

DEVELOPMENT OF A STRATEGIC FORESIGHT FRAMEWORK FOR CONTINUOUS PROFESSIONAL TRAINING FOR RESEARCH, INNOVATION, AND SERVICE EXTENSION (RISE)

Resty Samosa  Jie Anne E. Amistoso  Rona B. Quiton  Marion Rodrigo Marinas III  Eliza
Mae R. Samosa 
Cavite State University Naic

Corresponding author: rsamosa@cvsu-naic.edu.ph

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Abstract: Higher education institutions are increasingly challenged to strengthen research, innovation, and service extension amid rapid technological, societal, and policy changes, highlighting the need for future-oriented professional development. This study aimed to develop a Strategic Foresight Framework for Continuous Professional Training in Research, Innovation, and Service Extension (RISE) through a qualitative grounded theory approach. Thirty-five participants comprising faculty members, researchers, extension practitioners, and academic administrators were purposively selected from higher education institutions. Data were collected through in-depth semi-structured interviews, focus group discussions, document analysis, and field observations and analyzed using the constant comparative method involving open, axial, and selective coding. The findings revealed four interrelated themes: (1) Navigating Professional Growth Amid Emerging Institutional and Societal Demands; (2) Strategic Foresight as a Catalyst for Future-Ready Professional Practice; (3) Building Sustainable Professional Training through Collaborative and Adaptive Systems; and (4) the Emergence of the Strategic Foresight-Driven Continuous Professional Training Theory. The substantive theory explains that sustainable professional capacity develops through four interconnected processes: environmental intelligence, strategic capacity building, collaborative knowledge integration, and adaptive institutional transformation, supported by strategic foresight as the core organizational capability. These processes informed the development of the proposed Strategic Foresight Framework for Continuous Professional Training in Research, Innovation, and Service Extension (RISE), which provides an evidence-based guide for designing future-oriented professional development policies and institutional capacity-building initiatives. The study contributes to the literature by advancing a grounded theoretical framework that integrates strategic foresight with continuous professional learning, organizational resilience, and institutional transformation, offering practical implications for higher education institutions seeking to strengthen research productivity, innovation performance, extension effectiveness, and long-term sustainability.

Keywords: *continuous professional training, innovation, grounded theory, research, service extension, strategic foresight*

INTRODUCTION

Higher education institutions (HEIs) are increasingly recognized as drivers of knowledge creation, innovation, and sustainable development through their core functions of instruction, research, innovation, and community engagement (Lunag et al., 2024). In response to rapid advancements in digital technologies, artificial intelligence, globalization, and evolving societal challenges, universities are expected to strengthen their capacity to generate impactful research, foster innovation ecosystems, and deliver responsive extension programs to the community. These developments have heightened the need for continuous professional training that equips faculty members, researchers, extension practitioners, and academic leaders with the competencies required to adapt to emerging trends and future uncertainties in the field of education. Consequently, professional development has evolved from

a compliance-oriented activity into a strategic institutional investment that enhances organizational resilience, research productivity, innovation capabilities, and societal impact (Rivera et al., 2025).

Strategic foresight has gained increasing attention as an organizational capability that enables institutions to anticipate change, explore alternative futures and formulate proactive strategies in increasingly complex environments (Vásquez et al., 2022). Unlike conventional strategic planning, strategic foresight integrates horizon scanning, systems thinking, scenario development, and anticipatory governance to support long-term decision-making in uncertain conditions (Zhang et al., 2024). In higher education, embedding strategic foresight into continuous professional training can strengthen institutional preparedness by cultivating competencies in research, innovation, interdisciplinary collaboration, and community engagement (Andresen et al., 2020). This approach aligns with the growing international emphasis on future-ready universities capable of responding to technological disruption and sustainable development challenges (UNESCO, 2022; OECD, 2021).

Across ASEAN, higher education reforms have increasingly emphasized research excellence, innovation, digital transformation, and university-community partnerships to improve regional competitiveness. Nevertheless, professional development initiatives remain largely competency- and compliance-driven, with limited integration of strategic foresight into institutional capacity building. Similarly, Philippine higher education institutions continue to advance quality assurance, internationalization, research productivity, innovation, and extension in support of the Philippine Development Plan 2023–2028, the Commission on Higher Education's strategic priorities, and the Sustainable Development Goals, particularly SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation and Infrastructure), and SDG 17 (Partnerships for the Goals). Achieving these national and global priorities requires professional development systems that are adaptive, evidence-informed, and capable of preparing academic personnel for future institutional and societal demands (NEDA, 2023; CHED, 2025).

At the Cavite State University (CvSU), research, innovation, and extension constitute integral components of the university's mandate to promote academic excellence and sustainable community development. Although faculty development initiatives have strengthened research capability, innovation, and extension delivery, existing professional training programs predominantly address immediate institutional needs rather than systematically preparing academic personnel for emerging opportunities and uncertainties. This limitation underscores the need for a strategic foresight framework capable of guiding continuous professional training that is responsive to evolving research ecosystems, technological advances, and changing stakeholder expectations.

Despite the growing body of literature on faculty development, research capability, innovation management, and extension effectiveness, limited empirical evidence explains how strategic foresight can be integrated into continuous professional training within higher education (Muhonen et al., 2024). Existing studies have primarily employed descriptive, evaluative, or correlational designs, providing a limited understanding of the underlying processes through which stakeholders anticipate future challenges, develop adaptive competencies, and sustain institutional capacity (Tafere Gedifew et al., 2021; Saputra et al., 2024; Abukalusa, & Oosthuizen, 2025). Moreover, studies that generate a substantive theory linking strategic foresight with continuous professional training in research, innovation, and service extension remain scarce, particularly within the higher education context. Addressing this theoretical and contextual gap is essential for developing evidence-based models that support sustainable, institutional transformation.

Motivated by the researcher's professional experience in faculty development, research management, innovation, and extension, this study sought to develop a Strategic Foresight Framework for Continuous Professional Training in Research, Innovation, and Service Extension (RISE) using a grounded theory approach.

Specifically, this study explored stakeholders' experiences and future-oriented professional development needs, examined their perceptions and applications of strategic foresight, identified the processes and contextual factors influencing sustainable professional training, and generated a

substantive theory explaining the development of a foresight-driven framework. The resulting framework is expected to contribute to the advancement of strategic foresight scholarship while providing higher-education institutions with an evidence-based guide for strengthening professional development, institutional resilience, research excellence, innovation performance, and community engagement in an increasingly uncertain and dynamic environment.

RESEARCH OBJECTIVES

This study aimed to develop a Strategic Foresight Framework for Continuous Professional Training in Research, Innovation, and Service Extension (RISE) by generating substantive theory grounded in the experiences and perspectives of key stakeholders involved in professional development initiatives.

Specifically, this study sought to:

1. The study explored the experiences, challenges, opportunities, and future-oriented professional development needs of faculty members, researchers, extension practitioners, and academic administrators in relation to continuous professional training for research, innovation, and service extension.
2. This study examined stakeholders' perceptions and applications of strategic foresight in anticipating emerging trends, responding to uncertainty, and strengthening future competencies in research, innovation, and service extension.
3. Identify the processes, interactions, strategies, and contextual conditions that influence the effectiveness and sustainability of continuous professional training for research, innovation, and service extension.
4. Generate a substantive theory that explains the development of a Strategic Foresight Framework for continuous professional training in research, innovation, and service extension, providing an evidence-based foundation for future policy, capacity-building initiatives, and institutional practice.

METHODS

This study employed a qualitative research design using the Grounded Theory approach to develop a Strategic Foresight Framework for Continuous Professional Training in Research, Innovation, and Service Extension (RISE) in the agrifishery sector. Grounded Theory was selected because it enables the inductive generation of a substantive theory that explains the social processes, interactions, and experiences through which strategic foresight informs continuous professional training, rather than the testing of predetermined theoretical propositions (Charmaz, 2014; Corbin & Strauss, 2015).

This study was conducted in four coastal barangays of the Municipality of Naic, Cavite: Bucana Malaki, Labac, Bancaan, and Bagong Kalsada. These communities were purposively selected because of their active engagement in fisheries and agrifishery activities, as well as their involvement in community-based resource management, technology adoption, research, and extension initiatives facilitated by higher education institutions, local government units, and national agencies. The convergence of indigenous knowledge, scientific research, technological innovation, and extension activities within these communities provided a rich empirical context for examining strategic foresight in professional capacity development.

Thirty-five participants, comprising faculty members, researchers, extension practitioners, and academic administrators, were purposively selected from higher education institutions with relevant involvement in research, innovation, extension, community engagement, and professional capacity development initiatives in the Philippines. As the analysis progressed, theoretical sampling was employed to refine the emerging categories and identify participants who could provide deeper insights into developing concepts until theoretical saturation was achieved (Corbin & Strauss, 2015). Eligible

participants were at least 22 years old, had a minimum of five years of relevant professional experience, were actively involved in research, innovation, extension, community engagement, or capacity-building initiatives, and were affiliated with higher education institutions engaged in the selected coastal communities. Individuals who did not meet the inclusion criteria or were unable to participate in the in-depth interviews were excluded from the study.

Data were collected through semi-structured individual interviews, focus group discussions, document analysis, and field observations. Documentary evidence included municipal fisheries development plans, barangay development plans, research reports, innovation project documents, and extension program records. Throughout the study, field notes and analytic memos were maintained to capture contextual observations, emerging insights, and researcher reflections that informed theory development.

Data collection and analysis were conducted concurrently using a constant comparative method (Corbin & Strauss, 2015). The analysis involved open coding to identify initial concepts, axial coding to establish relationships among categories, and selective coding to integrate the emerging categories into a substantive theory explaining how strategic foresight strengthens continuous professional training in research, innovation and service extension. Continuous comparison, memo writing, and theoretical sensitivity facilitated conceptual refinement, while data collection ceased upon reaching theoretical saturation when no new categories or conceptual relationships emerged.

The rigor of the study was established using Lincoln and Guba's (1985) criteria for trustworthiness. Credibility was enhanced through prolonged engagement, member checking, and methodological triangulation across interviews, focus groups, documentary evidence, and field observations. Transferability was supported through thick descriptions of the research context and participants, while dependability was ensured by maintaining a comprehensive audit trail of the methodological and analytical decisions. Confirmability was strengthened through reflexive journaling, peer debriefing, and systematic documentation of the coding procedures to minimize researcher bias.

Ethical principles were followed throughout this study. Prior to data collection, ethical approval was obtained from the appropriate Institutional Research Ethics Committee. Participants received detailed information regarding the study's objectives, procedures, potential risks, and benefits before providing written informed consent. Participation was voluntary, and the participants retained the right to withdraw at any stage, without consequence. Confidentiality and anonymity were maintained through the use of pseudonyms, and all research records were securely stored and used exclusively for academic purposes. The emergent substantive theory served as the empirical basis for developing the proposed Strategic Foresight Framework for Continuous Professional Training in Research, Innovation, and Service Extension (RISE) to enhance research capability, innovation, and extension services within coastal agrifishery communities.

RESULTS AND DISCUSSIONS

This section presents the findings derived from the grounded theory analysis using the constant comparative method of open, axial, and selective coding. The findings reflect the experiences and perspectives of faculty members, researchers, extension practitioners, and academic administrators regarding continuous professional training in research, innovation, and service extension (RISE).

The results are organized according to the study's four research objectives: (1) participants' experiences, challenges, opportunities, and professional development needs; (2) stakeholders' perceptions and applications of strategic foresight; (3) the processes and contextual conditions influencing sustainable professional training; and (4) the emergence of the Strategic Foresight-Driven Continuous Professional Training Theory, which served as the basis for the proposed Strategic Foresight

Framework for Research, Innovation, and Service Extension (RISE). Participant narratives are integrated with relevant literature to support the interpretation of the findings and highlight their theoretical and practical implications

Theme 1. Navigating Professional Growth Amid Emerging Institutional and Societal Demands

The analysis revealed that participants regarded continuous professional training as a fundamental mechanism for strengthening research capability, innovation, and service extension, while enabling higher education institutions to respond effectively to evolving societal and institutional demands. Across participant groups, professional development was viewed as an ongoing process that equips academic personnel with the competencies needed to address emerging research priorities, technological advancements, policy reforms, and community needs.

One faculty member emphasized the importance of continuous learning:

"Professional training should not end after attending one seminar. Every year, new technologies, research methods, and community issues emerge; therefore, we must continuously upgrade our knowledge and skills to remain relevant." (Participant 4, Faculty Member)

Similarly, an extension practitioner highlighted the changing nature of community engagement:

"The needs of our partner communities are constantly changing. We need regular training to understand new approaches, technologies, and policies so that our extension programs remain responsive and sustainable." (Participant 12, Extension Practitioner)

The narratives indicate that participants view professional development not simply as the acquisition of individual competencies but as an adaptive institutional capability that enables academic professionals to respond to changing educational demands in the field. While Raman et al. (2025) and Khan et al. (2025) emphasize the importance of continuous professional learning for adaptability and institutional resilience, the present study extends this perspective by showing that professional development becomes meaningful when individual learning is translated into collective organizational capacity. Thus, professional development may be understood as a mechanism that connects individual growth and institutional adaptability.

However, participants' experiences also reveal a gap between the expectation for continuous development and the institutional conditions needed to sustain it. Inadequate financial support, heavy teaching and administrative workloads, fragmented programs, limited mentoring, and unequal access to research and innovation resources constrain meaningful participation. These findings suggest that professional development is not solely an individual responsibility but a systemic and organizational process. Therefore, the theoretical contribution lies in shifting the view of professional development from "participation in training" to "institutional capacity-building," where sustained learning, adequate support, mentoring, resources, and opportunities for application collectively transform professional growth into institutional resilience and innovation.

As one researcher explained:

"Many faculty members are willing to conduct research, but limited funding and heavy workloads make it difficult to participate in long-term training and collaborative projects." (Participant 18, Researcher)

An academic administrator similarly observed:

"Professional development activities are often conducted independently by different offices. Without coordination and long-term planning, the impact of these trainings becomes limited." (Participant 26,

These findings suggest that institutional constraints can reduce professional development to isolated training events rather than a coherent system for sustained competency enhancement. While Panella (2025) and Emborgo and Uchang (2025) emphasize organizational support, leadership, and resource allocation, the present findings extend this perspective by suggesting that the effectiveness of professional development depends on institutional connectedness—the extent to which training, mentoring, collaboration, resources, and opportunities for application are integrated into a continuous learning system.

Participants further identified interdisciplinary collaboration, digital platforms, international partnerships, industry linkages, mentoring, and communities of practice as important opportunities. Theoretically, these findings position professional development as an ecosystem of interconnected learning relationships rather than a series of training activities. Such an ecosystem enables knowledge to circulate across disciplines and institutional boundaries, transforming individual learning into collective capacity, innovation, and sustained organizational adaptability.

One participant remarked:

"Collaboration with researchers from other disciplines and institutions exposes us to new perspectives and improves both our research and extension programs." (Participant 21, Researcher)

Another participant stated,

"Online training and international webinars have expanded our access to experts and best practices that were previously unavailable." (Participant 30, Faculty Member)

These findings indicate that collaborative networks and digital technologies have shifted professional learning from institution-bound activities to interconnected and boundary-spanning learning systems. While Taga (2025) and Toquero and Ramos (2024) emphasize digital ecosystems, collaboration, and international partnerships, the present findings extend this view by suggesting that their greatest value lies in connecting knowledge, expertise, and resources across institutional boundaries, thereby strengthening the collective capacity for research and innovation.

Looking ahead, participants advocated for competency-based and foresight-oriented development focused on emerging technologies, artificial intelligence, sustainability, innovation management, research commercialization, strategic leadership, and evidence-informed decision-making. Theoretically, this suggests that professional development should evolve from reactive skills training to anticipatory capability building, enabling academic professionals to respond to current demands and identify, prepare for, and shape emerging educational challenges.

As one administrator explained:

"Future training should prepare us not only for today's challenges but also for those we have not yet encountered. We must anticipate future trends rather than simply reacting to them." (Participant 33, Academic Administrator).

This perspective suggests a shift from reactive professional development to anticipatory capacity building, where strategic foresight enables academic professionals to prepare for emerging uncertainties rather than merely responding to existing demands. Beyond supporting future-oriented learning systems, the findings propose that foresight should function as a core organizing principle of professional development, linking competency enhancement with institutional preparedness and adaptive actions.

Overall, the findings advance the view of professional development as an integrated adaptive

learning ecosystem, rather than a compliance-based training mechanism. Such an ecosystem connects lifelong learning, collaborative knowledge creation, foresight, and institutional support, transforming professional development into a strategic capability for sustaining research, innovation, community engagement, and institutional resilience amid future uncertainty.

Theme 2. Strategic Foresight as a Catalyst for Future-Ready Professional Practice

The analysis revealed that the participants perceived strategic foresight as an essential capability for anticipating future challenges and opportunities in research, innovation, and service extension. Although many participants were unfamiliar with the formal terminology of strategic foresight, they demonstrated its practical application through environmental scanning, trend monitoring, collaborative planning, risk assessment and proactive decision-making. These practices enabled them to prepare for emerging changes, rather than merely reacting to them.

A faculty member emphasized the importance of anticipating future developments:

"We cannot rely only on current practices because the demands of research and extension keep changing. We must anticipate future trends and prepare ourselves before these changes affect our work."
(Participant 7, Faculty Member)

Similarly, an extension practitioner described foresight as a guide for planning community-based initiatives:

"Before implementing extension programs, we study the community's future needs, possible environmental risks, and available technologies. Planning ahead helps develop more sustainable projects." (Participant 15, Extension Practitioner).

These narratives suggest that participants practiced strategic foresight not as a formalized process but as an embedded decision-making capability in research, innovation, and extension planning. Their emphasis on long-term implications, preparedness, adaptability, and informed choices indicates that foresight is a practical mechanism for reducing uncertainty and improving institutional responsiveness. The findings further suggest that foresight is context-triggered and adaptive, emerging in response to technological changes, shifting research priorities, funding conditions, climate concerns, and evolving community needs. Theoretically, this positions strategic foresight beyond formal forecasting exercises as a continuous organizational capability that connects environmental sensing with anticipatory action, enabling institutions to adjust their priorities and allocate resources before emerging changes become critical challenges.

A researcher shared:

"Research priorities constantly evolve because funding agencies focus on emerging issues. We must monitor these trends to ensure that our research remains relevant and competitive." (Participant 20, Researcher)

Similarly, an academic administrator noted:

"Strategic planning should always consider future institutional directions. If we only respond after changes occur, we will always be behind other institutions." (Participant 31, Academic Administrator).

These findings position strategic foresight as more than just a planning tool; it functions as a link between environmental sensing and institutional action. By identifying emerging opportunities and risks, participants used foresight to align professional development with evolving institutional priorities, while strengthening innovation readiness through environmental scanning, collaborative learning, and adaptive leadership. Although Obmerga et al. (2025) and Lintag et al. (2025) emphasized the role of foresight in resilience and sustainability, the present findings extend this perspective by conceptualizing foresight as an integrative capability that connects anticipation, learning, and adaptive decision-making.

Overall, strategic foresight emerges as a catalyst for future-ready professional practice, shifting institutional behavior from reactive problem-solving to proactive and continuous adaptation. Its integration into professional development can therefore transform individual competencies into collective institutional capacity for research, innovation, extension, and sustained responsiveness to uncertainty

Theme 3. Building Sustainable Professional Training through Collaborative and Adaptive Systems

The findings revealed that the sustainability of continuous professional training is shaped by the dynamic interaction between institutional support, collaborative engagement, leadership commitment, resource availability, and organizational culture. Participants consistently emphasized that effective professional development extends beyond individual participation and requires institutional systems that foster collaboration, mentoring, knowledge sharing, and continuous evaluation of the program. A faculty member underscored the importance of institutional support:

"Professional development becomes meaningful when the institution provides continuous support, adequate resources, and opportunities to apply what we have learned. Training should be a part of our institutional culture, not just an annual activity." (Participant 9, Faculty Member)

Similarly, an extension practitioner highlighted the value of collaboration:

"Working with researchers, local government units, and community partners allows us to exchange ideas and improve our extension programs. Learning becomes more sustainable when everyone contributes their expertise." (Participant 17, Extension Practitioner)

These accounts suggest that collaborative learning functions not only as a support mechanism but also as a social infrastructure for professional capability development. Mentoring, interdisciplinary collaboration, and stakeholder engagement enable knowledge circulation, competencies to be applied, and professional networks to be developed. The findings therefore position professional growth as a collective and relational process rather than an outcome of individual training alone.

The identified strategies, competency-based needs assessment, interdisciplinary learning, structured mentoring, collaborative research, stakeholder partnerships, digital platforms, and systematic evaluation collectively suggest an integrated professional learning ecosystem. The theoretical contribution lies in viewing these strategies as interconnected components that convert training into sustained knowledge exchange, competency application, and institutional capacity building. A researcher explained:

"Training should begin with the identification of competency gaps. When programs are based on actual needs and are followed by mentoring and evaluation, they become effective and relevant." (Participant 22, Researcher)

An academic administrator further emphasized the role of leadership:

"Institutional leaders should champion professional development by allocating resources, encouraging innovation, and creating policies that support continuous learning rather than one-time training activities." (Participant 29, an Academic Administrator):

These findings position transformational leadership not simply as a supportive condition but as a structural mechanism that converts professional development into an institutional practice. Leadership commitment connects innovation, collaboration, and continuous learning with strategic priorities, enabling professional development as an organizational capability rather than an isolated activity. Conversely, fragmented planning, inconsistent policies, inadequate funding, weak monitoring and evaluation, and competing workloads reveal that the sustainability of professional development depends on institutional coherence and support. The findings suggest that effective professional development emerges from the interaction of leadership, resources, policy alignment, and accountability, highlighting a shift from leader-supported training to leadership-initiated institutional learning. One participant remarked,

"Many training programs are well organized, but without follow-up support or evaluation, it is difficult to determine whether they actually improve our research, innovation, or extension practices." (Participant 34, Academic Administrator).

These findings conceptualize professional development as a socially constructed and organizationally embedded capability shaped by the interaction of individual agency, institutional commitment, and environmental conditions. Rather than treating training as an individual activity, the findings suggest that sustainable capacity building emerges when policies, collaborative learning, leadership, resources, and evaluation operate as interconnected systems.

While Watts et al. (2022), Rosel et al. (2025), and Parinasan et al. (2024) emphasize collaboration, shared leadership, and collective learning, the present study extends these perspectives by proposing institutional coherence as the central mechanism linking professional learning to organizational adaptability. Professional development becomes sustainable when learning is systematically connected to institutional priorities, resource allocation, knowledge-sharing, and continuous evaluation. Overall, the findings suggest that sustainable professional development is best understood as an adaptive institutional ecosystem that transforms individual learning into a collective capacity for research, innovation, extension, and long-term institutional resilience.

Theme 4. Emergence of the Strategic Foresight-Driven Continuous Professional Training Theory

The constant comparative analysis resulted in the emergence of the Strategic Foresight-Driven Continuous Professional Training Theory, which explains how higher-education institutions can strengthen research, innovation, and service extension by embedding strategic foresight within institutional professional development systems.

The theory emerged from participants' shared experiences and revealed that sustainable professional capacity is achieved through a continuous, adaptive, and collaborative process rather than through isolated training activities.

An academic administrator emphasized the importance of long-term institutional planning:

"Professional development should be guided by where the institution wants to be in the future. Training must prepare faculty and staff for emerging challenges instead of simply responding to current needs." (Participant 32, Academic Administrator)

Similarly, a faculty member highlighted the value of anticipating future competencies:

"We need to develop skills that will remain relevant in the coming years. Preparing for future technologies and research directions is more important than addressing today's issues alone." (Participant 11, Faculty Member)

Analysis of the participants' narratives identified four interrelated processes that collectively explain how strategic foresight enhances continuous professional training:

The first process, **Environmental Intelligence**, involves the continuous scanning of emerging technologies, research trends, institutional policies, funding opportunities, and societal needs. Participants explained that regularly monitoring external developments enables institutions to anticipate changes, identify opportunities, and proactively respond to emerging challenges.

The second process, **strategic capacity building**, focuses on aligning professional development initiatives with anticipated institutional priorities and future competency requirements. Participants emphasized that training programs should be competency-based, evidence-informed, and responsive to future developments in research, innovation, digital transformation, sustainability, and community engagement.

The third process, **collaborative knowledge integration**, reflects the importance of interdisciplinary partnerships, mentoring, stakeholder engagement, knowledge sharing, and organizational learning. Participants consistently described collaboration as a mechanism that facilitates innovation, strengthens research capability, and promotes the exchange of expertise across institutions and communities.

As one extension practitioner explained:

"Innovation grows when researchers, faculty members, extension workers, and community partners learn from one another. Collaboration transforms individual knowledge into institutional knowledge." (Participant 24, Extension Practitioner)

The final process, **Adaptive Institutional Transformation**, describes how continuous evaluation, innovation, evidence-informed decision-making, and organizational learning enable institutions to remain resilient and responsive to changing educational and societal demands. Participants viewed institutional adaptability as the outcome of leadership commitment, continuous learning, and supportive organizational culture.

A researcher stated:

"Training should not end after implementation. Institutions need to evaluate outcomes, learn from experience, and continuously improve future programs." (Participant 27, Researcher)

The findings revealed that strategic foresight, competency development, collaborative learning, and adaptive institutional transformation operate within enabling conditions such as transformational leadership, institutional commitment, collaborative culture, adequate resources, and supportive policy. When these conditions converge, higher education institutions are better positioned to anticipate change, respond proactively to uncertainty, and sustain research, innovation, and performance.

These findings provide an empirical foundation for the Strategic Foresight Framework for Continuous Professional Training in Research, Innovation, and Service Extension (RISE). The framework conceptualizes strategic foresight as the central integrating capability that connects environmental intelligence, competency development, collaborative learning, and institutional adaptation in a continuous cycle. This moves professional development beyond isolated training activities toward an anticipatory, systemic, and institutionally embedded process of capacity building.

Consistent with organizational learning and strategic foresight perspectives (Diangha, 2025; Ashkapova & Alili, 2025), the findings extend the existing scholarship by identifying institutional integration as the mechanism through which foresight is translated into sustained professional and

organizational capacity. Rather than treating foresight, learning, leadership, and support as separate factors, the emergent theory proposes that their interaction creates the conditions for continuous adaptation and resilience in organizations. Overall, the Strategic Foresight-Driven Continuous Professional Training Theory advances the view that sustainable professional development results from the dynamic interaction of anticipation, learning, collaboration, and institutional adaptation to the changing environment. This provides an evidence-based foundation for designing future-oriented policies and capacity-building initiatives that strengthen research, innovation, extension, and institutional resilience.

Proposed Strategic Foresight Framework for Continuous Professional Training for Research, Innovation, and Service Extension (RISE)

The Strategic Foresight Framework for Continuous Professional Training in Research, Innovation, and Service Extension (RISE) emerged from substantive theory generated through grounded theory analysis. The framework conceptualizes continuous professional training as a cyclical, adaptive, and future-oriented institutional process rather than a series of isolated training activities. At its core, the framework positions strategic foresight as the central organizational capability that enables higher education institutions (HEIs) to anticipate change, strengthen professional competencies, foster collaborative learning, and sustain excellence in research, innovation, and service. The framework illustrates that institutional resilience and long-term competitiveness are achieved through continuous interaction among external drivers, organizational processes and feedback mechanisms that collectively promote sustainable professional development.

External Drivers.

The outermost layer of the framework represents external drivers that continually influence institutional priorities and professional development needs. These include emerging technologies, artificial intelligence, research trends and priorities, climate change, government policies, industry needs, community needs, and Sustainable Development Goals (SDGs). These dynamic forces create opportunities and challenges that require institutions to continuously reassess their strategies, competencies, and organizational practices. Participants consistently emphasized that higher-education institutions cannot remain effective if professional development is based solely on current organizational needs. Instead, institutions must continuously monitor external developments to ensure that faculty members, researchers, extension practitioners, and academic leaders remain responsive to the rapidly evolving scientific, technological, economic, and societal demands. This finding aligns with the strategic foresight literature, which argues that organizations capable of systematically monitoring environmental change are better positioned to anticipate disruption and respond proactively rather than reactively (Lintag et al., 2025).

Strategic Foresight as the Core Organizational Capability

At the center of the framework is strategic foresight, which serves as the core organizational capability that integrates all components of continuous professional training. Rather than functioning as a single planning tool, strategic foresight represents an institutional mindset characterized by anticipatory thinking, future readiness, systems thinking, adaptive leadership, and innovation orientation. These competencies enable institutions to interpret emerging trends, anticipate future scenarios, and align professional development with long-term institutional goals. The grounded theory findings revealed that although the participants rarely used the formal term strategic foresight, they regularly practiced its underlying principles by engaging in environmental scanning, proactive planning, collaborative decision-making, and adaptive problem-solving. Consequently, the framework positions strategic foresight as the mechanism through which institutions transform uncertainty into innovative and sustainable development opportunities.

Phase 1: Environmental Intelligence

The first phase of the framework is environmental intelligence, which represents the foundation of strategic foresight. This phase consists of horizon scanning, trend analysis, futures thinking, risk assessment, and opportunity identification. Through these activities, institutions continuously collect and analyze information regarding emerging technologies, policy developments, funding priorities, community concerns, and global educational trends. Participants described environmental intelligence as an essential prerequisite for designing relevant professional-development programs. Rather than relying on historical practices, institutions should continuously monitor changes in both internal and external environments to anticipate future competency requirements. This proactive approach ensures that professional training remains aligned with evolving research agendas, innovation priorities and extension needs.

Phase 2: Strategic Capacity Building

Information generated through environmental intelligence informs the second phase, Strategic Capacity Building. This component focuses on aligning professional development with anticipated institutional priorities by strengthening competencies in research, innovation, digital technologies, artificial intelligence, leadership, sustainability, and community engagement. The findings suggest that future-oriented professional development should move beyond traditional seminar-based activities toward competency-based learning that develops transferable and future-ready skills. Participants emphasized that strategic capacity building should be evidence-based, flexible, and responsive to emerging challenges. Consequently, professional training becomes an investment in institutional adaptability rather than a compliance requirement for the institution.

Phase 3: Collaborative Knowledge Integration

The third phase, Collaborative Knowledge Integration, emphasizes that sustainable professional development is inherently collaborative. This component highlights mentoring, interdisciplinary research, communities of practice, stakeholder engagement, government partnerships, industry collaboration, and international linkages as mechanisms of knowledge creation and professional growth. Grounded theory findings demonstrated that participants regarded collaboration as a critical enabler of innovation and organizational learning. Professional expertise is strengthened when knowledge is shared across disciplines, institutions, industries, and communities. Therefore, the framework recognizes that meaningful professional development occurs through collective learning rather than individual training alone. This phase reflects the principles of organizational learning theory, where knowledge is created, transferred, and institutionalized through collaborative interaction (Muhonen et al., 2024). Such collaboration enhances research productivity, innovation capability, and the effectiveness of service extension programs.

Phase 4: Adaptive Institutional Transformation

The fourth phase, Adaptive Institutional Transformation, represents the institutional outcomes of continuous professional learning in schools. This phase includes evidence-based decision-making, an innovation culture, organizational learning, continuous evaluation, policy enhancement, and institutional agility. Participants emphasized that professional development should not conclude after training. Instead, institutions should continuously evaluate outcomes, refine practices, revise policies, and strengthen organizational systems based on the evidence and stakeholder feedback. Therefore, adaptive institutional transformation reflects organizational commitment to continuous improvement and innovation. The framework demonstrates that transformation is achieved when institutions institutionalize learning through supportive leadership, strategic planning, and evidence-informed governance. Such adaptive institutions are more capable of responding to uncertainty while maintaining academic excellence and community relevance.

Sustainable RISE Outcomes

The culmination of the framework is represented by Sustainable RISE Outcomes, which include enhanced research productivity, increased innovation capacity, responsive extension services, community transformation, institutional resilience, global competitiveness, and lifelong professional learning. These outcomes represent the long-term institutional benefits of integrating strategic foresight into continuous professional training programs. Rather than focusing exclusively on individual competency development, the framework highlights the broader organizational impacts that contribute to institutional sustainability and societal development. Participants consistently viewed successful professional development as one that ultimately improves institutional performance while generating meaningful benefits for the communities and stakeholders.

Continuous Feedback and Improvement

A distinguishing feature of the framework is the continuous feedback and improvement loop connecting sustainable outcomes to environmental intelligence. This circular relationship emphasizes that professional development is not a linear process but a continuous cycle of learning, evaluation, adaptation, and innovation. Institutional outcomes generate new organizational knowledge that informs future environmental scanning and strategic planning processes. As external conditions evolve, institutions reassess professional competencies, redesign training initiatives, strengthen collaborative partnerships, and implement organizational improvements. This recursive cycle enables higher education institutions to sustain organizational resilience and remain relevant in increasingly complex environments.

Theoretical and Practical Contributions

The framework extends existing scholarship on strategic foresight, organizational learning, and professional development by integrating these perspectives into a unified model for higher education. The existing literature has established that strategic foresight supports the anticipation of uncertainty, organizational learning promotes continuous adaptation and knowledge sharing, and professional development strengthens individual and institutional competencies. However, these perspectives have largely been examined as related but distinct dimensions, while conventional faculty development models tend to emphasize short-term competency enhancement rather than the systematic anticipation of future institutional needs.

A new grounded theory study reveals that strategic foresight can function as an integrating mechanism that transforms professional development from a training activity into an anticipatory institutional capability. The findings demonstrate that sustainable professional development emerges through the dynamic interaction of environmental intelligence, competency development, collaborative knowledge creation, adaptive institutional transformation, and continuous organizational learning. These processes operate as a recursive cycle: environmental intelligence identifies emerging changes and informs competency priorities; competency development builds capacity to respond; collaborative learning facilitates knowledge exchange and application; adaptive transformation institutionalizes new practices; and continuous learning generates feedback for the next cycle of anticipation. This represents a theoretical shift from viewing professional development as a collection of training interventions to understanding it as a continuous organizational adaptation cycle.

The study further reveals that transformational leadership, institutional commitment, collaborative culture, adequate resources, and supportive policies are not merely contextual conditions but enabling mechanisms that determine whether professional learning is translated into sustained institutional change. Thus, the central theoretical contribution of this study is the proposition that professional development becomes sustainable when anticipation, learning, collaboration, and institutional adaptation are systematically connected. Strategic foresight serves as a catalyst, while competency development, collaborative learning, and adaptive transformation provide pathways through which anticipation is converted into institutional action.

From a practical perspective, the Strategic Foresight Framework for Continuous Professional Training in Research, Innovation, and Service Extension (RISE) provides institutional leaders, faculty developers, research managers, innovation coordinators, extension practitioners, and policymakers with an evidence-based guide for designing future-oriented professional development systems. By embedding foresight into institutional planning and capacity building, higher education institutions can align professional competencies with emerging needs, strengthen research and innovation, improve extension effectiveness, and enhance organizational resilience.

Overall, the RISE framework advances the existing scholarship by demonstrating that sustainable institutional excellence is produced through a self-renewing cycle of anticipation, capacity building, collaboration, transformation, and feedback. Its novelty lies not merely in combining established concepts but also in explaining their functional relationships and the mechanisms through which they generate institutional capacity. Therefore, the framework positions strategic foresight as a catalyst for transforming professional development into an anticipatory, systems-oriented, and continuously adaptive institutional capability that can generate lasting academic, organizational, and societal impact.



Figure 1. Proposed Strategic Foresight Framework for Continuous Professional Training for Research, Innovation, and Service Extension (RISE)

CONCLUSION

This study demonstrates that continuous professional training in research, innovation, and service extension (RISE) is a strategic and adaptive process that strengthens institutional capacity in higher education. Participants identified both challenges, including limited resources, fragmented training, and heavy workloads, and opportunities, such as interdisciplinary collaboration, digital learning, and strategic partnerships, that shape sustainable professional development. The findings further reveal that strategic foresight functions as a critical organizational capability that enables stakeholders to anticipate emerging trends, manage uncertainty, and develop future-oriented competencies. Sustainable professional training depends on the interaction of institutional leadership, collaborative learning, organizational support, and continuous evaluation, emphasizing that professional development

extends beyond individual learning to become an embedded institutional process. Grounded in these findings, the study generated the Strategic Foresight-Driven Continuous Professional Training Theory, which explains that sustainable professional capacity develops through four interconnected processes: environmental intelligence, strategic capacity building, collaborative knowledge integration, and adaptive institutional transformation. These processes informed the development of the proposed Strategic Foresight Framework for Continuous Professional Training in Research, Innovation, and Service Extension (RISE). This study contributes to the growing literature on strategic foresight and professional development by providing an evidence-based framework that can guide higher education institutions in designing future-oriented capacity-building initiatives, strengthening research and innovation performance, enhancing extension services, and fostering institutional resilience in an increasingly dynamic and uncertain environment.

RECOMMENDATIONS

Based on these findings, higher education institutions should strengthen continuous professional training by adopting competency-based and future-oriented programs that address the evolving needs of research, innovation, and service extension. Institutional leaders should invest in sustained faculty development through adequate resource allocation, mentoring systems, interdisciplinary collaboration, and strategic partnerships to overcome barriers to professional growth. Strategic foresight should be institutionalized as a core component of professional development by integrating horizon scanning, environmental analysis, scenario planning, and evidence-informed decision-making into training policies and institutional planning processes. This will enhance organizational preparedness and capacity to respond proactively to emerging challenges and opportunities. To promote sustainability, institutions should establish collaborative learning ecosystems that support continuous evaluation, knowledge sharing, and organizational learning, while fostering leadership commitment and a culture of innovation. Embedding these mechanisms within institutional policies strengthens the effectiveness and long-term impact of professional development initiatives. Finally, future studies should validate and refine the proposed Strategic Foresight Framework for Continuous Professional Training in Research, Innovation, and Service Extension (RISE) across diverse higher education contexts using qualitative, quantitative, or mixed-methods approaches to enhance its applicability, generalizability, and contribution to policy and institutional practice.

LIMITATIONS OF THE STUDY

This study was limited to faculty members, researchers, extension practitioners, and academic administrators within selected higher education contexts; therefore, the findings reflect context-specific experiences and may not be directly transferable to other institutional settings. As a qualitative grounded theory study, the objective was to generate a substantive theory rather than produce statistically generalizable findings. Data were derived from participants' lived experiences through interviews, focus group discussions, document analysis, and field observations, making the findings inherently dependent on participants' perspectives and the research context. Although methodological triangulation, member checking, and other trustworthiness strategies were employed to enhance rigor, the proposed Strategic Foresight Framework for Continuous Professional Training in Research, Innovation, and Service Extension (RISE) has not yet been empirically tested or validated across diverse higher education institutions. Future research may evaluate and refine the framework using quantitative, mixed-methods, or longitudinal designs to establish its broader applicability and effectiveness.

FUTURE RESEARCH DIRECTIONS

Future research should validate and refine the proposed Strategic Foresight Framework for Continuous Professional Training in Research, Innovation, and Service Extension (RISE) across diverse higher-education institutions and disciplinary contexts to enhance its applicability and generalizability.

Quantitative and mixed-methods studies are recommended to empirically examine the relationships among strategic foresight, professional development, research productivity, innovation performance, and extension effectiveness. Longitudinal research may further investigate the long-term impact of foresight-driven professional training on institutional resilience and organizational performance. Comparative studies involving public and private higher education institutions, as well as cross-national investigations, could provide broader insights into the contextual factors influencing the implementation of strategic foresight in professional development. Future studies should explore the integration of emerging technologies, including artificial intelligence, digital learning ecosystems, and data analytics, to strengthen future-oriented capacity-building initiatives and support evidence-informed decision-making in higher education.

ETHICS STATEMENT

This study was conducted in accordance with the established ethical principles for research involving human participants. Ethical approval was obtained from the appropriate Institutional Research Ethics Committee prior to data collection. All participants were informed of the study's objectives, procedures, potential risks, and anticipated benefits before providing written informed consent. Participation was voluntary, and participants were informed of their right to withdraw from the study at any stage without penalty. Confidentiality and anonymity were maintained through the use of pseudonyms and the removal of identifying information from all research records. Interview transcripts, field notes, and other research data were securely stored and used exclusively for academic and research purposes. Throughout the study, the principles of respect for persons, beneficence, justice, and data confidentiality were strictly observed to ensure the protection of participants' rights and well-being.

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AI DISCLOSURE STATEMENT

The authors acknowledge the use of artificial intelligence (AI)-assisted tools solely to support language refinement, grammar checking, and improvement of manuscript clarity and readability during the writing process. AI tools were not used to generate, analyze, interpret, or fabricate research data, findings, or conclusions. The study design, data collection, coding, analysis, interpretation of results, development of the substantive theory, and proposed Strategic Foresight Framework for Continuous Professional Training in Research, Innovation, and Service Extension (RISE) were undertaken entirely by the researchers. The authors accept full responsibility for the accuracy, originality, integrity, and scholarly content of this manuscript.

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