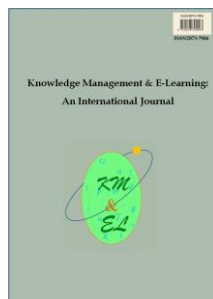


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## **Knowledge sharing in horticultural community-based enterprises: The determinants of indigenous knowledge sharing**

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## **Knowledge sharing in horticultural community-based enterprises: The determinants of indigenous knowledge sharing**

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**Abstract:** Population aging and the migration of young people to urban regions have led to a decline in agricultural knowledge. Nevertheless, the community of practices serves as a social learning platform, enabling the informal exchange of experiences among farmers. This study aims to examine the factors that influence knowledge sharing (KS) in horticultural community-based enterprises situated in six regions of Thailand, considering the varying levels of participation in each community. A comprehensive dataset was obtained by selecting samples for mixed-approach analysis using stratified and snowball sampling techniques. The data were analyzed using structural equation modeling and summative content analysis to validate hypotheses and engage in-depth data discussion. This study's findings, from knowledge recipients' perspectives, reveal that individual, social, and managerial aspects influence KS outcomes via the mediating factor of KS. Additionally, from the knowledge providers' perspective, factors such as norms, rewards, organizational structure, and training do not affect KS. These findings indicate that the management essential for successful knowledge sharing in horticultural community-based enterprises must align with the roles of community actors with different attitudes and preferences.

**Keywords:** Horticultural community enterprises; Indigenous knowledge;

Knowledge sharing; Communities of practice

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## 1. Introduction

Knowledge sharing (KS) can be a tool for human capital accumulation through the development and augmentation of tacit knowledge that aligns with the United Nations' Sustainable Development Goal 4, which pertains to quality education (Adeyeye, 2019). According to the socialization, externalization, combination, and internalization model, KS can be regarded as the core of new knowledge generation, as it transforms knowledge patterns from tacit to explicit through interactions among community members (Nonaka & Takeuchi, 1995). The benefits of effective KS are evident in the agricultural industry, particularly within local communities. For instance, skills and local wisdom extracted from farmers via KS, in combination with modern agricultural data, help curb cultivation losses under severe weather conditions (Mapfumo et al., 2016). In developing countries, horticultural community-based enterprises (HCEs) comprise a type of business that is driven by community members who are particularly interested in horticulture. Therefore, HCEs comprise communities of practice (CoPs) (Somerville & McElwee, 2011), which means that when farmers account for one HCE, they absorb and assimilate its knowledge, which triggers favorable outcomes. Subsequently, they usually share knowledge extensively with other members, which leads knowledge stock to continue to expand, which matters as much as the quality of knowledge (Raymond & Robinson, 2013). Accordingly, if an HCE's knowledge stock is not sizeable, KS may be scarce or null; thus, fostering KS behavior plays a key role in enhancing the agricultural efficiency of farmers in HCEs.

Premised on KS practice theory, HCEs resemble CoPs, although they possess unique features, as they comprise agglomerations of farmers who reside in a proximate area, while each community exhibits its own culture (Somerville & McElwee, 2011). Although KS in CoPs is a standard practice and positively affects every participant, currently, farmers in HCEs suffer from communication problems rooted in the age gap among its members and differences between remote communities with distinct cultures, which preclude them from accessing knowledge that is indispensable for cultivation (Rigg et al., 2020). Members' age gap constitutes an obstacle to the development of the agricultural industry in developing economies, not merely within Association of Southeast Asian Nations-member countries. Additionally, insufficient infrastructure development in some countries' rural areas forces farmers to make do with the limited data available within their communities (Nonvide, 2023). These restrictions make the communities' business competition capabilities subject to KS within each community.

Identifying the underlying causes of the willingness to share knowledge could enable farmers to access knowledge more conveniently; however, various prior studies attempting to identify such causes have focused on a single factor. For example, studies focused on the social aspect have found that the social interaction level and community members' role remain the most crucial factors for KS and the practical application of such knowledge (Thomas et al., 2020). Conversely, another study revealed that trust and proper personal guidance exert a direct influence on KS (Ingram et al., 2016). However, these studies have not considered the linkage among the factors influencing KS, which range from social factors (either on the inside or outside of the community) to managerial ones, including supportive factors, which also influence knowledge recipients' adaptation vis-à-vis applying the received knowledge (Šūmane et al., 2018). Moreover, most studies have emphasized farmers' KS behavior within the context of field crops and livestock (Thomas et al., 2020; Tran et al., 2018). However, horticulture is more susceptible to climate and environmental changes compared with field crops (Nadeem et al., 2018). Thus, there is a knowledge gap regarding the motives for KS within the context of agriculture; accordingly, filling this gap could prove advantageous for the agricultural sector by improving operations and supporting guidelines.

This study aims to unravel the complexity of the individual, social, and managerial factors that affect KS in HCEs, focusing on farmers' (as knowledge recipients) perspective, while establishing a comparison with the knowledge providers in small HCEs dispersed across local areas. It is expected that this study's findings will provide valuable insights vis-à-vis overcoming obstacles in KS, as well as point to a feasible approach for accessing and utilizing knowledge from local communities in other areas.

## 2. Literature review

### 2.1. Indigenous KS

Indigenous knowledge emerges in the social environment of a community and is passed down through generations via the storytelling of successes and failures until it permeates and harmonizes with members' lifestyles through tradition and culture, eventually becoming local wisdom (Son et al., 2021). This knowledge is crucial for scientific and agricultural knowledge development in response to global warming and sustainable development (Ankrah et al., 2022). Nonetheless, in the community whose cultural and local linguistic intensities are found, KS of indigenous agricultural knowledge, especially

cultivation techniques and practices, is sophisticated, heterogeneous, and difficult to perceive, which results in lower-than-standard products (Manyozo, 2018). Remarkably, participatory communication has proven to be effective for enhancing elderly members' willingness to share indigenous knowledge, ideas, viewpoints, practices, wisdom, and failures that affect agricultural sustainability (Zikargae et al., 2022). By contrast, if farmers do not participate in communities, they will not obtain proper knowledge, which worsens operational efficiency (van den Berg et al., 2020).

## 2.2. CoPs

CoPs comprise a type of KS that resembles the educational system (via social participation) and helps enhance participants' knowledge to a level that they can exploit (through the sharing and application of such knowledge). Its main characteristics include the domain or boundary of knowledge, the community, and the KS practices that members adhere to (Wenger, 2011). According to social learning theory, HCEs comprise a type of CoP, provided that one of their key members is a community leader who coordinates and manages their internal functions; such leaders are usually experts who gain the trust of HCE members or folk-wisdom farmers who expand knowledge for farmers in the community (Baker & Beames, 2016). The outcome of KS in the community aids farmers in assimilating knowledge to the extent that they can effectively deal with horticultural problems autonomously (van den Berg et al., 2020). In contrast, if community members do not participate in activities, they are unable to assimilate complex indigenous agricultural knowledge, and their operational efficiency decreases in every metric (Wongadisai et al., 2020). Empirical studies indicate that differences in norms, lifestyle, career, and public support influence CoP members' level of participation in KS activities in CoP (Heller, 2020; Laiprakobsup, 2018). Some agricultural communities accomplish sustainable KS by enabling collaboration among members who possess indigenous knowledge and younger members who are tech-savvy; they achieve this by fostering trust, a supportive environment, and informal organizational management (Muir et al., 2023). This indicates that KS is an important tool for knowledge dissemination and tacit knowledge transfer among members, with no restriction to a single organization; it requires appropriate management to enable knowledge providers and recipients to exchange knowledge with low effort, triggering individual tacit knowledge accumulation and enhancing personal values (Henttonen et al., 2016).

## 2.3. Determinants effect on KS in CoPs

### 2.3.1. Individual factors

KS behaviors result from the driving force of individual factors (Kmieciak, 2021). In their analysis of CoPs, Hadjielias et al. (2021) pointed out that whether an individual is willing to share knowledge or intentionally conceal it is directly related to individual factors. Moreover, empirical studies have revealed that trust is the most important factor for KS among organizational members (Kmieciak, 2021), as efficient KS in organizations depends solely on mutual trust (Olaisen & Revang, 2017). Nonetheless, trust is associated with KS motives, given that both internal and external motives positively reinforce each other. Conversely, if KS motives are insufficient, the knowledge derived from KS will be inefficient (Wang et al., 2019). Furthermore, Fischer (2022) posited that satisfaction affects KS motives. However, according to social economic exchange theory, positive individual behavior stems from the expected result of one's own deeds or the things acquired as a

result of such behavior (Bock & Kim, 2002). Based on this idea, Hsu et al. (2007) affirmed that satisfaction in KS varies according to individuals' expectation levels. Furthermore, empirical research has indicated that satisfaction and the propensity to share are affected by personality traits, with individuals characterized by agreeableness, conscientiousness, and openness demonstrating higher levels of KS behavior, compared with individuals characterized by other traits (De Vries et al., 2006; Matzler et al., 2011). Moreover, prior studies have indicated that the willingness to share knowledge is influenced by various individual factors, including mutual trust, self-satisfaction, satisfaction with others, and expectation for advantages acquired by interacting with community members; meanwhile, motives arising from internal and external forces, as well as community members' personality, influence KS participation. In sum, the empirical literature underscores the complexity of interrelated individual factors.

**H1:** Individual factors positively affect KS behavior in HCEs.

### 2.3.2. *Social factors*

KS is a voluntary social interaction initiated by individuals to integrate into society (Abbas et al., 2019). According to social exchange theory, the dynamics of KS resulting from social capital can be divided into crucial components, including interactions among members of the organization, efficiency in language usage for communication, norms (i.e., the collective beliefs of the community), and organizational culture (which gives rise to trust and the willingness to share knowledge, which in turn becomes a general practice) (Cabrera & Cabrera, 2005).

The establishment of interactions and interdependency among educated individuals within a community leads to the formation of distinct relationships within it and precludes community members from feeling forced to participate in activities due to an unwillingness to do so (Evangelou & Karacapilidis, 2005). Social exchange theory has revealed that social interaction among community members is an indicator of the worthiness of KS. If member interactions are more frequent, this will positively contribute to KS (Peltokorpi & Yamao, 2017). Meanwhile, support and norms of reciprocity directly influence the quantity and quality of the knowledge shared (Chang & Chuang, 2011). Conversely, another study showed that the norm of reciprocity does not result in KS behavior in virtual communities (Lin et al., 2009). However, it has been found that subjective norms create pressures that induce the acceptance of practices within a community (Witherspoon et al., 2013), implying that if outsiders do not understand the culture, they will not be acknowledged by the community (Chong & Besharati, 2014). Meanwhile, Swift and Virick (2013) posited that support from colleagues or community members influences KS, whereas the recognition of organizational support resulting from social norms does not. In sum, the empirical evidence indicates that the dynamics of persistent KS result from various mutually reinforcing social factors, which supports our second hypothesis:

**H2:** Social factors positively affect KS behavior in HCEs.

### 2.3.3. *Managerial factors*

Organizational support for KS enhances organizations' innovation capabilities and grants them a competitive advantage (Lin & Chen, 2008). Additionally, organizational support for KS fosters member interaction through activities aimed at setting collective goals that encourage KS (Wang et al., 2014). Within this context, both well-organized management and valuable and socially skilled personnel are indispensable components of an

organization (Matošková et al., 2022). Organization members' willingness to share knowledge with and provide support to others stems from their organizational commitment (Matzler et al., 2011). While the realization of training intensity has a positive linkage with the quantity of knowledge shared (Buch et al., 2015), in the context of the service industry (education, healthcare, and public service), the recognition of opportunity and awareness of training value do not influence KS behavior (Bastaki et al., 2021). Rewarding workers who satisfactorily carry out their tasks and achieve the set targets not only enhances their willingness to work but also establishes a supportive environment for KS within the organization (Voelpel et al., 2005). However, Sandhu et al. (2011) showed that the inefficacy of such reward systems is a hurdle for KS.

Various empirical studies have shown that managerial factors are not restricted to organizations' working style, structure, training, and rewards systems; they also encompass information technology (IT), which is an indispensable tool for in-house KS management and plays a significant role in enabling members of remote communities to access knowledge and reinforce learning and widespread KS, especially in developing economies (Oladele, 2011). The use of IT to facilitate KS enhances its effectiveness within a team (Choi et al., 2020). Nevertheless, IT must be accessible and enjoyable to facilitate effective KS (Hsu & Lin, 2008). Farooq (2018) established a conceptual framework for studying the linkage between organizational management and the nature of KS, arguing that the scope of the factors studied must be specified.

**H3:** Managerial factors positively affect KS behavior in HCEs.

#### 2.3.4. *The relationship of KS behavior and outcomes*

KS comprises the behavior through which an individual is willing to distribute knowledge – as tacit or codified knowledge – to community members (Zikargae et al., 2022). Chang et al. (2017) suggested that the dissemination and utilization of knowledge are key components of KS that positively affect organizations' innovation capability. KS also mediates the effect organizational culture's positive effect on innovation capability. Likewise, Majchrzak and Malhotra (2016) asserted that the pattern of KS in an online community has a positive impact on innovative outcomes. However, Choi et al. (2020) posit that KS, both official and unofficial, does not directly influence productivity at work; however, they found that it indirectly and positively influences efficiency via knowledge application. Although this issue remains controversial, in the context of agriculture, valid KS practices are firmly guaranteed because of their extreme importance to farmers' capabilities and cultivation efficacy (Thomas et al., 2020). An examination of the KS literature within the agricultural domain suggests that the KS behaviors of HCE members may influence KS outcomes. Subsequently, we propose the following hypothesis:

**H4:** KS behavior has a positive impact on the outcome of KS.

Fig. 1 depicts the present study's conceptual model, amalgamating the component factors derived from empirical evidence and the proposed hypotheses. This framework delineates four pathways, examining the impact of three types of factors (H1–H3) on KS within CoPs, as well as performance outcomes (H4).

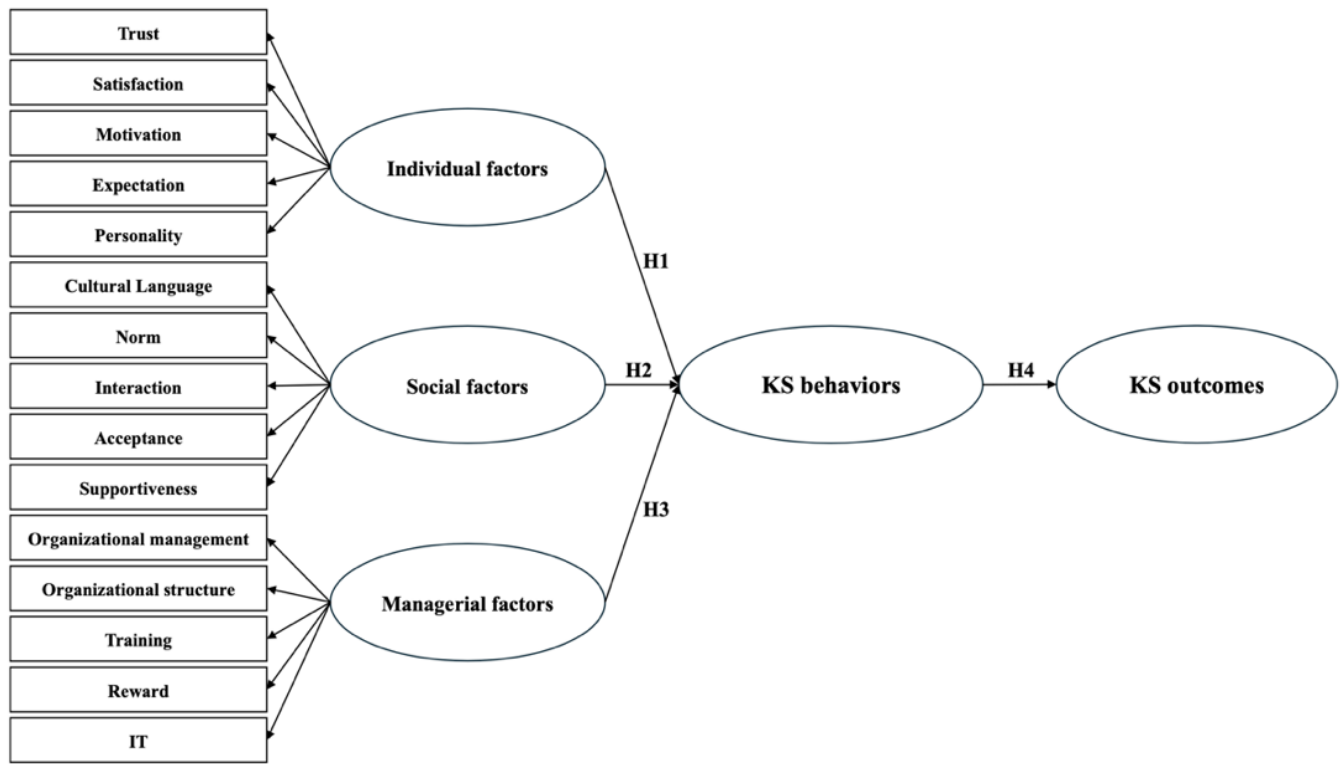


Fig. 1. Conceptual framework

### 3. Method

Fig. 2 illustrates the research methodology employed to evaluate the hypotheses derived from the literature on KS in CoPs. Preliminary data on the sample within the HCEs indicated the presence of two primary stakeholder groups: farmers and experts. The sizes of these groups were markedly different. Consequently, we used a mixed-methods approach to address this issue. This method greatly improves the reliability and depth of research, thereby contributing considerably to the literature (Lakshman et al., 2000). This section is divided into two parts: The first part describes the questionnaires employed and the comprehensive statistical analysis conducted via confirmatory factor analysis (CFA), as well as the hypothesis testing performed using structural equation modeling (SEM) to elucidate the relationships among the variables. The second part describes the interviews conducted with a small sample of agricultural specialists, whose data were analyzed using summative content analysis (SCA) (Creswell & Creswell, 2022).

#### 3.1. Quantitative approach

##### 3.1.1. Quantitative sample selection

To achieve the research aims, a stratified sampling method was employed to evaluate the population density in the HCEs across six regions of Thailand, including the southern, eastern, northeastern, western, and central regions. We collected survey data from March

2023 to February 2024 and obtained 418 completed surveys that met the inclusion criteria. The survey respondents (79.7% of whom were farmers) were divided into male (82.8%) and female (17.2%). Disaggregation on a regional basis revealed that the proportion closely aligns with the total population in the current study, as shown in Table 1 below.

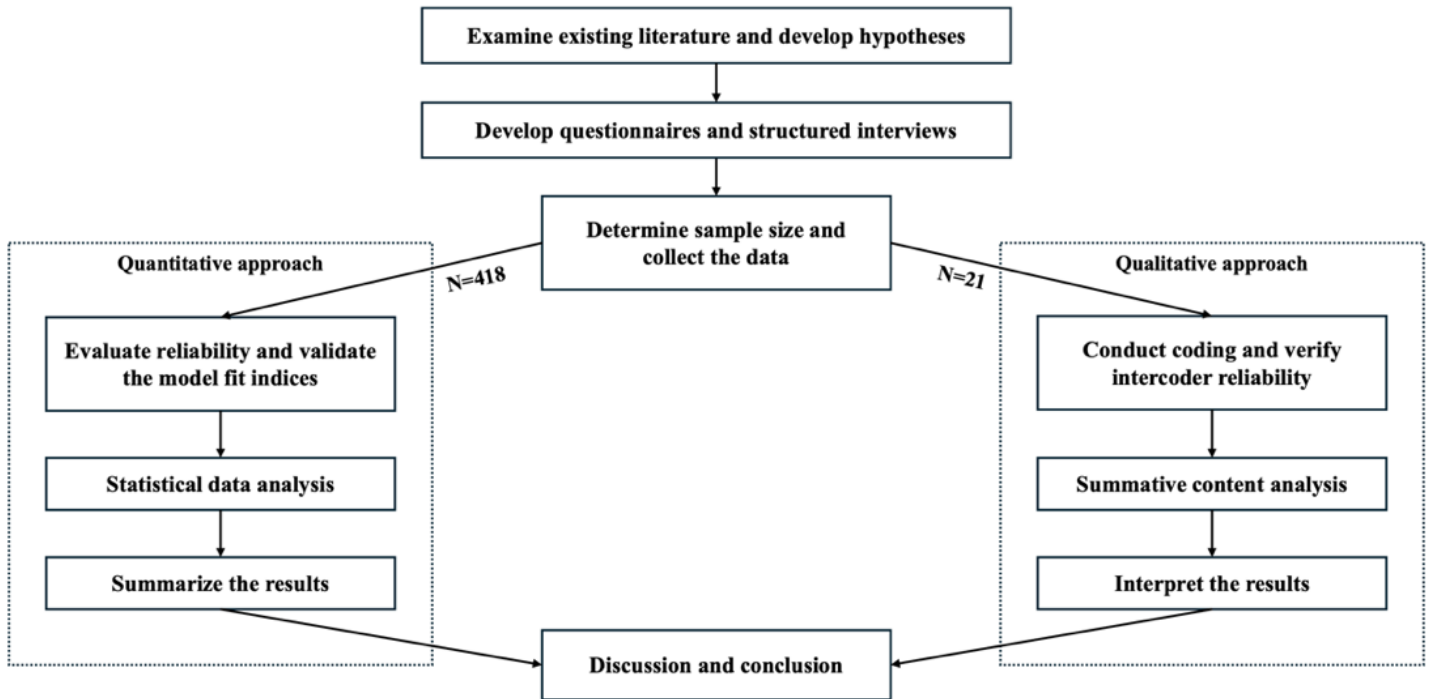


Fig. 2. Research method

**Table 1**  
Sample characteristics

| Region       | No. of village | Population | Percentage | Sample size | Percentage |
|--------------|----------------|------------|------------|-------------|------------|
| South        | 70             | 490        | 44.9       | 175         | 41.9       |
| East         | 45             | 315        | 28.8       | 117         | 28.0       |
| Northeastern | 19             | 133        | 12.2       | 57          | 13.6       |
| North        | 12             | 84         | 7.7        | 31          | 7.4        |
| Middle       | 4              | 28         | 2.6        | 20          | 4.8        |
| West         | 6              | 42         | 3.8        | 18          | 4.3        |
| Total        | 156            | 1,092      | 100.0      | 418         | 100.0      |

### 3.1.2. Measure

The survey employed a five-point Likert scale to investigate the determinants in each factor, based on the empirical literature. The 17 relevant variables are listed in Table 2. Reliability testing demonstrated that all the questionnaire items had Cronbach's alpha values exceeding .7, indicating their appropriateness for data collection.

**Table 2**

Measurement item and reliability test

| Factor             | Variables                        | Items | Adapted from               | $\alpha$ |
|--------------------|----------------------------------|-------|----------------------------|----------|
| Individual factors | Trust (IDV1)                     | 4     | Curado and Vieira (2019)   | .856     |
|                    | Satisfaction (IDV2)              | 3     | Fischer (2022)             | .839     |
|                    | Motivation (IDV3)                | 3     |                            | .894     |
|                    | Expectation (IDV4)               | 4     | Hsu et al. (2007)          | .831     |
|                    | Personality (IDV5)               | 3     | Matzler et al. (2011)      | .893     |
| Social factors     | Cultural language (SOC1)         | 4     | Ahmad (2017)               | .909     |
|                    | Norm (SOC2)                      | 3     | Obrenovic et al. (2022)    | .943     |
|                    | Interaction (SOC3)               | 3     |                            | .793     |
|                    | Acceptance (SOC4)                | 4     | Chang and Chuang (2011)    | .880     |
|                    | Supportiveness (SOC5)            | 3     |                            | .860     |
| Managerial factors | Organizational management (MAN1) | 3     | De Vries et al. (2006)     | .869     |
|                    | Organizational structure (MAN1)  | 5     | Matošková et al. (2022)    | .908     |
|                    | Training (MAN3)                  | 3     | Castaneda and Durán (2018) | .840     |
|                    | Reward (MAN4)                    | 4     | Nguyen and Prentice (2022) | .894     |
|                    | It (MAN5)                        | 3     | Choi et al. (2020)         | .820     |
| KS behaviors       | Ksscop                           | 5     | Cummings (2004)            | .914     |
| KS outcomes        | Ksout                            | 5     | Nguyen and Prentice (2022) | .884     |

### 3.2. Qualitative approach

The specification of a proper sample for qualitative research should emphasize the study issue and obtain saturated data (Crouch & McKenzie, 2006). Based on the preparedness and competence of horticultural communities, they can be categorized into three groups: those that consistently develop new crop species (H), predominantly found in the southern and eastern regions; those that develop new species with inconsistent efforts (M), with their regional distribution remaining ambiguous; and those that preserve primitive species without an interest in new species (L), primarily located in the central region. A stratified sampling method was used to distinguish the competencies of the community. We conducted semi-structured interviews using questions following Yin's (2009) and the snowball sampling method, since access to farmers in rural communities is difficult (Jalca et al., 2020). The data collection period spanned from April to July 2023, while 21 of 43 individuals agreed to participate in the interview. These interviewees included 11 community leaders (52.4%), six folk-wisdom farmers (28.5%), and four agricultural experts (19.1%). The interviewees typically requested telephone interviews, whereas some interviewees from the eastern, northeastern, and central areas were available for in-person meetings at community enterprises. All interviewees shared information in Thai, along with local dialects that varied according to cultural and regional attributes. Most respondents were highly experienced, with more than 10 years of work, accounting for 17 individuals (81%) who were all male (81%), while 11 (52%) resided in areas where the level of new crop species development was high.

This study was approved by the Office of the Research Ethics Review Committee for Research Involving Human Subjects, The Second Allied Academic Group in Social Sciences, Humanities and Fine and Applied Arts, Chulalongkorn University (COA No. 123/66).

## 4. Results

### 4.1. Quantitative analysis

#### 4.1.1. Normality test

The primary results, which represent the qualities of the 25 observed variables influencing KS in the HCEs, are presented in Table 3. The mean levels of these variables ranged from 3.42 to 3.78, which were relatively high, whereas the standard deviation values fell within the range of .77 – 1.11. The skewness values ranged from -.54 to .13, while the kurtosis values ranged from -1.34 to -.17, and these two did not exceed 3.00 and 10.00, respectively, indicating that they conform to the normal distribution of data (Kline, 2023). The values of the coefficient of variation were 20.28% – 31.14%, reflecting an applicable data distribution (Brown, 1998). Consequently, all 25 variables were applied to the CFA and SEM.

**Table 3**

Summary of descriptive statistics and normality test

| Latent construct   | Items   | Mean | SD   | Sk   | Ku    | CV     |
|--------------------|---------|------|------|------|-------|--------|
| Individual factors | IDV1    | 3.71 | .80  | -.01 | -.75  | 21.59% |
|                    | IDV2    | 3.71 | .79  | -.12 | -.45  | 21.27% |
|                    | IDV3    | 3.72 | .87  | -.30 | -.32  | 23.29% |
|                    | IDV4    | 3.71 | .83  | -.27 | -.17  | 22.28% |
|                    | IDV5    | 3.74 | .83  | -.19 | -.62  | 22.19% |
| Social factors     | SOC1    | 3.54 | .91  | -.03 | -.82  | 25.62% |
|                    | SOC2    | 3.48 | 1.00 | -.22 | -.64  | 28.62% |
|                    | SOC3    | 3.78 | .77  | -.12 | -.56  | 20.28% |
|                    | SOC4    | 3.72 | .90  | -.54 | -.24  | 24.22% |
|                    | SOC5    | 3.56 | .95  | -.27 | -.40  | 26.72% |
| Managerial factors | MAN1    | 3.69 | .85  | .02  | -.96  | 23.07% |
|                    | MAN2    | 3.54 | .89  | -.17 | -.23  | 25.12% |
|                    | MAN3    | 3.74 | .93  | -.35 | -.38  | 24.92% |
|                    | MAN4    | 3.66 | 1.01 | -.50 | -.36  | 27.57% |
|                    | MAN5    | 3.73 | .92  | -.40 | -.42  | 24.61% |
| KS behaviors       | KSSCOP1 | 3.50 | 1.03 | .03  | -1.15 | 29.52% |
|                    | KSSCOP2 | 3.53 | 1.11 | .02  | -1.34 | 31.38% |
|                    | KSSCOP3 | 3.45 | 1.07 | .13  | -1.22 | 30.95% |
|                    | KSSCOP4 | 3.42 | 1.08 | .13  | -1.24 | 31.41% |
|                    | KSSCOP5 | 3.52 | 1.08 | .05  | -1.28 | 30.79% |
| KS outcomes        | KSOUT1  | 3.70 | 1.01 | -.18 | -1.09 | 27.36% |
|                    | KSOUT2  | 3.73 | 1.01 | -.16 | -1.13 | 27.08% |
|                    | KSOUT3  | 3.72 | 1.03 | -.18 | -1.15 | 27.56% |
|                    | KSOUT4  | 3.78 | .99  | -.30 | -.98  | 26.19% |
|                    | KSOUT5  | 3.74 | 1.00 | -.27 | -1.00 | 26.63% |

Note. SD = standard deviation; SK = skewness; Ku = kurtosis; CV = coefficient of variation

#### 4.1.2. Confirmatory factor analysis

The goodness-of-fit analysis of the measurement model under the CFA, as in Table 4 revealed that every indicator satisfied the criteria, indicating that variables were concordant

with empirical data with a satisfactory criterion given that obtained indices were  $\chi^2/df = 1.255$ , CFI = .996, NFI = .995, IFI = .998, GFI = .995, AGFI = .974 and RMSEA = .042.

The factor loading results show that the weights were .52 – .89, indicating that all observed variables satisfied the criteria (Cheung & Wang, 2017). The AVE values were between .599-.640, higher than .50, signifying that the measurement model possessed accuracy and the variables are of unity (Hair et al., 2010). Multicollinearity verification revealed tolerance values ranging from .263 to .537 and a VIF below 3.8, indicating the independence of all observed variables (O'Brien, 2007). Correlation coefficient analysis of the variables affecting KS in HCEs was performed and divided into five types of unobserved variables relevant to the aspects of individual, society, management factors, KS in HCEs, and the outcome of KS. In total, there were 25 observed variables, and their correlation coefficient values were positive, between .032 and .781, and all lower than .90 (Field, 2024). This means that the confirmatory factors were highly accurate and reliable in terms of the measurement scales.

**Table 4**  
Confirmatory factor analysis

| Latent variables | Items code | Loadings | SE  | t-value | AVE  | CR   | Alpha | Tolerance | VIF   |
|------------------|------------|----------|-----|---------|------|------|-------|-----------|-------|
| IF               |            |          |     |         | .599 | .881 | .844  |           |       |
|                  | IDV1       | .85      | -   | -       |      |      |       | .447      | 2.238 |
|                  | IDV2       | .83      | .07 | 14.900* |      |      |       | .428      | 2.335 |
|                  | IDV3       | .81      | .07 | 14.941* |      |      |       | .405      | 2.471 |
|                  | IDV4       | .73      | .07 | 13.387* |      |      |       | .519      | 1.925 |
|                  | IDV5       | .62      | .06 | 12.250* |      |      |       | .464      | 2.154 |
| SF               |            |          |     |         | .640 | .898 | .824  |           |       |
|                  | SOC1       | .86      | -   | -       |      |      |       | .356      | 2.810 |
|                  | SOC2       | .81      | .06 | 17.306* |      |      |       | .396      | 2.527 |
|                  | SOC3       | .79      | .05 | 14.658* |      |      |       | .504      | 1.985 |
|                  | SOC4       | .64      | .06 | 12.948* |      |      |       | .526      | 1.903 |
|                  | SOC5       | .89      | .07 | 15.952* |      |      |       | .315      | 3.177 |
| MF               |            |          |     |         | .546 | .854 | .843  |           |       |
|                  | MAN1       | .85      | -   | -       |      |      |       | .304      | 3.291 |
|                  | MAN2       | .52      | .06 | 11.176* |      |      |       | .633      | 1.580 |
|                  | MAN3       | .76      | .06 | 17.150* |      |      |       | .435      | 2.301 |
|                  | MAN4       | .87      | .06 | 19.647* |      |      |       | .338      | 2.961 |
|                  | MAN5       | .64      | .06 | 13.688* |      |      |       | .556      | 1.800 |
| KSB              |            |          |     |         | .689 | .916 | .914  |           |       |
|                  | KSSCOP1    | .90      | -   | -       |      |      |       | .274      | 3.650 |
|                  | KSSCOP2    | .92      | .04 | 24.927* |      |      |       | .263      | 3.800 |
|                  | KSSCOP3    | .85      | .05 | 21.503* |      |      |       | .306      | 3.272 |
|                  | KSSCOP4    | .66      | .06 | 13.780* |      |      |       | .453      | 2.206 |
|                  | KSSCOP5    | .80      | .05 | 19.760* |      |      |       | .311      | 3.213 |
| KSO              |            |          |     |         | .587 | .876 | .884  |           |       |
|                  | KSOUT1     | .82      | -   | -       |      |      |       | .431      | 2.318 |
|                  | KSOUT2     | .78      | .05 | 16.589* |      |      |       | .461      | 2.169 |
|                  | KSOUT3     | .74      | .06 | 15.182* |      |      |       | .381      | 2.628 |
|                  | KSOUT4     | .81      | .06 | 16.756* |      |      |       | .318      | 3.148 |
|                  | KSOUT5     | .67      | .06 | 13.527* |      |      |       | .537      | 1.863 |

Note. \*  $p < .001$ . IF = individual factors; SF = social factors; MF = managerial factors; KSB = knowledge sharing behaviors; KSO = knowledge sharing outcomes

#### 4.1.3. Structural model

This study utilized AMOS software to validate the relationships in the structural model of factors affecting KS in HCEs, according to the hypotheses. The maximum likelihood method was applied to evaluate the consistency between the model and empirical data. Previous studies suggest that  $\chi^2/\text{df}$  should be  $< 2$  (Fan & Sivo, 2005), CFI, NFI should not be  $< .9$  (Hair et al., 2010), while AGFI should be  $> .8$  (Harrison-Walker, 2001). Besides, RMSEA  $< .05$  is viewed as excellent; instead, if it is higher but does not exceed .08, it is acceptable (Hair et al., 2010). Finally, a proper SRMR should be  $< .08$  (Fan & Sivo, 2005). Considering indices capturing the consistency between the model and empirical data as reported in Table 5, the structural model is congruent with such data according to the criteria at a reasonable fit level (Hair et al., 2010).

**Table 5**  
Measurement model

| Index            | $p$     | $\chi^2/\text{df}$ | CFI     | NFI     | GFI     | AGFI    | RMSEA   | SRMR    |
|------------------|---------|--------------------|---------|---------|---------|---------|---------|---------|
| Criteria         | $> .05$ | $< 2.00$           | $> .90$ | $> .90$ | $> .90$ | $> .80$ | $< .05$ | $< .08$ |
| Structural model | .058    | 1.205              | .996    | .977    | .972    | .928    | .022    | .063    |

#### 4.1.4. Hypothesis testing

Fig. 3 and Table 6 present the standardized regression weights for the latent variables, demonstrating the influence of each variable within the structural model. The results indicate that individual (SR = .46,  $p < .05$ ), social (SR = .55,  $p < .05$ ), and managerial factors (SR = .47,  $p < .05$ ) had direct and significant influences on KS in HCEs, thus supporting H1, H2, and H3. Additionally, individual (SR = .21,  $p < .05$ ), social (SR = .25,  $p < .05$ ), and managerial (SR = .22,  $p < .05$ ) factors indirectly and significantly affected KS outcomes. Lastly, KS behavior positively contributed to KS outcomes (SR = .46,  $p < .05$ ); thus, H4 was supported. According to Hair et al. (2019), the coefficient of determination ( $R^2$ ) suggests that factors in three dimensions can explain approximately 73% of the variance in KS behavior, indicating a moderate level of explanation. However, KS behaviors could only explain approximately 21% of the variance in KS outcomes, indicating a weak level of explanation.

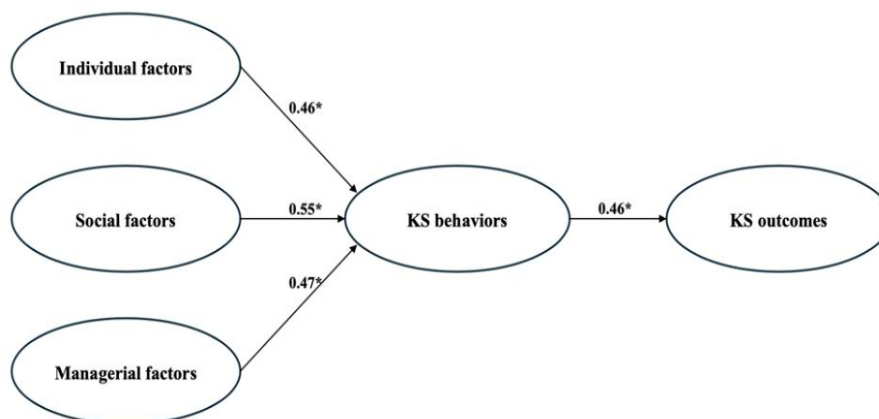


**Fig. 3.** Factors influencing KS among HCEs

**Table 6**

Path analysis in the structural model

| Hypotheses | Path      | SR   | SE  | <i>t</i> -value | R <sup>2</sup> | Direct | Effect Indirect | Total |
|------------|-----------|------|-----|-----------------|----------------|--------|-----------------|-------|
| H1         | IF → KSB  | .46* | .09 | 8.182           | 73.0%          | .46*   | -               | .46*  |
|            | IF → KSO  |      |     |                 |                |        | .21*            | .21*  |
| H2         | SF → KSB  | .55* | .08 | 9.616           | 73.0%          | .55*   | -               | .55*  |
|            | SF → KSO  |      |     |                 |                |        | .25*            | .25*  |
| H3         | MF → KSB  | .47* | .07 | 9.262           | 73.0%          | .47*   | -               | .47*  |
|            | MF → KSO  | -    |     |                 |                | -      | .22*            | .22*  |
| H4         | KSB → KSO | .46* | .06 | 5.959           | 21.0%          | .46*   | -               | .46*  |

Note. \*  $p < .05$ 

## 4.2. Qualitative analysis and results

### 4.2.1. Coding and validation

The data were prepared following the methodology of Humble (2009) using ATLAS.ti. After examining the interview data gathered during transcription and specifying codes instead of literal quotes to represent each factor, the experts scrutinized 680 codes to validate the accuracy of the findings as recommended by Denzin (2017). Overall, their Cohen's kappa as reported in Table 7 is equivalent to 0.69, which indicates substantial intercoder reliability (Landis & Koch, 1977). Consequently, these data apply to summative content analysis to describe the linkages between the factors in each dimension.

**Table 7**

Intercoder reliability

| Code Group         | No. of mentions ( $N = 21$ ) | Cohen's kappa | Interpretation |
|--------------------|------------------------------|---------------|----------------|
| Individual factors | 270                          | .71           | Substantial    |
| Social factors     | 206                          | .65           | Substantial    |
| Management factors | 145                          | .69           | Substantial    |
| KS behaviors       | 59                           | .68           | Substantial    |
| Total              | 680                          | .69           | Substantial    |

### 4.2.2. Interpreting the results

Summative content analysis, as outlined by Allsop et al. (2022), involves summarizing the findings from the perspectives of key informants. These informants included community leaders responsible for internal management, highly experienced folk-wisdom farmers who provided local knowledge to community members, and agricultural experts who were external supporters of the community. The initial stage involved conducting a descriptive statistical analysis of several components and drawing conclusions about the links between the impacts. This was achieved by interpreting and extracting hidden messages from the content in accordance with the research question framework.

#### 4.2.2.1. Individual factors

An analysis of the variables in each group showed that all variables exhibited a conformity degree of > 50%. Furthermore, summary content analysis revealed that trust (IDV1) emerged from the resolve to serve as a clear role model for others through trial and error. Trust can be categorized into three types: trust in the individual asking for information, trust in the capabilities of the individual to utilize the obtained information, and trust in the quality and sources of the information derived from the individual's efforts. Nonetheless, individuals who gain trust must be satisfied (IDV2) with their own knowledge and capabilities, reaching a sufficient level that can benefit others. Additionally, some individuals insinuated that a motivation (IDV3) to push the action has its roots in goodwill, which aims to bring about a community of hospitality. When a farmer expects (IDV4) assistance, they are amicable toward the community leader and local-wisdom members who are willing to help (IDV5). Examples of the interview information are provided below:

*"A group of farmers demands a different type of knowledge, especially that from the one they recognize or trust." [Informant No. H2]*

*"As you become a community leader, do you have a public consciousness? This can be measured, so the leadership translates into the true giver." [Informant No. M1]*

*"Within the community, we have an individual who embodies local wisdom and is consistently eager to impart knowledge." [Informant No. L3]*

#### 4.2.2.2. Social factors

An analysis of the variables within each group revealed that cultural language (SOC1), interaction (SOC3), acceptance (SOC4), and supportiveness (SOC5) exhibit conformity levels > 50%, whereas norms exhibited values < 50% (SOC2). Notably, the latter variable acquires conformity from areas in which the level of new species development is high and areas in which this level is low. The summative content analysis indicates that acknowledgement (SOC1) in terms of both knowledge recognition and personal recognition matters significantly because even though farmers recognize that individuals who share knowledge are highly proficient in that field, they demand actual outcomes that resemble the qualitative screening process of the knowledge obtained. When community members use disseminated knowledge to achieve positive results, they will spread the word, creating a supportive environment for a group of highly engaged members (SOC3). Furthermore, this study revealed that regions with strong cultural ties and frequent use of local dialects (SOC1) hinder cross-regional KS. However, some individuals believe that if community members behaved well, respected each other, and adhered to folk wisdom and norms (SOC2), this would foster a comfortable environment for communication and mutual KS, as shown in the following interview snippet:

*"One of the reasons why people from different groups, including farmers in various communities, are willing to share knowledge with us is mutual respect." [Informant No. H4]*

*"People who live in the same area typically understand the local dialect, whereas outsiders do not. If we communicate with a group from the neighboring province, we are able to understand their message, or there may be some specific meaning that both of our communities know; however, sometimes we do not recognize specific words." [Informant No. M2]*

*“If an agricultural garden suffers from plant diseases or pests, we inform the farmers about the appropriate herbicides or insecticides to use. Some farmers use the Internet to seek knowledge via video tutorials or approach the agricultural officers of that district for further information.” [Informant No. L1]*

#### 4.2.2.3. Managerial factors

Some participants agreed that only two variables – organizational management (MAN1) and IT (MAN5) – were significant in KS or had a conformity degree > 50%. The summative content analysis revealed that IT (MAN5) played a significant role in KS efficacy, given that if a community has constraints on IT usage, its members will struggle to deliver information to state the problem or indicate their preference. Organizational management (MAN1) should be semi-official because it corresponds to the agricultural lifestyle of the community. However, the informants suggest that the community enterprise necessitates the formal management and nomination of a representative (MAN2) in accordance with the relevant regulations, with the secondary goal of efficiently enhancing the overall operation of the community. Not only the individuals who establish an enterprise committee, but also local-wisdom members and agricultural experts are inclined to support regardless of the reward, monetary or otherwise (MAN4). These individuals are eager to arrange training (MAN3), as they perceive it as a chance to enhance their own knowledge and that of the farmers in the community. We have included a few samples of the interview information below:

*“Committees are rarely established because they are often only loosely defined, they lack a permanent structure for selected activities, and because regular participation is voluntary.” [Informant No. H5]*

*“Technologies are highly helpful, but there are obstacles in using data properly mainly because of signal issues. I am uncertain whether people in other areas also face this problem but, here, plantations or farmers’ homes are located in the mountain, where the signal is weak, while only around 20% receive a signal at all.” [Informant No. M1]*

*“We provide knowledge without charge, while a reward is not primary concern. We do it because we understand that everyone who comes is eager to learn how to grow durians like us.” [Informant No.L4]*

## 5. Discussion

Over the past decade, among a group of practitioners, KS in CoPs has attracted considerable attention. Most analytical paths attempt to fulfill the identification of some factors which are gaps (Schiuma et al., 2023). Based on the literature review, even so, considering factors under the same aspect but with disparate context or knowledge boundary gives rise to outcomes that are both verification and argument. This signifies the notion that we cannot deny or affirm those influences with certainty if there is a lack of concurrent multiple-factor analysis. Consequently, this study investigated several factors involved in the KS process.

The CFA results indicated that a component’s structure of each aspect displayed high weight, credibility, and consistency with KS in the HCEs, which affirmed the scope of the variable in each dimension prior to an investigation of influence (Farooq, 2018). A subsequent path analysis revealed that all dimensions exerted a positive impact and directly

influenced KS behavior to a significant extent, while they also indirectly affected efficacy, which aligns with the findings of prior studies (Agrawal & Snekkenes, 2017; Bolisani & Scarso, 2014). Unsurprisingly, social factors ( $DE = .55$ ) had greater weight than individual factors ( $DE = .46$ ). Previous studies on rural farming communities indicate that from an individual perspective, mutual trust significantly influences farmers' willingness to share knowledge (Zainoddin et al., 2018). In this study, interviews with agricultural experts and folk-wisdom farmers revealed that they were recognized as knowledge providers because of the trust community members placed in their expertise and skills, aligning with previous findings (Curado & Vieira, 2019). Nonetheless, some studies have indicated that culture significantly influences behavior (Castaneda & Ramírez, 2024), whereas language directly affects the quantity and quality of the knowledge exchanged (Chang et al., 2017). This indicates that the impact of each factor may vary depending on the context and scope of the study's sample, as demonstrated in this study focusing on KS within the context of HCEs.

Most prior research on KS has examined singular influencing factors such as trust, culture, motivation, and social interaction (Bolisani & Scarso, 2014). Nevertheless, KS activity is strongly influenced by individual and social factors (Panahi et al., 2016). This study revealed that management factors ( $DE = .47$ ) surpassed individual factors, while the interview findings revealed that semi-official organizational management and IT responsiveness significantly influenced KS efficiency. This aligns with prior research suggesting that organizations, optimizing interactions, IT infrastructure, and team support are essential elements for the success of CoPs in the creation and dissemination of knowledge within academic institutions (Akhavan et al., 2015). This highlights management factors' pivotal role in encouraging HCE farmers to share their knowledge. Moreover, from the agricultural experts' standpoint, rewards do not serve as incentives that encourage increased sharing, in contrast to farmers, who are recipients of knowledge.

Based on these results, KS behavior has a significantly positive impact on KS outcomes, which constitutes an achievement. Although  $R^2$  is low ( $DE = .46$ ,  $R^2 = .21$ ), all factors within the structural model exhibit significant indicators that can be deemed acceptable (Ozili, 2023). This refers to the complexity of the factors of interest regarding the scope of the current study, which might emanate from the fact that farmers in the village are bound together, aside from the differences in the characteristics of each area in terms of culture and belief. Previous studies have indicated that if outsiders can harmonize with existing members, this will facilitate knowledge exchange and enhance opportunities for the development of agricultural efficacy (Kommey & Fombad, 2023).

Additionally, if we examine the impact of the factors in each dimension from the farmers' perspective (as knowledge recipients) and contrast this with the extensive insights obtained from the interviews representing the knowledge providers' viewpoint, a substantial difference in norms will emerge, which is an essential component in social factors for knowledge recipients but holds no relevance from the knowledge provider's standpoint. The observations of folk-wisdom farmers indicate that most farmers seeking consultancy are young and eager to adopt the practices of their elders, but lack the confidence to ask. This aligns with findings from social capital theory in a comparable context, which suggests that young farmers typically show deference to older individuals because they are hesitant to seek additional knowledge due to a fear of appearing foolish (Gubbins & Dooley, 2021). This implies that the norms for KS between highly skilled individuals and those who are less proficient in the HCE context are established by the practices of exceptionally adept folk-wisdom farmers.

## 6. Conclusion

### 6.1. Theoretical implications

This study yields several conclusions. First, it broadens the scope of prior research by demonstrating that factor variables within a single dimension are significantly interconnected through structural relationships, subsequently influencing KS behavior in CoPs. Second, its hypotheses were validated through CFA and SEM, which are comprehensive methods for examining the relationships within the structural model. Consequently, the results can be used to identify factor variables that are structurally correlated and categorized into three factors – individual, social, and managerial factors – all of which influence KS behaviors in CoPs. Third, previous studies have been inadequate in delineating the disparity between knowledge recipients' and providers' viewpoints (Choi et al., 2020). This aligns with the current study, as most respondents were inexperienced farmers who acted as knowledge recipients. Consequently, content analysis was employed to derive comprehensive insights into the influence of diverse factors from the viewpoint of knowledge recipients (who are pivotal in HCEs), thereby facilitating an increased understanding. The results revealed that norms were a crucial factor for farmers' KS; however, from the experts' perspective, norms were of minimal importance. Fourth, the results regarding KS behavior's impact on KS outcomes may serve as supporting evidence to argue that CoPs represent an effective type of KS, thereby addressing a literature gap concerning the application of KS theory in CoPs, which has been limited within the horticultural context (Thomas et al., 2020; Tran et al., 2018).

### 6.2. Practical implications

In practice, it can be asserted that KS enables farmers in HCEs to access data and precise knowledge to enhance cultivation efficiency. The findings indicate that norms distinctly affected the KS of HCE farmers (who were primarily knowledge recipients) and experts (who were primarily knowledge providers). Therefore, the primary contribution of this study pertains to diverse stakeholders in the agricultural sector, especially agricultural extension agents and folk-wisdom farmers, who may require awareness of their existing normative practices, which can either facilitate or hinder knowledge absorption and utilization by inexperienced farmers. Conversely, several factors affecting the KS behavior of inexperienced farmers have been identified. This could allow experts to improve their practices for effective communication and facilitate knowledge acquisition. Additionally, official information is usually scientific and complex, requiring experts to translate the content into simple terms for farmers, thereby enhancing the likelihood of efficient implementation and dissemination of knowledge, while eventually leading to sustainable horticulture development.

### 6.3. Limitations and future research

Although the present study provides comprehensive insights into horticultural KS in CoPs, it had certain limitations. First, this study did not cover low-economic-value horticulture. A further constraint arose from the respondents' characteristics during the quantitative analysis, as the majority of the questionnaire data reflected the viewpoints of farmers as knowledge recipients. In contrast, there were few folk-wisdom members serving as knowledge providers, which is inadequate for conducting a comparative analysis. Therefore, it is necessary to use qualitative analysis by gathering data from local-community individuals whose competencies differ and individuals regarded as knowledge

providers. Conducting further research focusing on the perspectives of knowledge recipients could yield more comprehensive results.

Consequently, future studies should expand the scope of this study by comparing its findings with research on lower-economic-value horticultural domains. Moreover, farmers' concerns surrounding climate change and population shift in the agricultural industry, which could radically affect farming in remote areas, comprise another thought-provoking issue.

### Author Statement

The authors declare that there is no conflict of interest.

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