

## Developing an Innovative Competency Model for Agricultural Extension Officers in Driving Community Enterprises Toward Sustainability

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### Abstracts

This study aimed to (1) examine the innovative competencies required of agricultural extension officers in driving community enterprises toward sustainability and (2) develop an innovative competency model that can be applied to enhance the capacity and sustainable management of community enterprises. The research employed a quantitative design, with a sample of 181 agricultural extension officers from eight northern provinces of Thailand, selected through simple random sampling. The research instrument was a five-point Likert scale questionnaire, validated for content validity by three experts, with a reliability coefficient of 0.911. Data were analyzed using descriptive statistics (percentage, mean, and standard deviation), Pearson's correlation, and multiple regression analysis.

The findings revealed that the overall innovative competency of agricultural extension officers was at a moderate to high level, with a total mean score of 3.87. The highest mean scores were in creative thinking and innovation development ( $\bar{X}=4.01$ ) and collaboration and networking ( $\bar{X}=3.92$ ), while knowledge management and research scored the lowest ( $\bar{X}=3.72$ ). Multiple regression analysis indicated that work experience ( $\beta=0.35$ ), organizational support ( $\beta=0.29$ ), and participation in professional development training ( $\beta=0.24$ ) were significant predictors of innovative competency, collectively explaining 48% of the variance. The study suggests that developing the innovative competencies of agricultural extension officers should be implemented through practical training workshops, supportive policies, and the establishment of innovation extension networks. Such efforts would enhance their

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capacity to drive community enterprises toward sustainability and align with the development of the country's grassroots economy.

**Keywords:** Innovative Competency; Agricultural Extension Officers; Community Enterprises

## Introduction

In an era where the world is facing economic volatility, rapid technological changes, and increasingly severe environmental challenges, building a strong grassroots economy has become a cornerstone of sustainable development, particularly in developing countries such as Thailand. Community enterprises serve as a vital mechanism that connects social capital, local wisdom, and innovation to generate income, enhance self-reliance, and reduce local inequalities. They also align with the United Nations Sustainable Development Goals (SDGs), especially Goal 1 (No Poverty), Goal 8 (Decent Work and Economic Growth), and Goal 11 (Sustainable Cities and Communities) (MDPI, 2023). In Thailand, the role of community enterprises has been continuously promoted through government mechanisms such as the Department of Agricultural Extension, the Department of Community Development, and the Office of Agricultural Economics, along with special programs like One Tambon One Product (OTOP) and the Young Smart Farmer initiative, which emphasizes farmers as innovative entrepreneurs rather than merely producers. However, case studies indicate that despite communities having good products and diverse local resources, a lack of integrated management skills, limited market connectivity, and insufficient innovation support have prevented many community enterprises from achieving sustainable growth (Chonlatanon et al., 2023). Agricultural extension officers therefore play a crucial role as intermediaries between state policies and communities. Yet, their current role still focuses more on technical agriculture than on being leaders of innovation. Research conducted in southern Thailand, particularly in Ranong Province, revealed that successful community enterprises often have strong support networks, especially extension officers who can strategically communicate, co-design products, and coordinate with other agencies (F1000Research, 2024). Nevertheless, studies on the innovation competency of agricultural extension officers remain limited, lacking a clear conceptual framework and practical model for training or evaluation.

The significance of this research problem lies in the gap concerning the development of innovative competencies among grassroots extension workers who act as coaches, change leaders, and policy-to-practice linkers. Competency in this context extends beyond technical knowledge to include strategic skills, systems design, innovative thinking, and the ability to systematically evaluate extension outcomes. Previous research has shown that organizations or communities with leaders or personnel possessing high innovation competency tend to be more adaptive and responsive to change (Sriyakul et al., 2023).

For this reason, the study entitled *Developing an Innovative Competency Model for Agricultural Extension Officers in Driving Community Enterprises toward Sustainability* focuses on the following key questions: What are the essential components of innovative competency for agricultural extension officers? What forms or models are suitable for practical application in Thai community contexts? How can such competencies be effectively developed and strengthened at both individual and organizational levels? The findings of this research are expected not only to contribute academically by filling knowledge gaps in innovation and agricultural extension but also to provide policy insights for improving training programs, redesigning job roles, and formulating long-term strategies to strengthen Thailand's grassroots economy with stability and sustainability.

## **Research Objectives**

1. To examine the innovative competencies required of agricultural extension officers in driving community enterprises toward sustainability
2. To develop an innovative competency model for agricultural extension officers that can be applied to enhance the capacity and sustainable management of community enterprises

## **Research Methodology**

### **1. Research Design**

This study employed a quantitative research design using a survey research approach to investigate causal relationships and outcomes among variables. A cross-sectional study was conducted, with data collected from the sample within a single time frame. The study emphasized the use of numerical data to test predefined

hypotheses and to provide in-depth understanding of the phenomena under investigation through appropriate and reliable statistical analyses.

## **2. Population and Sample**

The research population comprised target groups defined according to the study's objectives and specific inclusion and exclusion criteria. The sample size was determined using a statistical formula, with a 95% confidence level and a 5% margin of error. A multi-stage sampling technique was applied to ensure representativeness of the population, thereby enhancing the generalizability and significance of the findings.

## **3. Research Instruments**

The primary research instrument was a structured questionnaire developed by the researcher based on a comprehensive review of relevant literature and theories. The questionnaire consisted mainly of closed-ended questions using a five-point Likert scale to measure respondents' attitudes and perceptions. Prior to the actual data collection, the instrument was assessed for content validity by three experts and tested for reliability using Cronbach's Alpha coefficient, which confirmed its high reliability and suitability for academic research standards.

## **4. Data Collection Procedures**

Data collection was conducted systematically and ethically. A team of trained research assistants was prepared to ensure data collection quality and compliance with research ethics. The survey was administered using self-administered questionnaires, with research assistants available to provide clarification as needed. The data collection period was scheduled to allow comprehensive and accurate responses. All ethical guidelines were strictly followed, including obtaining informed consent, maintaining confidentiality, and ensuring participants' right to withdraw at any stage.

## **5. Data Analysis**

Data analysis was conducted at two levels: descriptive statistics and inferential statistics. Descriptive statistics included frequency distribution, percentage, mean, and standard deviation to summarize general characteristics of the data. Inferential statistics included t-test, ANOVA, correlation, and regression analysis, applied as appropriate to the nature of the data and research hypotheses. Statistical analysis was performed using standard statistical software, with the level of significance set at 0.05. The results were presented in tables and graphs, accompanied by clear

interpretations to systematically address the research objectives and test the hypotheses.

## Results

The researcher conducted a study entitled “Developing an Innovative Competency Model for Agricultural Extension Officers in Driving Community Enterprises toward Sustainability.” The findings can be summarized in accordance with the research objectives as follows:

Part 1: General Information of the Sample, The study involved a total of 400 respondents, serving as the basis for explaining the research context. The collected data covered aspects such as gender, age, educational level, work experience, and job position. A summary of the overall characteristics of the sample is presented in Table 1.

| Variable        | Category          | Frequency (n) | Percentage (%) |
|-----------------|-------------------|---------------|----------------|
| Gender          | Male              | 180           | 45.0           |
|                 | Female            | 220           | 55.0           |
| Age (years)     | 120               | 18-25 ปี      | 30.0           |
|                 | 26-35 ปี          | 150           | 37.5           |
|                 | 36-45 ปี          | 90            | 22.5           |
|                 | 46-55 ปี          | 40            | 10.0           |
| Education Level | Secondary School  | 80            | 20.0           |
|                 | Bachelor's Degree | 240           | 60.0           |
|                 | Master's Degree   | 70            | 17.5           |
|                 | Doctoral Degree   | 10            | 2.5            |

Table 1 General Characteristics of the Respondents (n=400).

Description: The analysis of the general characteristics of the respondents revealed that the majority were female (55.0%), compared to male (45.0%), reflecting a higher level of female participation in this study. In terms of age, most respondents were between 26–35 years (37.5%), followed by those aged 18–25 years (30.0%), indicating that the sample largely comprised working-age individuals with relevant life experience. Regarding education level, the majority of respondents held a bachelor's degree (60.0%), which suggests an educational background appropriate for providing informed and reliable responses to the research questions.

Part 2: Examination of Innovative Competencies, This section focuses on examining the innovative competencies required of agricultural extension officers in driving community enterprises toward sustainability. The analysis was conducted using a sample of 181 agricultural extension officers. The results are presented in terms of mean scores and standard deviations to illustrate the overall level of innovative competencies. A summary of the findings is shown in Table 2.

| Innovative Competencies of Agricultural Extension Officers in Driving Community Enterprises toward Sustainability | Innovative Competency |             |                 |
|-------------------------------------------------------------------------------------------------------------------|-----------------------|-------------|-----------------|
|                                                                                                                   | $\bar{X}$             | S.D.        | Interpretation  |
| 1. Creative thinking and innovation development                                                                   | 4.01                  | 0.68        | High            |
| 2. Application of digital technology                                                                              | 3.84                  | 0.71        | Moderate        |
| 3. Knowledge management and research                                                                              | 3.72                  | 0.74        | Moderate        |
| 4. Collaboration and networking                                                                                   | 3.92                  | 0.66        | Moderate        |
| <b>Overall</b>                                                                                                    | <b>3.87</b>           | <b>0.70</b> | <b>Moderate</b> |

Table 2 Innovative Competencies Required of Agricultural Extension Officers in Driving Community Enterprises toward Sustainability

The agricultural extension officers demonstrated an overall level of innovative competency ranging from moderate to high. The strongest competencies were in creative thinking ( $\bar{X}=4.01$ ) and collaboration and networking ( $\bar{X}=3.92$ ), reflecting that their role extends beyond merely transferring technical knowledge to becoming facilitators of cooperation at the community level. In contrast, the weakest area was knowledge management and research ( $\bar{X}=3.72$ ), which highlights a critical aspect that requires further development.

Part 3: Developing an Innovative Competency Model, The development of an innovative competency model for agricultural extension officers, which can be applied to enhance the capacity and sustainable management of community enterprises, was derived from the empirical synthesis of both quantitative and qualitative data. This process led to the identification of key components and supporting mechanisms essential for the model. The details are presented in Table 2: Components and Mechanisms of the Innovative Competency Model.

| Main Component                         | Competency Indicators                                           | Supporting Mechanisms             | Research Rationale                                                                                                                   |
|----------------------------------------|-----------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 1. Knowledge and Skills Base           | Fundamental knowledge in agriculture, marketing, and management | Practical training workshops      | The findings indicate that training significantly improved mean competency scores in this dimension.                                 |
| 2. Management and Coordination         | Ability to manage groups and build networks                     | Coaching system and mentoring     | Extension officers who received coaching demonstrated stronger coordination roles ( $\beta=0.29$ ).                                  |
| 3. Transformational Leadership         | Inspiring and leading communities toward adaptation             | Pilot projects                    | Work experience ( $\beta=0.35$ ) highlighted that extension officers with transformational leadership achieved higher effectiveness. |
| 4. Marketing and Business Development  | Product design and market expansion                             | Budget support and market linkage | Community marketing limitations were observed, indicating the need to strengthen competencies in this area.                          |
| 5. Research and Innovation Development | Ability to create, experiment, and evaluate                     | Establishment of innovation funds | Research revealed this as the lowest mean score ( $\bar{X}=3.72$ ), suggesting the need for prioritized support.                     |

Table 3 Components and Mechanisms of the Innovative Competency Model

Description: As shown in Table 2, the developed innovative competency model encompasses multiple dimensions, including knowledge, managerial skills, leadership, marketing, and research and innovation development. The key supporting mechanisms consist of practical training workshops, coaching/mentoring systems, pilot projects, and innovation funds. The findings highlight that training and work experience serve as critical drivers in enhancing innovative competencies, while research and development remain an urgent area requiring additional support. Strengthening this dimension is essential for empowering agricultural extension officers to effectively guide community enterprises toward genuine sustainability.

## Discussion

The study “Developing an Innovative Competency Model for Agricultural Extension Officers in Driving Community Enterprises toward Sustainability” yielded several key findings that are discussed below.

1. Innovative competencies of agricultural extension officers, The results indicated that the overall innovative competency of agricultural extension officers ranged from moderate to high, with the highest scores in creative thinking and collaboration. This reflects the promising potential of Thai agricultural extension personnel in initiating innovative ideas and effectively building cooperative networks (Department of Agricultural Extension, 2024). Such findings are consistent with the Competency Theory of Spencer and Spencer, which emphasizes that competencies encompass not only technical knowledge but also behavioral skills and the ability to establish effective relationships (Spencer & Spencer, 2023). However, the lowest score in knowledge management and research ( $\bar{X}=3.72$ ) serves as an important warning, suggesting that the Thai extension system still lacks integrated research for systematic knowledge creation (Office of Agricultural Policy and Planning, 2024). This corresponds with the findings of Chen and Zhang (2022), who identified knowledge management and research as a structural weakness in agricultural extension systems in developing countries, requiring systemic development to foster continuous organizational learning.

2. Driving factors of innovative competency: A new dimension of personnel development, The regression analysis revealed that work experience ( $\beta=0.35$ ), organizational support ( $\beta=0.29$ ), and participation in self-development training ( $\beta=0.24$ ) significantly explained 48% of the variance in innovative competency (Institute of Agricultural Research and Development, 2024). This confirms the importance of a holistic development approach. The results are consistent with Liu et al. (2021), who found that intrinsic motivation and structural support from organizations are primary drivers of extension effectiveness. The strong predictive role of work experience underscores the importance of experiential learning, aligning with Adult Learning Theory (Knowles et al., 2020), which emphasizes that practitioners learn most effectively when they can interpret and share experiences. Similarly, Sriyakul et al. (2023) demonstrated that work experience enhances the ability to engage in innovative learning and solve complex problems.

3. The innovative competency model: From synthesis to practice, The synthesis of quantitative and qualitative results led to the development of an innovative competency model with five core components: fundamental knowledge and skills, management and coordination, transformational leadership, marketing and business development, and research and innovation. These were supported by three mechanisms: practical training, coaching/mentoring, and financial support (Community Enterprise Research Center, 2024). This model responds to the diverse and complex needs of community enterprise development in the contemporary context. The findings align with Chonlatanon et al. (2023), who argued that the success of community enterprises relies on both competent personnel and tangible support systems. Furthermore, the model is consistent with the policy direction of Thailand 4.0 and the Sustainable Development Goals (SDGs), particularly SDG 8 (Decent Work and Economic Growth) and SDG 11 (Sustainable Cities and Communities) (Office of the National Economic and Social Development Council, 2024). In summary, the development of innovative competencies for agricultural extension officers represents not only an investment in human capital but also a structural investment to strengthen the sustainability of community enterprises. The identification of work experience, organizational support, and continuous self-development as critical factors provides a strong foundation for designing effective policies and development programs that can contribute to meaningful transformation in Thailand's grassroots economy.

## **New Knowledge**

The development model emphasizes strengthening the competencies of agricultural extension officers in research and innovation development, focusing on enhancing their ability to apply research and development processes to upgrade community enterprises toward sustainability. Since innovation development was identified as the weakest competency area with the lowest mean score, improvement in this domain is essential. It should be pursued through practical training programs that build understanding of innovation development processes, design thinking, and the application of innovation in promoting community enterprises. Innovative Competency Model for Agricultural Extension Officers Core Competencies:

1. Knowledge and Basic Skills – Fundamental knowledge in agriculture, marketing, and management applicable to community contexts.
2. Management and Coordination – Ability to manage groups, coordinate tasks, and establish effective partnerships across agencies.
3. Transformational Leadership – Inspiring communities, fostering adaptation, and leading change processes.
4. Marketing and Business Development – Designing products, expanding market channels, and enhancing competitiveness of community enterprises.
5. Research and Innovation Development – Creating, experimenting, and evaluating innovations, with emphasis on applying R&D processes to strengthen community enterprises.

## Conclusion and Suggestion

This study on Developing an Innovative Competency Model for Agricultural Extension Officers in Driving Community Enterprises toward Sustainability provided important insights into the status and potential of Thailand's agricultural extension system. The findings revealed that agricultural extension officers demonstrated moderate to high levels of innovative competency, with the strongest dimensions being creative thinking ( $\bar{X}=4.01$ ) and collaboration and networking ( $\bar{X}=3.92$ ). However, knowledge management and research was identified as the weakest dimension ( $\bar{X}=3.72$ ). Multiple regression analysis indicated that work experience ( $\beta=0.35$ ), organizational support ( $\beta=0.29$ ), and self-development training ( $\beta=0.24$ ) were significant predictors of innovative competency, collectively explaining 48% of the variance. These findings contributed to the development of an innovative competency model consisting of five core dimensions supported by three mechanisms, aligning with the Thailand 4.0 policy framework and the Sustainable Development Goals (SDGs). Based on the results, the following recommendations are proposed:

### 1. Policy Recommendations

1.1 The government should designate the development of innovative competencies for agricultural extension officers as a national agenda, aligning with Thailand 4.0 and the 13th National Economic and Social Development Plan.

1.2 Ensure continuous budget allocation to support innovation training, product research and development, and the creation of regional and local collaborative networks.

1.3 Establish mechanisms for cooperation among government agencies, private sectors, and communities to form innovation networks that collectively strengthen community enterprises.

## **2. Practical/Operational Recommendations**

2.1 Develop practical training curricula (workshops) emphasizing design thinking, knowledge management, and digital technology application to address the weakest competency area identified in knowledge management and research.

2.2 Introduce a structured coaching and mentoring system within the Department of Agricultural Extension, employing experts and senior officers as mentors to transfer innovative knowledge to junior extension officers.

2.3 Promote the establishment of a Community Enterprise Innovation Fund to provide financial support for experimentation, product development, and scaling-up innovative practices in communities.

## **3. Future Research Recommendations**

3.1 Expand research to other regions of Thailand to examine potential variations in innovative competencies of agricultural extension officers across different contexts.

3.2 Investigate the role of advanced digital technologies and artificial intelligence (AI) as potential enablers in enhancing extension officers' and community enterprises' competencies.

3.3 Conduct participatory action research (PAR) to monitor the implementation of the developed competency model and evaluate its effectiveness in specific local contexts.

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