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Determinants of online marketing channel choice among small and micro community enterprises in Thailand

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Abstract

Purpose: This study aimed to analyze the factors affecting the decision of small and micro community enterprises (SMCEs) in Sakon Nakhon Province, Thailand, to engage in online product marketing.

Design/Methodology/Approach: A structured questionnaire was distributed to 360 SMCEs across 18 districts in 2024 to collect empirical data. The survey data were analyzed via 12 variables (gender, age, education, experience, marketing training, attitude, group size, product variety, product type, marketing budget, distance, and technology equipment) using descriptive statistics and binary logistic regression.

Findings: Approximately 66% of the SMCEs marketed their products using online and offline channels, with the majority selecting social media platforms (Facebook and Line) as key channels and the minority using e-marketplaces (Shopee and Lazada). Group management experience, group leader attitude, product variety, product type, marketing budget, and distance from the shipping company proved to be the statistical factors influencing the decision to sell products online.

Originality/Value: This study informs the development of targeted online marketing strategies that cater to diverse target groups' product attributes and resources. Furthermore, the elicited outcomes can assist in formulating policies or establishing training that strengthens farmer groups' potential to enhance their competitiveness in the agricultural market. Small-scale entrepreneurs can enhance their competitiveness in online markets with the strategic decision-making information derived from this study.

Keywords: Agribusiness, agricultural products, e-marketplaces, Online marketing, social media.

Tayland'daki küçük ve mikro topluluk işletmeleri arasında çevrimiçi pazarlama kanalı seçiminin belirleyicileri

Özet

Amaç: Bu araştırmanın amacı, Tayland'ın Sakon Nakhon Eyaletindeki mikro, küçük ve orta ölçekli işletmelerin (KOBİ) ürünlerini çevrimiçi pazarlamaya yönelik kararlarını etkileyen belirleyicileri incelemektir.

Tasarım/Metodoloji/Yaklaşım: Veriler 2024 yılında 18 ilçede 360 KOBİ'ye yapılandırılmış bir anket uygulanarak toplanmıştır. Verileri analiz etmek için tanımlayıcı istatistikler ve ikili lojistik regresyon. Analizde toplam cinsiyet, yaş, eğitim, deneyim, pazarlama eğitimi, tutum, grup üyeleri, ürün çeşitliliği, ürün tipi, pazarlama bütçesi, mesafe ve teknoloji ekipmanı olarak 12 değişken kullanılmıştır.

Bulgular: SMCE'lerin %66'sının ürünlerini hem çevrimiçi hem de çevrimdışı kanallar aracılığıyla pazarladığını ortaya. Çoğunluk, birincil kanalları olarak Facebook ve Line gibi sosyal medya platformlarını tercih etti, ancak azınlık bir grup Shopee ve Lazada gibi e-pazar yerlerini. Ürünleri çevrimiçi satma kararını etkileyen istatistiksel faktörler, grup yönetimi deneyimi, grup liderinin tutumu, ürün çeşitliliği, ürün türü, pazarlama bütçesi ve nakliye şirketine olan uzaklık olarak ortaya konmuştur.

Özgünlük/Değer: Bu çalışma, her hedef grubun ürün özellikleri ve kaynaklarına uygun çevrimiçi pazarlama stratejileri geliştirmek için içgörüler sunar. Ayrıca, çiftçi gruplarının tarımsal ürün pazarlarındaki rekabet güçlerini artırma potansiyellerini güçlendirmek için politikalar belirlemek veya eğitimler düzenlemek için de kullanılabilir. Ayrıca, küçük ölçekli girişimcilere çevrimiçi pazarlardaki rekabet güçlerini artırmak için stratejik karar alma bilgileri sağlar.

Anahtar kelimeler: Tarımsal işletme, tarımsal ürünler, e-pazaryerleri, çevrimiçi pazarlama, sosyal media.

INTRODUCTION

Farmer groups play a pivotal role in their members and communities. Given their high bargaining power to acquire resources at a lower cost or to sell products at a fair price, farmer organizations possess prove beneficial in increasing farmers' competitiveness in the marketplace (Vedasri and Mishra, 2022). Members intending to reduce production costs are encouraged to interchange resources (Abdul-Rahaman and Abdulai, 2020), as well as disseminate knowledge, experiences, and robust agricultural techniques (Kasmawati et al., 2023; Cholisoh, 2023). Furthermore, they collaborate to navigate challenges and establish networks among farmer collectives across diverse regions (Irwan, 2024). The Thai government has implemented a policy to facilitate farmers' establishment of small and medium-sized enterprises (SMCEs) to enhance their capabilities, amplify their impact, as well as extend their knowledge and skills in production, processing, and marketing for the sustainable development of the rural economy and society. Thailand recorded 83,553 registered SMCEs across all provinces in 2022 (Community Enterprise Promotion Division, 2023).

Farmers' access to marketplaces is a key determinant of agriculture sustainability and advancement, specifically in the wake of rapid technological and market shifts. Such accessibility is key to enhancing their competitiveness and revenue (Ma and Gong, 2024). Farmers who adopt online marketing increases market effectiveness (Setiadi et al., 2020) by reducing operational expenses (Qiu et al., 2024), eliminating intermediaries, establishing greater pricing, all of which increase revenue (Zhang et al., 2024), and customer access (Lumentah et al., 2024; Song, 2023). Hence, online marketplaces are a significant way for small-scale farmers to engage with larger markets, determine new opportunities, and sustainably advance the agricultural domain. The Electronic Transactions Development Agency (2024) in Thailand reported that the e-commerce value reached $164,454 million USD in 2022, with the business-to-consumer (B2C), business-to-business (B2B), and business-to-government (B2G) segments accounting for 51.70%, 37.8%, and 10.5%, respectively. The main online sales channel constitutes the e-marketplace, followed by the company's website or application and social media.

For example, the Thai government has implemented a strategic policy that integrates agricultural small and medium-sized enterprises (SMEs) into online markets to equip producers with the requisite knowledge and skills for e-commerce and create additional revenue streams. The focus is on supporting SMEs to add value to their agricultural goods and facilitate their online distribution, both of which promotes farmers' transition from primary producers to agricultural entrepreneurs (Office of the National Economic and Social Development Council, 2018).

A consistent upward trend in Thailand's online agricultural trade contextualizes this policy intervention, particularly since the onset of the COVID-19 pandemic. Reaching an estimated USD 38.33 million in 2023, the transaction value denotes significant market expansion (Department of Agricultural Extension, 2024). Nonetheless, the adoption rates are not uniform despite the government's initiative in encouraging farmer collectives to utilize online platforms for product marketing. Certain farmer groups struggle to adapt to online marketing channels, possibly due to variations in individual circumstances, digital literacy, and established operational practices.

Studies on personal factors and business factors, which significantly influence farmers' decisions to sell their products via online platforms, are presented below under two headings:

- Personal factors: These aspects significantly impact farmers' decisions to adopt online marketplaces in terms of demographic characteristics, gender, age, education, psychological factors, attitudes, socioeconomic characteristics, experience, and training. Following Triatmojo et al. (2024) and Yap et al. (2023), female farmers are more driven to adopt technology and reflect enhanced decision-making authority regarding the use of mobile applications for digital marketing compared to their male counterparts. Thakur et al. (2023), Zhu et al. (2022), and Jitmun and Kuwornu (2019) also highlighted age as a factor influencing decision adoption. As older and more experienced farmers tend to utilize numerous distribution channels, age positively influences market channel selection. Nthiga et al. (2024) and Kaur and Thapar (2019) highlighted the significant influence of age, farming experience, and educational attainment on marketing channel participation and selection. Moreover, highly-educated farmers are more inclined to participate in e-commerce (Rathwa et al., 2024; Triatmojo et al., 2024; Liu et al., 2021). Akudugu et al. (2023), Yap et al. (2023), and Kaur and Thapar (2019) denoted a negative correlation between farmers' age and experience, as well as their utilization of digital platforms. In line with Su et al. (2021), training centered on e-commerce competencies and digital financial literacy can substantially enhance farmers' engagement in digital markets. Farmers with favorable attitudes toward digital platforms are more driven to adopt these technologies (Yamini et al., 2024). On another note, producers who are aware of the potential for enhanced income and market

access via digital channels tend to reflect positive attitudes toward online sales (Zhang et al., 2024). These findings suggest the influence of personal factors on farmers' decisions to engage with e-commerce platforms.

- Business factors influence farmers' adoption and selection of online marketing platforms. A key factor influencing online marketing platform selection is farmer group size. In addition to having increased market access, large farmer groups are better equipped to manage the high product volumes necessary for serving a wide customer base via e-commerce (Song et al., 2024; Thakur et al., 2023; Lee et al., 2020). Product attributes are crucial for successfully penetrating into online markets. Product variety and type (fresh and processed produce are factors that substantially influence the entry into online markets and fulfilment of diverse consumer needs (Sorkun, 2019). Agricultural goods suitability for online channels also depends on its physical characteristics. For example, product types with a longer shelf life (processed goods) are better adapted to the logistical timelines of e-commerce than highly-perishable, fresh produce (Zheng et al., 2019; Huang, 2022). Marketing budget allocation is integral for producers to make more informed decisions by predicting market responses and optimizing financial resources (Zhao et al., 2019). Parallel to Nthiga et al. (2024), distance to the market significantly affects farmers' participation and choice of marketing channels due to high logistics costs. Reducing these transactional costs could increase farmer engagement in e-commerce (Song et al., 2024). Moreover, communication technologies plays a pivotal role in encouraging farmers to adopt e-commerce. These tools facilitate the transactions inherent in e-commerce and, subsequently, promote its adoption among farmers (Su et al., 2021).

Thai farmer groups or SMCEs' adoption of online marketing platforms remains incongruent despite significant government support and a rapidly growing e-commerce market in the country. In this context, disparate digital literacy, varied operational practices, and high logistics costs are recognized as key barriers. A sound understanding of the factors influencing this inconsistent uptake is necessary to bridge the existing literature gap, which is underlined by the contradictory findings on the role of age and experience. While some studies suggested a positive relationship with different marketing channel use (Thakur et al., 2023; Zhu et al., 2022), others identified a negative relationship with digital platform adoption (Akudugu et al., 2023; Yap et al., 2023). The lack of an integrated model assessing the interactive and prioritized effects of personal factors against business factors fails to advance the understanding of the adoption process. As such, these contradictions require further examination in the context of Thai SMCEs to establish a more comprehensive framework for assessing the relationship between the predicting determinants and e-commerce adoption among farmer groups.

The present study identified the factors affecting SMCEs' choice of online market channels in terms of (i) gender, which may influence the decision to use digital marketing applications; (ii) training, which promotes farmers' participation in digital markets; (iii) positive attitudes, which influence readiness to adopt digital platform technologies; (iv) agricultural product types, which may influence the success of online sales; (v) marketing budget allocation, which influences decision-making on appropriate marketing channels; and (vi) communication technology readiness, which is a factor driving farmers to increasingly use e-commerce. Binary logistic regression served as the primary data analysis method. Fundamentally, the outcomes elicited by examining the specific factors influencing farmers' selection of marketing channel could facilitate policymakers, agricultural extension staff, and marketers to promote sustainable agricultural development.

MATERIAL AND METHODS

Study area

Figure 1 depicts Sakon Nakhon Province, (study area), which is located in Northeastern Thailand. Most of the inhabitants in this province are engaged in agricultural activities. Furthermore, 2,664 SMCEs are scattered across the districts. The 2023 Sakon Nakhon Provincial Office assessment regarding SMCEs' agricultural marketing potential in Sakon Nakhon Province called for these enterprises to broaden and diversify their market reach and marketing channels, respectively. The Thai government has implemented a policy to enhance agricultural product marketing. This initiative underscores the development of marketing channels (particularly online platforms) to promote SMCEs' growth as agricultural entrepreneurs in the region by integrating production and marketing systems (Sakon Nakhon Provincial Office, 2023).

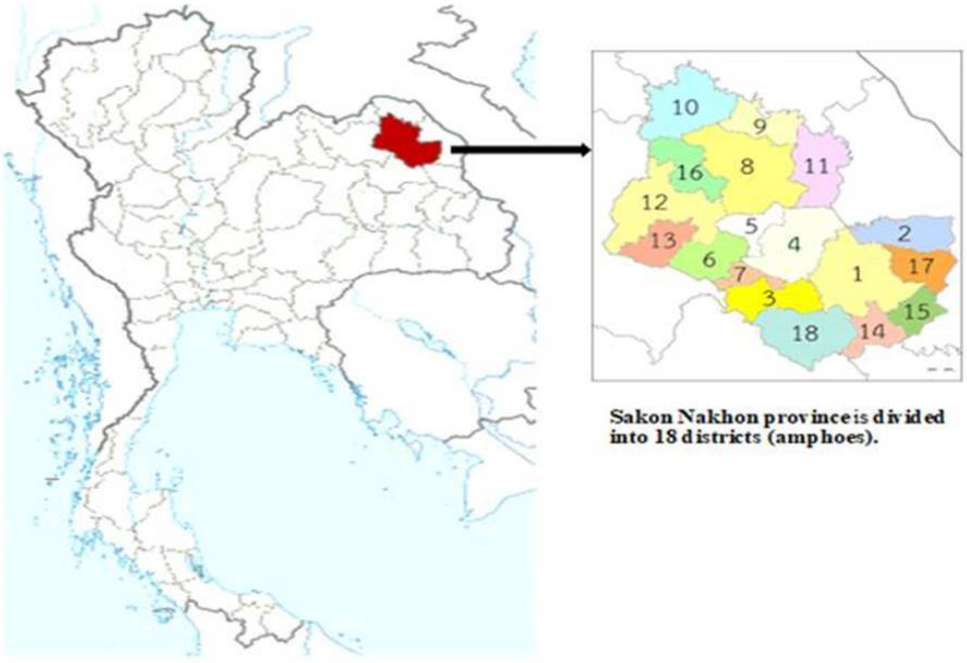

Figure 1. Map of the research location, Sakon Nakhon province, Thailand
Source: Wikimedia Commons (2025)

Sampling procedures and data collection

The target population encompassed 2,664 SMCEs in Sakon Nakhon Province. Notably, the sample size was determined at a 95% confidence level based on Yamane's formula (Yamane, 1973). The equation is expressed as follows:

$$n = \frac{N}{1 + Ne^2}$$

Where;
n = the sample size;
N = the population of the study;
e = the margin of error in the calculation, e = 0.05, based on the research conditions.

The study respondents entailed 348 SMCEs. To enhance analysis precision, the sample size was increased by 12 additional groups, yielding a total of 360 samples. The respondents, consisting of 20 groups in each of the 18 districts of Sakon Nakhon Province, were selected via multi-stage cluster sampling. Targeted purposive sampling was employed to identify the SMCEs engaged in agricultural production. In terms of logistic regression analysis, the sample size (n) should be a minimum of 30 times the number of predictive variables ($n \geq 30P$), with P representing the predictive variable (Vanichbuncha, 2012). The number of predictive variables under study should not exceed 12.

Research instrument

A structured questionnaire was employed to collect primary data. The ethical approval for these forms was obtained from The Ethical Committee of the Sakon Nakhon Rajabhat University on 27 February 2024. The survey was developed using the secondary data derived from relevant literature review. To ensure content consistency and reliability, the questions were revised through the following methods:

(1) The item objective congruence index (IOC) was employed for content validity assessment, with three experts evaluating the alignment between the questions and objectives (Rovinelli and Hambleton, 1977). The equation is expressed as follows:

$$IOC = \frac{\sum R}{N}$$

Where;
IOC = the item objective congruence index;
R = the score that experts rate;
N = is the number of experts.

(2) Reliability test with Cronbach's alpha coefficient: the revised questionnaire was subjected to a pilot study involving 30 non-sample research populations to analyze instrument reliability (Cronbach, 1951). The equation is expressed as follows:

$$\alpha = \frac{k}{k-1}\left[1 - \frac{\sum S_i^2}{S_t^2}\right]$$

Where;
α = Cronbach's alpha;
K = the number of test items;
$\sum S_i^2$ = the sum of the items' variance;
S_t^2 = the variance of the total score.

The IOC values (0.66 to 1.00), exceeded the acceptable minimum threshold of 0.50 (Turner and Carlson, 2003), thus validating alignment with the research objectives. In this study, Cronbach's alpha value of 0.95 met the criteria of $0.6 \leq \alpha < 0.7$ (acceptable reliability), $0.7 \leq \alpha < 0.9$ (good reliability), and $\alpha \geq 0.9$ (excellent reliability) (Streiner, 2003). Following this criterion, Cronbach's alpha value proved to be excellent.

Methods of data analysis

The survey data were subjected to both inferential (binary logistic regression) and descriptive (frequency, mean, and percentage) analysis to describe the SMCE leaders' demographic characteristics and determine the relationship between explanatory and dependent variables, respectively. Statistical Package for Social Sciences (SPSS) version 29 and Microsoft Excel were the analytical tools employed.

A binary logistic regression model was employed to examine the factors influencing SMCEs' selection of online marketing channels. This statistical method is appropriate for delineating the relationship between predictor variables and a binary outcome, which predict the probability of an event occurring. The dependent variable (y) proved dichotomous, defined as y = 1 (selection of an online marketing channel) and y = 0 (non-selection of an online marketing channel) (Vanichbuncha, 2017). Denoted as β_0, β_1, β_2, …, and β_{12}, the estimated coefficients measured the relationship between each predictor variable and log-odds of the dependent variable. Table 1 details the independent variables under study. The following equation mathematically specifies the logistic regression model:

$$\ln(Y) = \ln\left(\frac{Y)}{1-Y}\right) = ß_0 + ß_1X_1 + ß_2X_2 + ... + ß_nX_n \quad 1$$

The study model is specified as follows:

$$Y = ß_0 + ß_1 X_1 + ß_2 X_2 + ß_3 X_3 + ß_4 X_4 + ß_5 X_5 + ß_6X_6 + ß_7X_7 + ß_8X_8 + ß_9X_9 + ß_{10}X_{10} + ß_{11} X_{11} + ß_{12} X_{12} \quad 2$$

Table 1. Independent variables measurement and working hypothesis

Variables	Description	Measurement/code	Expected sig.
Y: COM, Choice of Online Marketing Channels	Choice of SMCEs' Online Marketing Channels	1 = choose to use online marketing channels 0 = otherwise	
X_1: GEN, Gender	Gender of SMCE's leader	1 = male 0 = female	+ve
X_2: AGE, Age	Age of SMCE leader	years	+ve / -ve
X_3: EDU, Education	The education level of SMCE leader	1 = Bachelor's degree or higher 0 = Below Bachelor's degree	+ve
X_4: EXP, Experience	Experience in group management of SMCE leader	Years	+ve / -ve
X_5 : MAR-T, Marketing training	Number of times attended marketing training of SMCE leader	Times	+ve
X_6 : ATT, Attitude	The level of positive attitude of SMCE members	Percentage	+ve
X_7 : MEM, Group size	Number of SMCE members	People	+ve
X_8 : PRO-V, Product variety	Product variety of SMCEs	1 = more than 1 type 0 = 1 type	+ve
ß$_9$: PRO-T, Product type	Product type of SMCEs	1 = processed 0 = unprocessed	+ve
X_{10} : MAR-B, Marketing budget	Marketing budget of SMCEs	1 = set a market budget 0 = no marketing budget set	+ve
X_{11} : DIS, Distance	Distance to the shipping company	kilometers	-ve
X_{12} : TEC-E, Technology equipment	Technology equipment of SMCEs	1 = more than 1 type 0 = 1 type	+ve

Note: +ve is the expectation for the positive relationship, and -ve is the expectation for the negative relationship.

RESULTS AND DISCUSSION

Respondent profile

Table 2 presents a summary of the SMCE leaders' demographic characteristics, which indicate a predominance of female (60.83%) compared to male (39.17%) leaders. The most represented age ranged between 51 and 60 years (45.28%), with an average age of 52. Regarding education, the most common level of completion was upper-secondary (28.89%. These demographic findings coincide with the broader profile of small-scale farmers in Thailand. A 2021/2022 survey by the Agricultural Land Reform Office (2023) reported that the agricultural sector is also female-dominated, with a comparable average age of 51 for laborers and a general education of primary and secondary school. In terms of the management experience within the SMCE group, most of the respondents (48.33%) had six to 10 years of experience with an average experience of 10 years.The leaders demonstrated high engagement with modern communication and continuous learning. A significant majority (92.22%) utilized social media on a daily basis and attended an average of three to four marketing training courses per year.

Table 2. Respondent profile

Variables	Groups	Frequency (n = 360)	Percentage (%)
Gender	Male	141	39.17
	Female	219	60.83
Age (years)	≤ 40	35	9.72
	41-50	110	30.56
	51-60	163	45.28
	> 60	52	14.44
Education Level	Primary School	97	26.95
	Lower-secondary	79	21.94
	Upper-secondary	104	28.89
	High Vocational Certificate	32	8.89
	Bachelor's Degree	39	10.83
	Master's Degree	9	2.50
Experience in group management (years)	≤ 5	81	22.50
	6-10	174	48.33
	11-15	79	21.95
	> 15	26	7.22
Attended marketing training in the past year (times)	Never	28	7.78
	1-2	124	34.44
	3-4	168	46.67
	> 4	40	11.11

Business information of SMCEs

Table 3 details the SMCEs' business. On average, these enterprises consisted of 23 members. The product offerings were diverse (60.28%), with a focus on processed products (64.17%).Most of the SMCEs (86.39%) engaged in online commerce operated without a dedicated digital marketing budget, and situated four to six kilometers from the nearest transportation provider.

With regard to technological infrastructure, 96.11% of the sample SMCEs had access to a stable internet connection, with mobile phones being the preferred device for online sales. This finding corroborates research from the Office of Agricultural Economics, wherein 91.50% of farmers own smartphones for communication, accessing agricultural information, and commercial activities. Nevertheless, the high cost of mobile devices can limit the effectiveness of online platforms for this demographic segment (Bureau of Agricultural Economic Research, 2023).

Table 3. Business information of SMCEs

Variables	Groups	Frequency (n = 360)	Percentage (%)
Members (people)	≤ 10	38	10.56
	11-20	134	37.22
	21-30	125	34.72
	> 40	63	17.50
	Mean	23	
Product variety	1 type	143	39.72
	More than 1 type	217	60.28
Product type	Processed	231	64.17
	Unprocessed	129	35.83
Marketing budget	Set a market budget	49	13.61
	No marketing budget set	311	86.39
Distance to shipping company (kilometers)	≤ 3	40	11.11
	4 - 6	179	49.72
	7 - 9	60	16.67
	> 9	81	22.50
Technology equipment	1 type	292	81.11
	More than 1 type	68	18.89
Internet access	Stable internet access	346	96.11
	Unstable internet access	14	3.89

Attitudes of SMCE leader in selecting online marketing channels

For factor analysis, the goodness-of-fit measures of the data were assessed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. The KMO value of 0.96 indicates excellent sampling adequacy (Kaiser, 1974). With a Chi-Square value of 4015.31, Bartlett's test proved significant. The p-value was equal to 0.000 at the 95% confidence level, indicating the high correlation of the variables in the factor model. Overall, the study data proved appropriate for factor analysis (see Table 4).

Table 4. KMO and Bartlett's test

Test		Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.96
Bartlett's Test of Sphericity	Approx .Chi-Square	4015.31
	df	78
	Sig.	0.000

Table 5 highlights the factor analysis outcomes. Specifically, principal components analysis (PCA) was conducted to identify the factors underpinning the selection of online marketing channels. Varimax rotation was employed, with component inclusion determined based on two criteria: (i) factors required an eigenvalue exceeding 1.0, and (ii) individual items needed a factor loading above 0.50 to be retained (Hair et al., 2018). The analysis yielded a single-component solution accounting for 67.07% of the total variance, with an initial eigenvalue of 8.72. This component consisted of 13 items, with all the factor loadings falling within a strong range of 0.70 to 0.86. The result suggests the presence of a single construct, which can be interpreted as the influence of "attitude" on channel selection by SMCEs. Reliability analysis was performed to assess the measurement scale's internal consistency. The rule of thumb for Cronbach's alpha is presented as follows: $\alpha \geq 0.9$ is excellent, $0.8 \leq \alpha < 0.9$ is very good, $0.7 \leq \alpha < 0.8$ is good, $0.6 \leq \alpha < 0.7$ is acceptable, $0.5 \leq \alpha < 0.6$ is poor, and $\alpha < 0.5$ is unacceptable (Streiner, 2003). In this study, Cronbach's alpha value of 0.95 indicates that the items' measurement demonstrates excellent reliability.

Table 5. Attitudes toward selecting online marketing channels

Attitudes	Factor Loadings
Intellectual attitude	
1. I think online marketing channels can help increase the efficiency of a business's marketing efforts.	0.77
2. I think selling products through online marketing channels helps businesses succeed faster.	0.82
3. I think selling products through online marketing channels makes businesses more competitive.	0.84
4. I think using social media such as Facebook, Instagram, and Line is easy.	0.78
5. I think using e-marketplaces like Shopee, Lazada, and TikTok Shop is easy.	0.79
Affective attitude	
6. I like selling products through online marketing channels.	0.81
7. I feel that online marketing channels will allow me to sell more products.	0.83
8. I feel that online marketing channels will make it easier for me to reach my customers.	0.84
9. I feel that online marketing channels provide more convenience for customers.	0.86
10. I feel confident in paying for products through online marketing channels.	0.70
Behavioral attitude	
11. I intend to sell my products through online marketing channels.	0.82
12. I plan to add online channels to sell my products.	0.87
13. I have been searching for online marketing information to find a way to sell my products.	0.84
Eigenvalues	8.72
Percentage of variance explained	67.07
Cronbach's alpha	0.95

Figure 2 depicts SMCE leaders' attitudes regarding the selection of online marketing channels. With 91% of the respondents believing that online marketing channels offer greater customer convenience, a strong positive perception of the benefits were established in this study. From the respondents' perspective, online marketing platforms could broaden customer outreach (90.5%) and increase product sales (88.33%). This finding aligns with Praneeth et al. (2023), who revealed that farmers in India access broader markets and achieve competitive pricing by leveraging online platforms. Similarly, Yeo and Keske (2024) highlighted increased sales and profitability as perceived economic advantages that significantly catalyze farmers' adoption of online transactions. Conversely, the lowest level of positive sentiment (78.56%) was observed for confidence in online purchasing security. This apprehension corroborates He et al. (2024) and Dongsheng and Yulian (2021), who indicated that concerns about financial loss and data security breaches are perceived risks that can hamper the producers' adoption of online marketing channels.

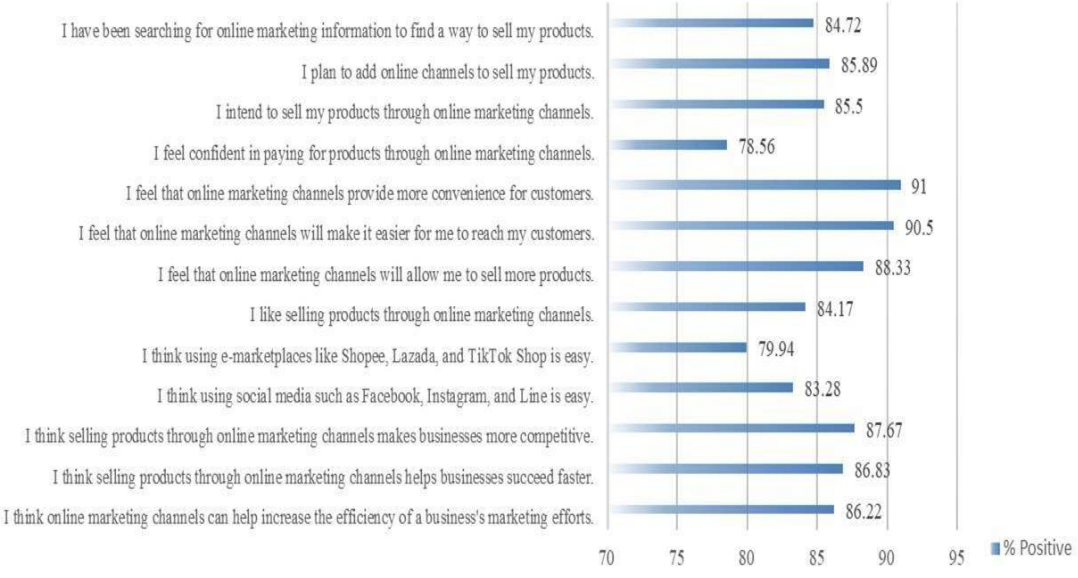

Figure 2. Attitudes of SMCE leaders toward choosing online marketing channels

Marketing channels of SMCEs

In analyzing the SMCEs' marketing channels, a majority of them (66%) employed a hybrid of offline and online distribution channels. The remaining 34% wholly depended on offline methods (see Figure 3). The diverse

offline channels entailed direct sales to consumers via shopfronts or at the farm, sales to third-party merchants, sales at exhibition booths, consignment to souvenir shops or acquaintances' establishments, participation in community markets, and sales through contract companies.

In terms of online channels, SMCEs showed a distinct preference for using social media platforms over e-marketplaces (see Figure 4). Facebook proved to be the dominant platform for product sales (35%), followed by Line (26%). With Shopee and Lazada accounting for 16% and 13% of online sales, respectively, activity on e-marketplaces was lower. The SMCEs prefer selling their products on social media platforms (particularly Facebook) due to their high familiarity and ease of use. Regardless, this preference misaligns with the Electronic Transactions Development Agency's (2024) report on broader consumer behavior trends, in which most retail and wholesale enterprises' purchases mainly occur on e-marketplace platforms.Based on this disconnect, smallholder farmers experience limitations in their market reach and sales effectiveness due to difficulties in adapting to the accessible online sales channels favored by purchasers.

In evaluating operational efficiency by revenue, SMCEs that utilized online and offline distribution channels earned an average annual revenue of USD 10,708. Conversely, SMCEs exclusively relying on offline channels generated an average annual revenue of USD 8,450 (exchange rate: USD 1 = 32.83 THB). These results highlight a positive association between online sales channel adoption and increased enterprise revenue.

Figure 3. SMCE marketing channels

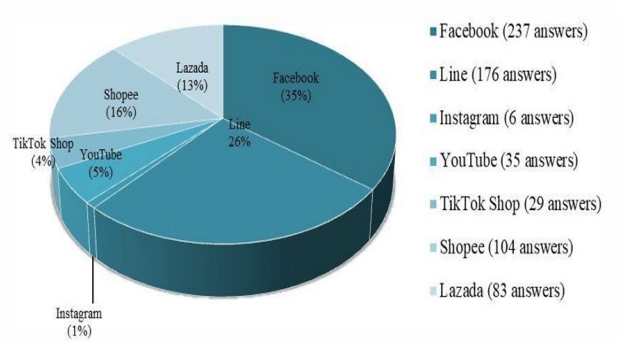

Figure 4. SMCE online marketing channels

Factors influencing SMCEs' choice of online marketing

A binary logistic regression analysis was employed to identify the key determinants influencing SMCEs' selection of online marketing channels through the enter method.The model's suitability and predictive power were assessed via several diagnostic tests, while its goodness-of-fit was evaluated using the Hosmer and Lemeshow test. The non-significant result ($X^2 = 8.110$, $p > 0.05$) confirms that the model's predictions align well with the observed data, denoting a suitable model fit (see Table 6). Pseudo R-squared values were used to assess the model's explanatory power. Resultantly, the independent variables accounted for between 41.8% (Cox and Snell R^2) and 57.9% (Nagelkerke R^2) of the variance in the dependent variable. The overall model accurately classified 85.8% of the cases regarding the selection of online marketing channels, thus demonstrating high predictive power (see Table 7).

Table 6. Hosmer and Lemeshow test

Test	Chi-Square	df	Sig.
Goodness of fit	8.110	8	0.423

Table 7. Pseudo R-square and predicted result

Test	Value
Cox & Snell R-square	0.418
Nagelkerke R-square	0.579
Percentage Correct	85.80

Table 8 presents the binary logistic regression analysis results. Group management experience, the group leader attitude toward selecting online marketing channels, product variety, product type, the available marketing budget, and online marketing channel selection were the model's six factors significantly predicting SMCEs' selection of online marketing channels. These results are elaborated on in the subsequent description and analysis.

Experience in group management significantly influenced SMCEs' selection of online distribution channels ($\beta = 0.135$, $P < 0.01$, Odds ratio = 1.144). Based on the odds ratio of 1.144, the odds of an SMCE leader selecting an online marketing channel for each additional year of management experience increased by a factor of 1.144. Leaders with greater experience may demonstrate superior capabilities in areas critical for e-commerce: maintaining product quality, achieving standardization, and executing diversified marketing strategies. Following Chiv et al.(2020), a significant relationship was identified between farmers'experience and their choice of marketing channels. Experienced farmers often increase their income and profitability by selecting direct marketing methods.

The SMCE leader attitudes regarding the selection of online marketing channels proved to be statistically significant ($\beta = 0.035$, $P < 0.05$, Odds ratio = 1.036). Based on the positive coefficient, SMCEs leaders with more favorable attitudes toward online marketing channels tend to adopt these channels for product distribution. The odds of selecting an online channel increased by a factor of 1.036 for each unit increase in the positive attitude score. A positive mindset seeks new opportunities by effectively navigating challenging issues and situations. While online distribution offers significant potential for sales growth, it requires gaining knowledge and resolving diverse challenges: technological utilization, online platform navigation, and logistical issues related to product shipping. Entrepreneurs with a positive outlook are more driven to view these challenges as growth opportunities, with a focus on the potential for enhanced income rather than the associated difficulties. Following Yamini et al. (2024) and Zhang et al.(2024), farmers with favorable attitudes toward digital platforms are more likely to adopt such technologies, especially when users perceive clear benefits related to increased income and expanded market access.

Product variety significantly, negatively influenced SMCEs' adoption of online marketing channels ($\beta = -1.061$, $P < 0.01$, Odds ratio = 0.346). Based on the odds ratio of 0.346, enterprises with a broader product range are less likely to use online marketing platforms. A singular product enables SMCEs to focus their entire digital marketing budget and efforts on one product and target audience. This result contradicts the findings of Sorkun (2019), who highlighted the need for various products to effectively penetrate and adopt the online market, improve consumer satisfaction, and build loyalty. The current findings align with Keller (2001), in which a diverse product requires segmented marketing campaigns for various product lines. This may diminish the overall impact and elevate customer acquisition costs for each category. Based on this study, providing a limited product variety assists SMCEs in adopting and managing online marketing channels.

Product type significantly predicted online channel adoption ($\beta = 2.837$, $P < 0.01$, Odds ratio = 17.060). Following the odds ratio, SMCEs offering processed products were 17.06 times more likely to utilize online marketing channels than those selling fresh products. Processed products with a longer shelf life facilitate shipping and are appropriate for online sales. Furthermore, processed items provided greater opportunities for market differentiation. The sample enterprises can highlight specific attributes (use of traditional knowledge, community-based production methods, health benefits, or sustainable sourcing) to add value and create a unique brand identity. These findings corroborate Zheng et al. (2019), who revealed product processing and shelf life as critical factors for suitability in online distribution channels. Huang (2022) added that product category influences online sales success. Due to reduced operating costs and waste, dried and processed agricultural products are expected to yield a higher income than fresh products.

Marketing budget allocation significantly predicted SMCEs' online channel selection ($\beta = 3.194$, $P < 0.01$, Odds ratio = 24.393). Based on the analysis, enterprises with a designated marketing budget were 24.393 times more likely to sell products through online marketing channels compared to those without a formal marketing budget

allocation. This finding underscores the critical role of financial planning in digital transformation. As different online platforms involve varying costs and potential returns, a marketing budget must be established to make strategic decisions on channel selection. Digital advertising campaigns, inventory management systems, and the costs of hiring graphic designers or agencies to produce professional content fall under these expenditures. This result aligns with Zhao et al. (2019), who claimed that allocating marketing budgets assists small businesses in making smart decisions.Enterprises that plan these expenditures can better anticipate market dynamics and optimize their financial resource distribution for maximum impact.

Distance from the shipping company provider proved to be a statistically significant factor influencing its adoption of online marketing channels (β = -0.128, P < 0.01, Odds ratio = 0.880). With an odds ratio of 0.880, the current analysis revealed a negative relationship. The likelihood of an SMCE selecting online sales channels decreased by 12% for each one-kilometer increase in distance from a shipping company. Essentially, logistical costs and operational policies significantly influenced this relationship. While many shipping companies offered their clients complimentary product collection, a maximum distance and a minimum order value often constrained these services. An SMCE that is located outside the designated service area or fails to meet the order threshold may incur additional collection fees or be required to deliver its products to the shipping depot, thus increasing costs and logistical complexity.The study findings corroborate that of Nwafor (2021), who identified distance to market as a key factor influencing smallholder farmers' marketing channel selection in South Africa. Likewise, Nthiga et al.(2024) implied that proximity to market strongly influences marketing channel participation and selection. Elevated logistics costs pose a key barrier for farmers, particularly those situated at considerable distances from the shipping firm.

Table 8. Binary logistic regression results of factors influencing SMCEs' choice of online marketing channels

Variables	Coefficient	Standard error	Wald	P-value	Odd ratio
GEN	0.551	0.354	2.423	0.120	1.736
AGE	0.026	0.021	1.556	0.212	1.027
EDU	0.658	0.486	1.838	0.175	1.932
EXP	0.135	0.044	9.324	0.002**	1.144
TRAIN	-0.043	0.127	0.113	0.737	0.958
ATT	0.035	0.016	5.060	0.024*	1.036
MEM	-0.002	0.010	0.032	0.858	0.998
PRO-V	-1.061	0.384	7.624	0.006**	0.346
PRO-T	2.837	0.355	63.956	0.000**	17.060
MAR-B	3.194	0.807	15.683	0.000**	24.393
DIS	-0.128	0.039	10.659	0.001**	0.880
TEC-E	0.816	0.500	2.662	0.103	2.262
Constant	-5.510	1.778	9.606	0.002	0.004

Notes: * significant at p < 0.05;** significant at p < 0.01.

CONCLUSION AND RECOMMENDATIONS

This study investigated the key factors influencing the SMCEs' selection of online marketing channels via binary logistic regression analysis. Based on the elicited findings, a combination of personal factors and business factors influenced the adoption of online marketing channels. Regarding the personal factor, SMCE leaders with greater management experience and more positive attitudes toward e-commerce were more likely to utilize online platforms. Business characteristics also played a crucial role. Product variety was found to be a significant negative predictor, with SMCEs offering a single product type being more inclined to adopt online channels. Furthermore, firms selling processed products tended to engage more in online marketing than those selling fresh goods. A higher marketing budget and a closer distance to a shipping services provider were both positively and significantly associated with online marketing channel selection. Notwithstanding, one finding on product variety contradicted past works. Sorkun (2019) argued that diverse product variety enhances consumer satisfaction and loyalty by addressing mixed customer demands, thus encouraging a move to online platforms. This inconsistency could be attributed to the principle of resource allocation under constrained conditions. These enterprises may operate with a limited marketing budget. Consequently, making a smaller, focused product variety is more manageable for the marketing budget.

The present study proposed policy and strategic recommendations to foster the growth of online marketing among SMCEs, particularly those in the agricultural sector: (i) enhance the management experience and foster positive attitudes toward online marketing channels via training on strategic management, digital marketing, and the use of online platforms, as well as establish a consulting team to provide ongoing support; (ii) encourage SMCEs to shift from raw to processed goods through workshops and resources for agricultural product processing to add value, extend product shelf-life, and standardize products, rendering them more suitable for the logistical demands of online sales;

(iii) provide eligible SMCEs with targeted financial assistance or subsidies to mitigate the initial barrier of inadequate marketing budgets, invest in essential online promotional activities, and gain initial market traction; and (iv) develop logistics systems and distribution points in communities by establishing community-level distribution points to shorten transport times, reduce product damage, and increase efficiency in online product delivery.

Theoretical and practical implications

Regarding the theoretical implications, this study contributes to and refines existing models of technology adoption and strategic choice for SMCEs. The emphasis is on the interplay of personal factors (managerial skill and attitude), firm strategy (product characteristics and value-added processing), and external factors (internet and logistics infrastructure). Based on past literature, the most significant theoretical contribution lies in the challenge presented to the conventional marketing principle that a wider product variety is inherently advantageous for online platforms (Sorkun, 2019). The identification of a negative relationship between product variety and online channel adoption presents a critical theoretical moderator (resource scarcity). Furthermore, the strong empirical evidence demonstrated that the personal characteristics of leaders (management experience and attitudes toward e-commerce) are direct predictors of strategic technology adoption. This elicited findings reinforce the theory that a firm's strategic choices reflect its top management's cognitive base and outlook. Finally, the significance of marketing budgets and proximity to reliable shipping services is highlighted. Online market entry is conceptualized as a strategic choice enabled by the firm's resources rather than a technological decision.

In practice, the current findings present key implications for both SMCEs leaders and the supporting organizations. For SMCEs owners, success in online marketing hinges on developing personal digital literacy and a positive e-commerce attitude while strategically focusing initial efforts on a singular product type to maximize limited marketing budgets. It is also vital to align the choice of online channels with the product (prioritizing them for processed goods), as well as secure a sufficient marketing budget and proximity to reliable shipping services before launching. With regard to policymakers and business support agencies, effective interventions for SMCE leaders (targeted training programs) can promote the development of logistical infrastructure such as shipping hubs and bridge geographical gaps. Access to dedicated digital marketing grants or loans can also overcome financial barriers.

Limitations and future research avenues

This study is not without its limitations despite enriching the current body of knowledge. First, this study is limited by its cross-sectional design, in which data are collected at a single point in time. This analysis facilitates the identification of associations but cannot establish causality. Future works could consider employing the longitudinal research design to track SMCEs over time to better understand the dynamics of their adoption decisions. Second, the outcomes may be specific to the cultural and economic context of the sample SMCEs, thus limiting their generalizability. Potential scholars could aim at validating these findings across different industries and geographical regions to assess the generalizability of the factors identified.

Lastly, this study is confined to key personal and business factors. Other variables such as internet infrastructure quality, digital literacy levels, or specific government e-commerce policies can be included into the proposed model to advance the understanding of the subject matter and address variable bias.

Researchers' Contribution Statement Summary

Narawut Rapankum: Conceptualization, Supervision, Methodology, Formal Analysis, Resources, Investigation, Writing – original draft, Writing – review & editing. Thanada Konkan: Conceptualization, Funding acquisition, Project administration, Supervision, Formal Analysis, Data Curation, Investigation, Visualization, Writing – original draft, Writing – review & editing. Chanoknan Srilapat: Conceptualization, Methodology, Formal Analysis, Validation, Resources, Investigation, Writing – original draft, Writing – review & editing. Kumaree Khodmechai, Kanjanaporn Niljinda, and Laddawan Lertjunthuk: Data Curation, Investigation.

Conflict of Interest Statement

The authors declare no conflict of interest between them.

Ethic Declaration

The Ethical Committee of the Sakon Nakhon Rajabhat University, Thailand, granted approval for this study on 27 February 2024 (Ref. No. HE 67-002).

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