creativity, yet some managers lack the ability to provide clear direction.	Hock-Doepgen M., Clauss, T., Kraus, s., Cheng, C.F. (2021); Sosik, J. J., & Jung, D. (2011); Randolph, K. (2021)
Technical Expertise	Many R&D managers lack the advanced technical skills needed to fully oversee and comprehend the technical aspects of innovation projects.	Szczepańska-Woszczyna, K., & Gatnar, S. (2022, September); Barbosa, A. P. F. P. L., Salerno, M. S., de Souza Nascimento, P. T., Albala, A., Maranzato, F. P., & Tamoschus, D. (2021).
Strategic Thinking	Deficiencies in strategic thinking can cause misalignment between R&D activities and business objectives, leading to wasted resources and missed opportunities.	Bolatan, G. I. S., Giadedi, A., & Daim, T. (2022); Huang, Z., Sindakis, S., Aggarwal, S., & Thomas, L. (2022).
Project Management	Poor project management skills among R&D managers lead to delays and inefficiencies in project execution.	Ahmad, A., Maynard, S. B., Motahhir, S., & Anderson, A. (2021); Ollila, S. and Yström, A. (2020)
Decision-Making & Problem-Solving	Case-based learning and action learning programs are effective in developing decision-making and problem-solving skills essential for R&D management.	Ahmad, A., Maynard, S. B., Motahhir, S., & Anderson, A. (2021); Liu et al. (2021)
Coaching and Mentoring	Coaching and mentoring are crucial for improving leadership and strategic thinking skills, facilitating knowledge transfer within R&D teams.	Bolatan, G. I. S., Giadedi, A., & Daim, T. (2022); Castellano, S., Chandavimol, K., Khelladi, I., & Orhan, M. A. (2021).

R&D managers possess a number of skills and competencies, but several areas are in critical need of development. One is the fundamental competency of leadership. Jelena Hock-Doepgen, Ute Bäumer, and Hans-Michael Traut (2021) say that effective leadership in R&D requires the ability to inspire teams to give their best

and the confidence to think outside the box. R&D managers must also provide clear and compelling direction to their teams if they are to engage in the kind of innovative work that leads to R&D success. The absence of these leaders and their key qualities, team engagement, and team innovation outcomes has the potential to wither. "It might be tough for R&D teams if they and their results underperform," says Randolph (2021).

Another area where R&D managers frequently experience shortfalls is technical experience and expertise. Innovation projects today require a deep understanding of the relevant technologies and processes. Yet, as Szczepańska-Woszczyzna and Gatnar (2022) point out, many R&D managers do not have the advanced technical skills necessary to fully comprehend specific parts of their projects. When there is a gap in this expertise, the effectiveness with which R&D managers manage the technical challenges and good decision-making, can be negatively impacted (Barbosa et al., 2021).

It is vital to think strategically to link R&D activities with the wider organizational goals. When organizations plan beyond what is necessary, it can lead to a serious misallocation of R&D resources.

In one paper by Bolatan (2022), the authors suggest that if management in organizations cannot think of the R&D of the present and the future in a proper strategic way, then the organization is likely to suffer from what can be termed as "intended goal deviation".

In another paper led by Huang (2022), the study explored what is technically called "strategic alignment" and its effects on R&D resource allocation and thereby innovativeness.

To ensure R&D projects run smoothly and deliver innovative results on time, it is essential for managers to have good project management skills. Ahmad et al. (2021)

in a recent academic study found that many R&D managers are not good project managers; they lack the ability to plan or execute work in a timely, efficient, and effective manner.

R&D managers require effective problem-solving and decision-making skills, not just R&D-natured competence. Innovation projects are as complex and uncertain, and the kinds of scenarios contrived in case studies take on a startling realism when viewed through the lens of an actual problem requiring an actual solution (Ahmad et al., 2021). Liu et al. (2021) suggest that case-based programs and action learning are fundamental for developing the critical thinking and problem-solving skills that R&D managers must have to deal with the dynamic challenges of R&D.

Addressing deficits in leadership and strategic thinking in research and development requires coaching and mentoring, according to Bolatan et al. (2022). Coaching is viewed as the means by which guidance and feedback are provided to R&D managers, enabling them to improve their skills and become the leaders they need to be. Effective mentoring, on the other hand, is about transferring the right kind of knowledge from one person to another so that both individuals in the mentoring relationship become more effective. Castellano et al. (2021) suggest that R&D managers can get better at not only leading their teams but also thinking strategically if the right kind of mentoring is taking place.

It is critical for organizations to provide professional development to their R&D directors so that they can lead the R&D engineers and scientists under them toward successful outcomes. These new product development (NPD) initiatives seldom go badly because the "leadership" and "technical expertise" competencies are usually present. When issues arise, they often can be traced back to the "decision-making,"

"coaching/mentoring," and overall "system R&D management" competencies that need further sharpening in our targeted development programs.

Synthesis

The literature emphasizes the importance of structures, cultures, and leadership styles in empowering research and development managers to drive innovation. While existing research offers many insights, it is predominantly quantitative. More qualitative studies are needed to understand the specific challenges and opportunities faced by R&D managers today, especially in developing countries. This ethnographic study offers an opportunity to generate rich, contextualized knowledge. It does so in an effort to inform the development of targeted programs that build research and development management skills and competencies.

Chapter III

RESEARCH METHODOLOGY

Research Design

With an ethnographic method in place, the study applies a qualitative research design to explain the capacity needs of R&D managers in the food manufacturing industry, which is ideal for an in-depth understanding of their roles, interactions, and the organizational culture that shapes their leadership. It provides deeper understanding and insights into the behavior, beliefs, and cultures of R&D managers, and at the same time, the researcher was able to immerse and recall past experiences.

The study employed several theoretical frameworks to comprehend the empowerment of R&D managers. One of these was the Resource-Based View (RBV) of the firm, which posited that the main way to achieve sustained competitive advantage was to leverage the firm's unique resources and capabilities (Barney, 1991). In the context of R&D, this included not just the firm's resources but also those of the teams that worked in R&D. And for R&D to be productive, those resources needed to be well utilized. Another pertinent framework was the Dynamic Capability Theory, which emphasized how well an organization could integrate and build internal and external competencies to take advantage of opportunities in a fast-moving environment (Teece, Pisano, & Shuen, 1997).

The R&D management environment was documented by capturing experiences, challenges, and solutions. This approach provided a detailed and specific view of the current state of R&D management in the food industry. The participants' personal experiences were examined extensively, which are often overlooked in conventional, quantitative research.

Data Collection

Data collection was conducted through two main sources— in-depth interviews with two R&D managers and focus group discussions with three participants. The FGD was conducted face-to-face with three participants in a closed space, while the IDIs were conducted virtually via separate Zoom calls.

Data Analysis

The data analysis in this ethnographic study delves deeply into a thematic examination of the collected data, combining meticulous description with the researcher's insightful interpretations (Creswell, 2010). Specifically, manual thematic analysis was employed to delve into the perceptions and experiences of the participants. This process commenced with the researcher immersing themselves in the collected materials, thoroughly reading and transcribing them to cultivate familiarity with the data. Codes were meticulously assigned to data segments aligned with the research questions. Similar codes were then grouped together, allowing for the identification of broader themes. These themes were scrutinized to ascertain their pertinence to the research questions. Furthermore, the refinement of themes through consolidation, division, or further analysis ensured that each theme was well-supported by data and yielded valuable insights into the research questions. In this study, emergent themes related to R&D structure and environment include Functional & Specialized Team Structures, an Innovation-driven Culture, and the Balance between Creativity and Process Familiarity. Within the realm of Professional Growth and Skill Development for R&D managers, the themes identified are Core Skills for Innovation Management, Challenges in Skill Development, and Opportunities for Professional Development. Regarding R&D manager skills and competencies, themes

such as Critical Thinking and Problem-Solving Skills, the Impact of Attitude and Mindsets on Competency Growth, and Resources Opportunities and Stakeholder Engagement were highlighted.

Data Management

To effectively maintain and secure the research data management, the researcher stored all data, interviews, and FGD manuscripts in a password-protected Google Cloud Drive system. All identifiers were removed so that no personal or organizational information exists in the storage cloud location. The researcher is the only individual who has knowledge of the location and its password. And when the required retention period is passed, it will be disposed of or deleted.

Ethical Considerations

This study addresses several important ethical considerations, including informed consent, confidentiality, and data privacy. Informed consent was obtained from all participants, ensuring they were fully aware of the nature of the research and their role in it. Focus group discussions were held to confirm clarity and agreement on the shared stories.

To protect the privacy of the respondents and their organizations, the specific names were not disclosed in any part of the study. All data collected was anonymized, and identifying information was excluded from records and publications. Only the information shared by the respondents was used for the purpose of this research and will not be used for any other purposes.

The researcher, who is also an R&D manager, acknowledges the potential biases arising from this dual role and engages in continuous reflexive practices to minimize such influences. The researcher also works with a peer debriefer to maintain a level of objectivity and ensure that the researcher's personal biases do not overly influence the findings.

Chapter IV

RESULTS AND DISCUSSION

Structure and Environment of R&D Departments

Theme 1: Functional and Specialized Team Structures

The structure of an R&D department in food manufacturing plays a significant role in its operational efficiency and ability to drive innovation. A common approach is to organize teams into specialized functional groups, with clear leadership hierarchies to streamline activities and improve focus on specific objectives.

For the team of IDI1, "The current R&D department was restructured to become more functional and specialized into categories. A management team heads every section, and every project lead and specialist reports to them." This demonstrates a clear-cut hierarchy. The head of R&D oversees the department and reports directly to top-tier management and the executive board. For IDI2, their R&D department operates based on specialization. They noted that their *"R&D is separated into 3 sections: Creative, Commercialization, and Systems,"* with each section having a singular focus with three positions: "Creative" (i.e., prototype mode), "Commercialization" (i.e., batch-trial mode), or "Systems" (i.e., the operational mode at standard temperature and pressure). This structured yet loose approach enables R&D teams to address a whole range of prototyping to operationalization challenges and fosters accountability through defined roles and responsibilities.

The insights gained from the focus groups confirm what was learned in the in-depth interviews about the staffing and structure of the food manufacturing companies' R&D departments. FGD1 stated, *"R&D Departments are usually parts of the Quality*

or Technical Services Department... now part of the Innovation group." FGD2 offered a description of the basic R&D department hierarchy that was also mentioned through the IDIs: *"The Researchers report to the R&D head, which is the manager or the owner of the company."*

Leading dynamic structures of R&D organizations can be a challenge, especially when specialized teams are involved. On the one hand, the team structure can encourage focused and independent innovation generation. On the other hand, it can also pose the challenge of managing diverse expectations from different team members and from top executives.

To maximize efficiency and innovation, research and development groups frequently organize themselves into functionally specialized teams, or a combination of teams and individuals working in a team-of-teams structure. Team roles matter for both task performance and creative problem-solving, according to Amabile and Pratt (2021). Furthermore, the importance of defining team roles is emphasized, not only to ensure task clarity but also to foster team creativity. When researchers are organized into teams, they need to be able to trust that their teammates will handle their work parts, and they need to have a clear vision of the overall work plan.

Theme 2: Innovation-Driven Culture

A culture of innovation is one where it is not just acceptable but encouraged to think creatively and unconventionally. Yet it is not enough to allow employees the freedom to be creative. To achieve true innovation, there must also be an environment of continuous learning and external exposure. According to IDI1, "The R&D department has room for creativity and innovation. They are continually exposed to training and food expos that allow them to expand their skills and knowledge base."

This underscores that fostering an innovative culture is more than allowing employees the time and space to be creative. Similarly, IDI2 observes, "Currently, R&D is on the problem-solving of daily operation concerns and at the same time creative as it explores unconventional ways to solve problems." Problem-solving with a creative bent is another way for R&D to practice an innovative culture in its daily activities.

The focus on innovation and management's vision and engagement in this area drives competitiveness in R&D teams. This is true not just in the industry sectors represented by our interviewees, but across the entire global economy. "Everywhere I go, be it the US, Europe, or Japan, the same message comes through: If you're not pushing towards a vision—be it for products, services, or spaces in which you do R&D—you're not going to stay competitive," according to IDI1, the interviewee who works outside the vocational education sector.

The IDIs uncover the association of an innovation culture with being successful in R&D, and it highlights some of the pressures that come with it. "The R&D department is often at the forefront of innovation, and as such attracts the attention of top officials who want to be involved in the creation of successful products," according to IDI2 whose organization has this culture. This can be an opportunity, but also a stress point. When top officials get involved, they need to be led by the R&D department into successful products, or at least the appearance of successful products, before the appearance becomes very real.

It is essential for an innovation-driven culture to exist for creativity to flourish within R&D teams, according to Baer and Frese (2023), whose recent work centers on understanding the relationship between team creativity and leader-type factors. The authors found that "open" leadership practices characterized by accessibility, lack

of micromanagement, and encouragement of divergent and risk-taking behavior predicted higher team creativity. These findings relate directly to the individuals who comprise R&D teams. A more empowering organizational environment increases the chances that team members will take creative risks in pursuit of innovative solutions to the kinds of complex technical problems they encounter daily.

Theme 3: Balance Between Creativity and Process Familiarity

It is critical to balance the creative aspects of R&D with the knowledge of standardized processes when trying to achieve both innovation and operational efficiency. Standardized processes help streamline workflows. Overly confining solutions and decisions within those fixed processes, however, stifles creativity and limits companies from innovating outside established product categories. According to Smith & Lewis (2022), "a marketing and top management-driven, high technology company culture " promotes an R&D culture that balances creative problem-solving and operational efficiency. However, the disadvantage of this type of culture is that "the R&D team has specialized skills that help keep things moving on a timeline that is reasonable and makes sense for product development. The downfall of this is being too familiar with the process which leads to uninnovative outcomes."

Organizations can ensure the consistent development of innovative solutions while maintaining operational excellence by fostering environments where standardization is complemented by opportunities for creative exploration. Findings from both the FGDs and the IDIs underscored the need to harmonize creative ideation with process knowledge. FGD1 expressed, "With the team transitioning to Innovation, it has become more creative and organized..." while FGD2 noted, "Owners being involved in conceptualization can be positive if they support ideas." These findings

support the IDI observation that maximizing innovation requires creative autonomy to coexist with structured processes.

IDI1 found it often difficult to strike a balance between creativity and the rigorous processes of building a new product. He was a "control freak," yet he knew he had to let go of that control so the team could do the work they needed to do. "It was really hard for me to delegate, and it was even harder when it came time to not get involved in the execution of tasks." He also struggled with the different levels of understanding his team members had of the fundamental knowledge and technology they were working with.

Ensuring structured processes and creative freedom can be a tough balance for R&D organizations to strike. Smith and Lewis (2022) argue that leaders must find this balance to achieve optimal innovation outcomes. They define exploration as "untamed creativity" that occurs in a "framing mindset." They define exploitation as "efficient processes and systems" that occur in a "judging mindset."

These three themes, namely, (1) functional and specialized team structures, (2) innovation-driven culture, and (3) balance between creativity and process familiarity, show how the structures and cultures of the food manufacturing industry's R&D departments either support or challenge their ability to innovate. Having a clear functional specialization ensures that the necessary focus and clarity are present for the R&D department to work. Moreover, every R&D department in the food manufacturing industry needs an innovation-driven culture. Balancing these two with process familiarity helps creativity flow in the teams, keeping them competitive.

Professional Growth and Skill Development of R&D Managers

Theme 1: Core Skills for Innovation Management

The effective supervision and driving of innovation by R&D managers are premised on an apt skill mix. This mix should lean toward familiar core competencies of a competent manager: creativity, critical thinking, and problem-solving. These are the bedrock skills needed to navigate the complex, dynamic challenges of R&D departments.

It is taken for granted that R&D managers have these skills when they are selected for the job. It is much more common for those selected to manage R&D to have technical expertise and much less common for such individuals to have the mix of managerial, as well as creative/critical thinking/problem-solving, skills necessary to make them effective overseers of R&D innovation (Gritz et al., 2017).

The skill gaps in innovation management identified in the IDIs were also identified through FGDs. In the FGD, participants indicated a need for better people management skills, data analytics capabilities, and machine learning competencies. They also added their perceptions about the need for better time management and problem-solving skills. Following the individual's narrative, the researcher prompted a reflection on the specific skill sets required in the new managerial role.

Innovation management requires three main competencies: critical thinking, problem-solving, and adaptability. According to Sosik and Jung (2011), the development of these competencies among research and development managers is crucial; therefore, they recommend a full-range leadership training regimen. Dyer et al. (2020) support this regimen and posit that the management of disruptive innovation is at the very core of effective leadership in today's complex business environment.

Theme 2: Challenges in Skill Development

There is a strong need for core skills in R&D management. Yet several barriers hinder the development of these skills. Some of these barriers, which include mindset issues, have been mentioned by the participants. According to the FGD responses, traditional or conventional mindsets, though has merit in creating stable structures of thought, prevents the acceptance of new schools of thought and adaptation to more timely strategies. Moreover, the fear of taking risks, and a culture of blaming people are not conducive to teaching people what they need to know to achieve innovative management breakthroughs.

From both the IDIs and FGD, the barriers faced by R&D managers were determined. Balancing dual responsibilities, they must conduct top-notch research while also managing a team of professionals that helps them reach their goals. The second FGD expounded on this idea: "development becomes difficult because there is a scarcity of resources and support from other stakeholders." R&D managers face several issues, including "constrained resources like equipment, raw materials, and insufficient data," highlighted by the third FGD. These are all systemic issues that hinder R&D from advancing and growing, which in turn, threaten the R&D manager's career as limited resources prevent quality outputs and performance.

Professional growth is often hindered because of outdated ways of thinking and a reluctance to change. Acur and Uslucan (2020) discuss the possibilities for overcoming these barriers when they explore the merits of transformational leadership. Transformational leaders do not simply give orders but also inspire and motivate others. One way they do this is by ensuring that knowledge flows freely within and among workgroups. Ahmad et al. (2021) take a different route when they look at

professional skill acquisition and the parallels between a person's development of skills and a person's working through parallel cases of change resistance.

Theme 3: Professional Development Opportunities

To close the gap in innovation management capabilities, organizations need to provide structured professional development. These can include technical seminars, competitive checks, joining trade shows and exhibits, and hands-on training that enhances the knowledge and skills of innovation managers. One IDI informant noted the supportive role of top management: "top management sends R&D personnel to technical seminars and skills development workshops to help the team become more competent and aligned with current trends. This investment in continuous learning helps us stay current with industry advancements." Another informant mentioned the R&D team's market exposure, along with training, as a means to broaden their perspectives. These professional development experiences not only fill existing skill gaps but also help create a culture of innovation in the organization.

The focus group discussions confirmed the significance of the development opportunities that the IDIs had indicated. The FGD group recommended that the R&D managers be trained not just in "people management," but also in "project management" and given "exposure to local and global consumer trends." Meanwhile, the second participant in the FGD group insisted, "support the R&D managers in becoming more strategic. They are so smart! And they can be much smarter if they could mentor and motivate their subordinates." These discussions around R&D director and manager capabilities highlighted significant opportunities for enhancing the effectiveness of R&D functions within these organizations.

Findings from the FGD also revealed that participants believed that their professional growth was enhanced with exposure to global trends and innovation. One participant mentioned “exposure to global trends, collaborative work with suppliers and partners, more management training courses, and creating an environment that is nurturing with knowledge and skills.” This sentiment was echoed across the participants in the FGD session, highlighting common needs in their career development.

R&D manager skills and competency needs

Theme 1: Critical Thinking and Problem-Solving Skills

R&D managers need to think critically and solve problems effectively to steer complex, insoluble challenges toward innovation. As such, deficiencies in these competencies must be identified and addressed immediately. One participant’s view is that these deficiencies stem from training too many R&D managers to operate with a mindset of "compliance" rather than a more useful mindset of "innovation." It is a kind of training-induced societal condition within the R&D manager class of our industry.

The FGD responses highlighted the lack of critical thinking and problem-solving skills. They said, "There's a lack of a clear vision for the product... poor problem-solving skills." These findings support the IDI findings that there is a severe lack of these competencies. They limit the effectiveness of R&D managers to solve complex innovation problems. One participant said she was just not effective at a high level. She was not prepared for a strategic planning kind of role. She said, "I was frightened at the first session. It was all alien to me." When they did mentor her, it was on a basic level.

R&D performance suffers when critical thinking and problem-solving are in short supply. Huang et al. (2022) assert that leadership plays the pivotal role in cultivating these two key competencies in academic and industrial R&D. They also emphasize the need for R&D leaders to be adaptable when addressing recurring problems that are challenging to address. Sosik & Jung (2011) highlight the relationship between leadership and adaptability in solving difficult problems.

Theme 2: Impact of Attitudes and Mindsets on Competency Growth

R&D managers' growth of core competencies is closely related to their attitudes and mindsets. Some managers are resistant to change. They cling to their traditional ways of doing things, and they are not very open to risk. These challenges severely limit the innovation capacity and competency development in many organizations (Gritzo et al., 2017). IDI1 noted these problems and also mentioned another issue—blame. When managers blame their subordinates, it does not create a very open environment. Stimulating innovation and competency development requires more than changing these three mindset problems. It requires a growth mindset. A growth mindset and risk-tolerant culture are key to enhancing competencies and skill development.

The responses from the FGD validated the role of attitudes and mindsets. FGD1 highlighted the need to overcome "fear of making mistakes... keeping in mind that mistakes are learning experiences." Similarly, FGD2 emphasized, "removing the fear of mistakes as failure but rather as a way of learning." These comments align well with the findings from the IDIs. It is clear that fostering a growth mindset is essential for developing the competencies needed to accomplish every project.

One of the FGD participants recognized that his intense desire to win often got in the way of working well with the team members he led and that it slowed down progress towards goals. He stated: "It was hard for me to give away credit or to act like I was just a part of what was going on. I wanted to be seen as leading something great." This perspective emphasizes the importance of working towards not just building great teams, but towards "team greatness," where the sum of what all the individuals accomplish together is greater than their individual worthy efforts.

The development of competencies is greatly affected by people's attitudes toward learning and change. It is necessary to create a growth mindset for competencies to develop, and it is not possible to create such a mindset through any other means than transformational leadership. On the other hand, it is also going to be pretty hard to be transformational when at least some of the leaders lack adaptability, which is a function of a mindset (Gritzo et al., 2017).

Theme 3: Resources, Opportunities, and Stakeholder Engagement

R&D managers cannot develop the right skills and apply them properly when they are short on both resources and time, or when the stakeholders are not engaged. These conditions are obstacles to the competence development that R&D managers need to realize.

Inadequate stakeholder engagement can hinder the progression of competencies. By offering the right resources and fostering important stakeholders' cooperation, those contributing to the effort can help and assist the R&D managers in achieving their vision, particularly in addressing challenges related to technical skills development.

The concerns about limited resources and stakeholder collaboration expressed in the IDIs were echoed by the participants in the FGDs. "Support with sourcing new materials and suppliers," FGD1 noted, was needed, while FGD2 said support in "creating a culture that values and rewards collaboration" is crucial. These responses confirmed the need not just for better resource allocation but also for better resource engagement. It also reflected on the need to manage stakeholder expectations and limited resources. There is a need to strike a balance between following the R&D director and the owner of the company, who often have different priorities and perspectives.

Two big challenges threaten to derail the successful implementation of innovation strategies: insufficient resources and ineffective stakeholder engagement. Dutta and Roy (2023) examined the tension between resource constraints and innovation, particularly in the context of science and technology. They found that certain leadership practices can help bridge the resource gap. In their view, effective leaders enable the ambidextrous behavior that R&D teams need in order to be both exploratory and exploitative.

Ambidextrous teams, however, are not enough. Bolatan et al. (2022) lay out the roles that technology transfer and collaboration play in helping organizations overcome resource constraints. From their perspective, these elements are central to innovation itself.

Correcting these shortcomings calls for specific strategies, such as encouraging R&D managers to adopt a growth mindset, providing them with sufficient resources, and ensuring that all stakeholders are actively engaged in efforts to support the R&D function. Although stakeholder engagement was the least emphasized theme

in the interviews, it is a necessary condition for the R&D function to thrive. In much of what follows, this study offers a contextualized narrative of what was learned from the IDIs and FGDs. Poor R&D functions can become good R&D functions through systemic changes that will drive continuous improvement.

The study illustrated the many sides of being an R&D manager. It is not enough to be technically astute; one must also lead and get the most from the team. Indeed, multiple insights have been gained from this study. The first and most important is organizational support. R&D is a unique environment in many ways. It takes a certain mindset and numerous mechanisms to optimize R&D performance, and the first key mechanism is having the right kind of supportive organization.

An Action Plan for the Strategies can be implemented to Enhance the Capacity of R&D Managers.

The action plan for enhancing the capacity of R&D managers in leading and managing innovation within food manufacturing organizations is designed to address identified challenges and foster a culture of continuous improvement. This comprehensive approach emphasizes organizational alignment, skill development, and resource optimization to empower R&D managers to excel in their roles.

Table 2

Action/Intervention Plan: Strategies to Enhance R&D Managers' Capacity in Leading and Managing Innovation

Objective	Themes	Identified Challenges	Proposed Strategies	Implementation Steps	Expected Outcomes
Describe the organizational structure and culture of R&D organizations in the food manufacturing industry	Functional and Specialized Team Structures	Difficulty in coordinating between specialized teams.	Implement cross-functional team collaboration frameworks.	<ul style="list-style-type: none"> - Facilitate regular cross-functional meetings. - Assign team leads for specific inter-departmental projects. 	Improved communication and alignment between teams, fostering collaboration and reducing silos.
	Innovation-Driven Culture	Inconsistent focus on innovation across levels.	Establish organizational innovation goals linked to rewards and recognition programs.	<ul style="list-style-type: none"> - Develop an innovation charter outlining priorities. - Create incentives for innovation contributions. 	Increased innovation, consistency, and alignment across the organization.
	Balance Between Creativity and Process Familiarity	Difficulty balancing process adherence with creative freedom.	Create flexible innovation frameworks that allow structured experimentation.	<ul style="list-style-type: none"> - Develop process guidelines for innovation projects. - Train managers in adaptive leadership. 	Enhanced creativity within structured processes, leading to more innovative product outcomes.
Determine the professional development skills of R&D managers that will improve their innovation management capabilities.	Core Skills for Innovation Management	Limited knowledge of innovation frameworks and management techniques.	Provide tailored training on innovation management and leadership skills.	<ul style="list-style-type: none"> - Organize workshops on design thinking, strategic management, and innovation methodologies. 	R&D managers are equipped with essential innovation management skills.

Objective	Themes	Identified Challenges	Proposed Strategies	Implementation Steps	Expected Outcomes
To analyze R&D manager competency deficiencies for upskilling and reskilling	Challenges in Skill Development	Lack of time and organizational support for skill development.	Embed learning opportunities into daily operations (e.g., on-the-job training, microlearning modules).	<ul style="list-style-type: none"> - Offer bite-sized learning resources integrated into the workflow. - Schedule periodic skill-refresh sessions. 	R&D managers develop skills without disrupting productivity.
	Professional Development Opportunities	Limited access to professional development resources.	Partner with industry associations to provide access to certifications and advanced training programs.	<ul style="list-style-type: none"> - Build partnerships with training organizations. - Encourage participation in innovation forums. 	Increased access to professional development enhancing competency in innovation management.
	Critical Thinking and Problem-Solving Skills	Lack of structured critical thinking frameworks for problem-solving.	Introduce tools like SWOT analysis, root-cause analysis, and scenario planning in decision-making processes.	<ul style="list-style-type: none"> - Conduct training sessions on critical thinking tools. - Encourage their application in team projects. 	Improved critical thinking and problem-solving capabilities among R&D managers.
	Impact of Attitudes and Mindsets on Competency Growth	Resistance to delegating and mentoring due to competitive mindsets.	Foster a mentorship culture by rewarding effective delegation and team development.	<ul style="list-style-type: none"> - Develop mentorship programs for R&D managers. - Align KPIs to team growth and knowledge transfer. 	Improved team dynamics and a more collaborative environment foster competency growth.
	Resources Opportunities and Stakeholder Engagement	Insufficient access to tools, time, and stakeholder alignment for innovation initiatives.	Increase resource allocation for R&D and implement stakeholder engagement plans for innovation alignment.	<ul style="list-style-type: none"> - Budget for modern R&D tools and training. - Conduct stakeholder alignment workshops. 	Improved resource availability and alignment of stakeholder expectations with R&D innovation objectives.

Enhancing Organizational Structures and Cultures

The program starts with addressing the structural and cultural conditions that exist in the current R&D organization and managing changes within them. At present, the R&D organization is functional and specialized to the point of presenting coordination challenges. The R&D teams form divisions that make it difficult to achieve coherent and clear communication and alignment across the teams. Even the proper functioning of essential boundary spanners is adversely affected by the conditions in which the R&D organization finds itself. This is a boundary-spanning culture—it is not funneling by any means—in which span can be seen from either inside or outside. There is no Penrose condition for a closed, coherent structure that has clear functions and clear spans.

Another vital aspect of the plan is balancing creativity with process familiarity. Innovation frameworks must be introduced that allow for structured experimentation while still adhering to established processes. Managers must be trained in adaptive leadership, where the manager effectively leads a team that needs more freedom to experiment and try new things, as opposed to molding the team into something more creative. This part of the plan should result in the R&D division having more freedom and being more dynamic in terms of executing the directives and developing new products.

Key knowledge gaps were also identified. Time and support were the two significant barriers to skill development. These can be addressed through integrating learning opportunities into the daily routine, thus allowing continuous learning while working. Two main types of learning can be integrated into a daily routine: microlearning and on-the-job training. Microlearning deals with short learning sessions within highly focused learning units that can be conducted with mentors and leaders

of the organization. On-the-job training, in contrast, is a type of learning that deals with learning the principles, processes, and nature of the work through immersion and hands-on training.

Analyzing and Mitigating Competency Deficiencies

The final component of the program focuses on the inadequacies in a number of competencies. As noted from the FGDs and IDIs, R&D managers and directors lack the fundamental skills of critical thinking and problem solving. Part of the reason for this is a lack of structured frameworks that guide these key processes. To address this, structured frameworks including SWOT analysis, root-cause analysis, and scenario planning will be introduced to the R&D decision-making apparatus.

Competency development also benefits from the right mindset. If managers have a competitive mindset, they may resist delegating and mentoring, which is detrimental for developing their teams. A mentorship culture is one antidote to this. When KPIs are aligned with team development, and when effective delegation is a performance factor that gets rewarded, then mentorship becomes a much less prohibited pathway for developing both the mentor and the mentee.

The challenges that come with limited resources and stakeholder engagement can inhibit innovative efforts. This tendency can be countered through a plan to allocate more resources, modern tools and technology to R&D. As with most of the strategies aforementioned, stakeholder alignment and ample support is needed to execute this plan. The support from stakeholders can be strengthened through conducting workshops that ensure that clear expectations are set and that organizational goals regarding innovation are well understood by all involved.

Expected Outcomes

This action plan's implementation is expected to result in a significant transformation of the R&D manager's role, allowing these individuals to lead and direct innovation efforts across their organizations. The outcome of this program is envisioned to direct project teams and management teams in the future towards working more effectively together; becoming better at using the cash and time resources afforded them; and succeeding in product development initiatives that are more unique, transformational, and groundbreaking than the outreach of product development efforts today.

Shown in Table 3 is the summary of the recommended strategy and framework for capacitating R&D Managers in the food manufacturing industry to enhance management skills based on insights gathered from this study.

Table 3

Framework for Capacitating R&D Managers in the Food Manufacturing Industry for Enhanced Management

Areas of Concern	Design	Guidelines	Key Focus
Structure and Environment of R&D Managers	Functional and Specialized Team	Develop cross-cultural functional teams with specialized skills to foster collaboration and innovation.	Align team roles with projects to ensure efficient and effective problem-solving skills and project execution.
	Innovation Driven Culture	Encourage a culture where creativity, experimentation, and risk-taking are valued and supported	Establish open communication and reward innovative thinking and solutions
	Creativity and Process Familiarity	Ensure processes are flexible to allow creativity while providing objectivity and structure for consistency	Implement frameworks that allow for both exploration and structured progress tracking/monitoring

Areas of Concern	Design	Guidelines	Key Focus
Professional Growth and Skill Development of R&D Managers	Core Skills for Innovation Management	Focus on building skills like strategic thinking, technology management, and adaptability.	Assess, identify and bridge gaps in current skills with tailored and personalized training workshops.
	Skill Development	Recognize and address barriers such as time constraints, resource limitations, and resistance to change	Develop flexible learning opportunities that integrate with current workloads and responsibilities
	Professional Development Opportunities	Provide opportunities for continuous learning and development through courses, seminars, and mentorship programs	Encourage participation in industry conferences and networking to stay updated on the latest trends and technologies related to its functions
R&D Managers Skills & Competency	Critical Thinking and Problem Solving	Regularly assess and enhance critical thinking skills through training and real-life scenarios	Utilized problem-based learning methods to strengthen analysis and decision-making capabilities
	Attitude & Mindset on Competency Growth	Foster a growth mindset by promoting resilience, curiosity, and continuous improvement	Implement feedback mechanisms and encourage self-reflection to drive personal growth and development
	Resources Opportunities and Stakeholders Engagement	Leverage internal resources and collaborate with stakeholders to enhance competency and drive innovation	Establish strategic partnerships and utilize external expertise for enriched learning and competency development

Chapter V

CONCLUSION & RECOMMENDATIONS

Conclusions

Findings from this study revealed that the effectiveness of R&D managers in the food manufacturing industry depends on a mix of organizational, cultural, and individual factors. These influence the path leading to the "big idea" and the innovation happening in the many necessary forms (e.g., product, process, business model) that typical food and beverage companies undertake to satisfy customer and consumer demands. The study highlighted the urgent need for timely and targeted interventions to support R&D managers in overcoming a series of challenges ranging from a lack of authority to the identified resource problems.

Furthermore, although numerous organizations aim to create a culture where innovation flourishes, the absence of explicit objectives and inadequate incentives for innovative contributions slows down the momentum. The balance between stimulating creativity and following essential processes emerged as a critical issue that demands a careful resolution, allowing for both creative exploration and operational discipline. The most significant finding noted from this study was the substantial gap in critical managerial skills in R&D, especially related to the art and science of managing for innovation. Many R&D managers are competent in terms of the technical aspects but lack the skills in leadership and strategic thinking.

Time constraints limited organizational backing, and insufficient access to professional development resources have been determined to detriment these inequities. The study also revealed some weak spots on the part of R&D teams such

as weak spots in competencies that affect the ability to achieve innovation targets. This includes gaps and deficits in critical thinking and problem-solving, as well as competencies that form the basis of those activities.

In addition, scarce resources and stakeholders with misaligned expectations create another obstacle that constrains R&D managers and reduces their capacity to drive successful innovation projects.

Recommendations

From these results, some suggestions can be made that will strengthen the R&D manager's position as presented in Table 3. It is one thing for a manager to make reforms based on these findings, but it is another to have the organization carry them out. Structural reforms that lead to better communication, clearer objectives, and a more cross-functional team-based environment are crucial if Reforming Catalysts are going to effectively catalyze innovation in their organizations.

To tackle the lack of professional skills, organizations need to develop and carry out far-reaching training schemes that are specifically targeted at R&D managers. These schemes should aim to elevate the kinds of innovation management competencies that are necessary for R&D managers to perform at a high level. They should also contain many learning-by-doing opportunities, as well as access to many certifications and industry events.

The deficits in competencies must be resolved by generating a culture of mentorship and collaboration through delegation and recognition. In addition, giving R&D managers access to modern-day tools, adequate funding, and clear stakeholder alignment will allow them to leverage those resources to drive their innovation efforts.

To sum up, the study highlights a far-reaching and comprehensive solution to the problem of insufficient support for R&D managers in the food manufacturing industry. It targets three key areas for improvement and offers remedies that should allow those managers and their R&D teams to work more effectively, with a greater likelihood of achieving truly innovative results.

The following stakeholders and institutions will benefit and gain knowledge from this study:

R&D Office

For R&D offices, this study provides critical new insights into the structures and cultures that best enable R&D managers to act in an empowering way and thus optimize the return on the organization's R&D investment. The following barriers that often stand in the way of empowered decision-making at several R&D offices are: 1) managerial barriers (e.g., policies that constrain creativity and innovation), 2) structural barriers (e.g., layers of organization), and 3) cultural barriers (e.g., a culture that does not value empowerment). R&D offices must overcome those barriers and optimize the governance of R&D processes.

R&D Managers

This study directly benefits R&D managers. It highlights the skill shortages and development needs of R&D managers, which identifies a clear path toward personal and professional enhancement. R&D managers can use these findings to inform their choices of training programs, workshops, and other learning opportunities. In addition to fully utilizing this study for their growth, they must use it in R&D team discussions to direct the development of team members toward better performance and enhanced team success. If their organization is not currently offering the identified necessary

training, discussions must be conducted with their direct supervisor about the results and suggested paths of personal and professional growth.

Academia and University Community

The study stands to benefit the faculty, staff, and student bodies of universities and colleges in the Philippines. Those within the institutions of higher learning may be seen as the primary incubators for innovation and entrepreneurship in society. As such, the findings may serve to inform and guide the development of not just curricula but also the programs and experiences for which they hold faculty and students accountable.

The results of this ethnographic study should empower those within the university community with practical guidelines and actionable insights for improving the academic research setting. If universities truly are the incubators for innovation and entrepreneurship and if "stirring the pot" is necessary for improving the yield of innovative projects, then the study's implications for the university community can only lead to one destination: a better, more practical, and more successful research agenda.

Policymakers

The study's results hold benefits for more than just the organizations examined in this research. They can also be of service to policymakers. Innovation and technological advancement create lasting economic growth. Possible funding sources—be they company coffers or government purse—should operate under the premise that R&D and innovation are essential activities. And they should act, not just fund, in the spirit of the findings of this research and the ones it extends. To stimulate those activities, more effective R&D organizations must be cultivated, ones in which

R&D managers feel both empowered and equipped to lead their teams in the development of innovative ideas, especially across the many industries where research and development funding plays a significant role.

Researcher

Innovation management, organizational behavior, and leadership studies all have something to gain from this study, which adds to the current state of knowledge in these fields. The reason it stands to make a (positive) impact is that it provides both hard data (the kind that you can count and that speaks for itself) and soft data (the kind that requires you to think deeply for it to really speak to you), which makes for a rather potent combination in an academic paper these days. When one considers the exploratory nature of the study (that is, it doesn't claim to have all the answers), what one comes away with is plenty of food for thought concerning the empowerment of R&D managers and how that is catalyzing innovations in organizations.

Future Researchers

For those who will be doing the research in the future, this study sets forth a framework and methodological approaches that could be effectively used to not only investigate but also to understand the empowerment of R&D managers far and wide. This study set the stage and identified critical aspects of this empowerment process that could/should be explored in future investigations. This study also offered several insights that researchers could use to inform their future undertakings. The results/findings of this study provided both a theoretical backdrop and a practical stage for why and how not only R&D managers but also those who lead and govern them could be better served, and serve better, on the empowerment front.

This study matters because it could help practices across several areas to do better. R&D offices might operate a little more smoothly and with a little more brilliance, according to this study. R&D managers might find themselves growing, profiting, and, yes, having a good time in the R&D space, owing to some helpful hints and directions for them in this study. The university sector and its many stakeholders might be in a better position to educate the next generation of R&D leaders, according to this study. Leaders across several sectors might make better and more innovative decisions, owing to this study's accumulation of helpful hints for mentoring R&D managers and, by extension, those in their charge.

In conclusion, this paper has provided valuable insights, yet certain limitations have been identified. This should serve as a starting point for future investigations, which are vital for a more comprehensive understanding and for building upon the work presented.

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Appendices

APPENDIX A

In-depth Interview (IDI) Questions

1. How is your R&D department set up? Is it more controlled by a central group or spread out among different teams?
2. What is the work environment like in your R&D department? Is it creative, cautious, or something else?
3. How does the way your R&D department is organized and its culture affect your ability to innovate?
4. What skills do R&D managers in the food manufacturing industry need to manage innovation well?
5. What are the biggest challenges in developing these skills?
6. How much support do you feel you get from your organization for your professional growth?
7. How do you measure the success of new ideas and projects in your department?
8. What are the main obstacles you face when trying to implement new ideas or technologies?
9. How do you encourage teamwork and sharing of knowledge in your R&D team?
10. What strategies do you use to balance short-term and long-term innovation goals?

APPENDIX B

Focus Group Discussion (FGD) Questions

1. How are R&D departments usually set up in food manufacturing companies?
2. How do these setups affect the ability to come up with new ideas?
3. What common problems in your department make it hard to come up with new ideas ?
4. What skills do R&D managers in the industry often lack?
5. How can companies better help R&D managers grow professionally?
6. What are the best ways to create a culture or environment of innovation in R&D departments?
7. How can companies encourage risk-taking and trying new things?
8. What should be measured to see if innovation efforts are successful?
9. How can companies improve teamwork and sharing of knowledge between R&D teams?
10. What are the best strategies to help R&D managers lead innovation effectively?