

## How to Cite

Tinh, T. T., & Thoa, H. T. (2025). Digital transformation for value chain development of mountainous OCOP products in Thanh Hoa Province, Vietnam: Opportunities and challenges. *International Journal of Business, Economics and Management*, 8(3), 282-291. <https://doi.org/10.21744/ijbem.v8n3.2445>

# Digital Transformation for Value Chain Development of Mountainous OCOP Products in Thanh Hoa Province, Vietnam: Opportunities and Challenges

## Tran Trung Tinh

National Academy of Education Management, Hanoi City, Vietnam

<http://orcid.org/0000-0002-3590-6692>

Corresponding author email: [tinh.naem@gmail.com](mailto:tinh.naem@gmail.com)

## Hoang Thi Thoa

Thanh Hoa College of Agriculture, Vietnam

Email: [thoa.hoang1974@gmail.com](mailto:thoa.hoang1974@gmail.com)

**Abstract**---This paper investigates the role of digital transformation in the management and development of value chains for OCOP (One Commune One Product) products in the mountainous communes of Thanh Hoa Province, Vietnam. The study employed a mixed-method design, combining a survey of 95 OCOP entities with semi-structured interviews involving 12 stakeholders, including commune officials, agricultural experts, and local producers. Descriptive statistics, SWOT analysis, and thematic analysis were applied to assess the structural features of OCOP entities, their readiness for digital adoption, and the opportunities and challenges they face. The results show that household producers dominate the OCOP structure, accounting for 61.1 percent of respondents, while cooperatives and small enterprises represent 27.4 percent and 11.6 percent, respectively. Agricultural products form the majority of outputs (71.6 percent), highlighting dependence on natural resources, while handicrafts and processed foods remain limited. Although awareness of digital transformation is widespread, actual adoption is constrained by low digital literacy, weak infrastructure, and financial barriers. Cooperatives and younger producers demonstrate greater openness to digital platforms, creating opportunities for collective initiatives and generational change. The SWOT analysis indicates that the strengths of unique resources and policy support are counterbalanced by weaknesses in organizational capacity and skills, while threats from market competition and infrastructural limitations persist. The study concludes that advancing digital transformation requires strengthening cooperatives, expanding training programs, localizing policy support, and prioritizing value-added activities. These measures are essential for leveraging opportunities from digital platforms, enhancing branding and traceability, and expanding market access both domestically and internationally.

**Keywords**---cooperatives, digital transformation, e-commerce, mountainous communes, OCOP, rural development, Thanh Hoa, traceability, value chain, Vietnam.

## Introduction

In recent decades, value chain development has been considered a critical strategy for enhancing the competitiveness and sustainability of agricultural and local products worldwide. The One Commune One Product (OCOP) program, initiated in Vietnam in 2018, has played an increasingly important role in promoting rural economic restructuring, poverty reduction, and local brand development (Hoang & Nguyen, 2022; Ho et al., 2023). Particularly in mountainous provinces such as Thanh Hoa, OCOP not only serves as a driver for socio-economic growth but also acts as a bridge to bring indigenous products closer to domestic and international markets (Tran, 2023; Do et al.,

2022). However, despite its potential, many OCOP products in Vietnam continue to face structural challenges related to fragmented production, weak branding, and limited market reach (Vo & Nguyen, 2022; Nguyen et al., 2022).

Global trade and agricultural development research also highlight that climate change, trade fluctuations, and global competitiveness impose new pressures on value chains. For instance, studies on soybean trade in China and Brazil (Ali et al., 2022) or the temperature effects on exports in the United States (Karlsson, 2021) demonstrate how external factors reshape agricultural trade and competitiveness. In the case of OCOP products, especially those produced in vulnerable mountainous areas, such external shocks create risks that require adaptive management models to ensure long-term value creation and market stability. The literature on export barriers has also shown that small and medium-sized enterprises, which dominate OCOP production, encounter multiple constraints in internationalization, ranging from limited resources to regulatory burdens (Arteaga-Ortiz & Fernández-Ortiz, 2010; Crick & Crick, 2016; Kahiya, 2013). These barriers are further reinforced by inadequate digital readiness, making it difficult for local producers to exploit opportunities from global e-commerce platforms (Kahiya & Dean, 2015, 2016).

The context of Vietnam's digital transformation provides both opportunities and challenges for OCOP product development. With the issuance of key national strategies such as Decision No. 749/QĐ-TTg on the National Digital Transformation Program (Prime Minister of Vietnam, 2020) and Decision No. 411/QĐ-TTg on the Digital Economy and Society Development Strategy (Prime Minister of Vietnam, 2022), local governments are urged to integrate digital technologies into agricultural and rural development. Thanh Hoa Province has actively responded with specific plans to promote OCOP and e-commerce, such as Plan No. 268/KH-UBND (People's Committee of Thanh Hoa Province, 2021), Plan No. 157/KH-UBND on e-commerce platforms (People's Committee of Thanh Hoa Province, 2022), and Plan No. 36/KH-UBND for OCOP implementation in 2025 (People's Committee of Thanh Hoa Province, 2025). These policy directions highlight the province's ambition to strengthen digital applications in product management, traceability, brand promotion, and market expansion, aligning with national objectives for rural transformation.

Nevertheless, the practical implementation of digital transformation in OCOP value chains remains limited in mountainous areas. Challenges such as poor digital infrastructure, low technological literacy among producers, and high investment costs hinder the ability of OCOP entities to fully integrate into digital platforms (Bach et al., 2024; Pouliot & Sumner, 2013). Moreover, while previous studies have explored OCOP development in the Mekong Delta or in association with rural tourism (Tran, 2023; Bach et al., 2024), research focusing on mountainous contexts like Thanh Hoa is still scarce. This gap is critical because the unique socio-economic and cultural conditions of mountainous communities may require tailored approaches to digital adoption and value chain development.

Against this backdrop, this paper aims to investigate the application of digital transformation in managing and developing value chains for mountainous OCOP products in Thanh Hoa Province. It seeks to identify both opportunities and challenges, while also proposing strategic implications for enhancing product value, strengthening branding, and expanding markets domestically and internationally. By doing so, the study not only contributes to the academic literature on value chain development and digital transformation but also provides practical insights for policymakers, local authorities, and OCOP entities striving to foster sustainable rural development (Lowe et al., 2019).

## *Literature Review*

### *Value Chains and the OCOP Program*

The value chain framework has been widely recognized as a critical analytical tool for understanding the processes through which products gain added value from production to final consumption. Originating from industrial and agricultural economics, value chain analysis allows policymakers and scholars to examine the interconnected activities that influence competitiveness, efficiency, and sustainability in local and global markets. In the context of developing countries, value chains are often associated with strategies to upgrade rural industries, integrate farmers into broader markets, and create branding opportunities that can differentiate local products from mass-produced commodities (Verhoef et al., 2021).

Vietnam's One Commune One Product (OCOP) program is a prominent example of such an approach. Officially launched in 2018, the program builds on earlier Japanese and Thai models of "One Village One Product" to promote unique, locally rooted goods that reflect community identity and cultural heritage. The OCOP framework emphasizes local resources, indigenous knowledge, and traditional skills, while simultaneously linking these attributes to modern production, marketing, and branding processes. Scholars argue that OCOP has the potential not only to contribute to

rural industrialization but also to enhance community empowerment and social capital, especially when integrated into broader rural development strategies (Hoang & Nguyen, 2022; Ho et al., 2023).

In mountainous provinces such as Thanh Hoa, OCOP plays a particularly significant role. These regions are characterized by socio-economic challenges, including limited infrastructure, lower educational levels, and restricted access to external markets. Yet, they also possess unique ecological and cultural resources, ranging from traditional handicrafts to specialty agricultural products. Research indicates that if these resources are effectively incorporated into structured value chains, they can generate high-value-added outputs while preserving cultural identity (Do et al., 2022). Thus, the OCOP program, when combined with modern tools such as digital transformation, provides a pathway for improving livelihoods and narrowing the development gap between rural and urban areas.

#### *Export Barriers and Internationalization of Local Products*

The internationalization of local and small-scale enterprises has been a major theme in business and development research over the past five decades. A large body of literature demonstrates that small and medium-sized enterprises, which dominate rural production systems, face persistent barriers in entering and sustaining themselves in export markets. Early studies sought to categorize these barriers into internal constraints, such as the lack of managerial expertise, the limitation of financial capital, and the inadequacy of technological capabilities, as well as external constraints, including tariff and non-tariff barriers, market information gaps, and complex regulatory environments (Leonidou et al., 2010).

Arteaga Ortiz & Fernández Ortiz (2010), highlight that despite decades of research, there has not been a universally accepted measurement scale for export barriers, partly because such barriers vary by industry, country, and firm characteristics. More recent research has focused on the experiences of international new ventures, which face different challenges than conventional firms. Kahiya (2013) points out that while new ventures are often more agile and innovative, they still confront significant barriers in scaling up exports. Subsequent studies by Kahiya & Dean (2015, 2016) suggest that these barriers directly shape firms' strategic confidence and their ability to transition through different stages of internationalization.

For OCOP enterprises, which are typically small-scale and community-based, these findings are highly relevant. Limited resources, inconsistent product quality, and a lack of global branding frequently constrain their ability to penetrate international markets (Bach et al., 2024). The first export order itself, as revisited by Crick & Crick (2016), is often a major innovation and learning process for such firms. In the case of Vietnamese OCOP entities, which must compete in increasingly globalized and digitalized markets, these barriers are compounded by low digital readiness, making it difficult to utilize e-commerce platforms and traceability systems effectively.

#### *Digital Transformation and E-commerce Development*

Digital transformation has emerged as both an opportunity and a necessity in the management and development of agricultural value chains. Scholars emphasize that digitization can reduce transaction costs, improve transparency, and facilitate trust between producers, intermediaries, and consumers. In particular, traceability systems have been highlighted as essential for ensuring food safety and maintaining industry reputation in global markets (Pouliot & Sumner, 2013). Digital platforms also enable producers to bypass traditional intermediaries and directly access consumers, thereby increasing profit margins and fostering stronger brand identity.

Global studies underscore the urgency of adopting digital tools in response to climate change and market volatility. For example, Ali et al. (2022) show how climate change impacts soybean trade between China and Brazil, while Karlsson (2021) demonstrates the effects of temperature fluctuations on export performance in the United States. These findings underline the importance of resilient and adaptive systems, where digital technologies play a central role in monitoring risks and adjusting supply chains accordingly.

In Vietnam, digital transformation has been institutionalized through key government policies, such as Decision No. 749/QĐ-TTg on the National Digital Transformation Program (Prime Minister of Vietnam, 2020) and Decision No. 411/QĐ-TTg on the National Strategy for Digital Economy and Digital Society Development (Prime Minister of Vietnam, 2022). These policies set ambitious goals for integrating digital solutions across industries, including agriculture and rural development. Complementing national policies, Thanh Hoa Province has implemented a series of plans to promote e-commerce platforms (People's Committee of Thanh Hoa Province, 2022), integrate national digital databases (Government of Vietnam, 2024), and strengthen OCOP promotion through digital tools (People's Committee of Thanh Hoa Province, 2021, 2025a, 2025b). Collectively, these initiatives demonstrate a policy push

toward embedding digital solutions into OCOP value chains to achieve greater market access, transparency, and competitiveness.

### *Domestic Research on OCOP Value Chains*

Within Vietnam, scholarly attention to OCOP has grown in recent years, reflecting the program's increasing significance for rural transformation. [Do et al. \(2022\)](#) illustrate how a community-based OCOP model in Dak Lak Province strengthened local participation and enhanced the sustainability of rural products. Similarly, [Nguyen et al. \(2022\)](#) analyzed the medicinal plant value chain in Hoa Binh, arguing for integrated solutions that link production, processing, and consumption in a way that maximizes local resources while ensuring market viability.

Case studies in the Mekong Delta further highlight both achievements and persistent challenges. [Vo & Nguyen \(2022\)](#) examined the Cau Duc pineapple value chain in Hau Giang Province, finding that while farmers benefited from improved incomes, weaknesses in logistics, infrastructure, and branding limited the sector's growth potential. [Trang et al. \(2024\)](#) expanded this line of inquiry by analyzing how OCOP entities make investment decisions, emphasizing the implications of such decisions for sustainable rural development. [Bach et al. \(2024\)](#) specifically addressed export barriers faced by OCOP businesses in the Mekong Delta, concluding that while demand exists in international markets, institutional and capacity-related barriers hinder export readiness.

These studies collectively suggest that OCOP has made meaningful contributions to rural economies, but significant obstacles remain, particularly in scaling production, ensuring quality control, achieving brand recognition, and meeting international standards. Moreover, much of the existing literature has concentrated on lowland or delta regions, where infrastructure and digital adoption are relatively more advanced compared to mountainous areas.

### *Research Gap*

Despite growing literature on OCOP and value chain development, research focusing specifically on mountainous provinces such as Thanh Hoa remains limited. While there are insights into community-based models ([Do et al., 2022](#)), export barriers ([Arteaga-Ortiz & Fernández-Ortiz, 2010](#); [Kahiya & Dean, 2016](#)), and value chain management in the Mekong Delta ([Bach et al., 2024](#); [Vo & Nguyen, 2022](#)), few studies systematically explore how digital transformation can be strategically applied in mountainous contexts. This is a critical omission because the socio-economic, cultural, and infrastructural conditions of mountainous areas differ significantly from those of other regions, requiring tailored solutions.

Furthermore, while national and provincial governments have established ambitious digital transformation and OCOP promotion policies (Prime Minister of Vietnam, 2020, 2022; People's Committee of Thanh Hoa Province, 2021, 2022, 2025a, 2025b), little empirical research has evaluated their actual implementation on the ground. Questions remain regarding the extent to which local producers, many of whom are ethnic minorities, can adopt and benefit from digital tools. Issues of digital literacy, affordability of technology, and market readiness must be examined in detail.

This study seeks to fill these gaps by investigating how digital transformation is applied in managing and developing OCOP value chains in Thanh Hoa's mountainous communes. By identifying opportunities and challenges, the research will contribute to both theoretical understanding and practical policymaking, offering strategies that align digital innovation with sustainable rural development goals ([Huang & Benyoucef, 2013](#)).

## **Methodology**

### *Qualitative Data Collection*

The qualitative data were collected through semi-structured interviews with 12 participants from four mountainous communes. The participants included four commune-level officials directly in charge of OCOP activities, three experts from agricultural extension services, and five representatives of local OCOP entities such as cooperatives and household producers. The interviews were designed to capture experiences related to the management of OCOP programs, the extent of digital application in product development, and perceptions of opportunities and challenges at the commune level. Each interview lasted approximately 45 to 60 minutes, was recorded with consent, and subsequently transcribed for thematic analysis.

### *Quantitative Data Collection*

The quantitative component was based on a survey of 95 respondents in six mountainous communes of Thanh Hoa Province. The sample included 58 household producers (61.1 percent), 26 members of cooperatives (27.4 percent), and 11 representatives of small enterprises (11.6 percent). In terms of product categories, 68 respondents (71.6 percent) were engaged in agricultural production, 17 respondents (17.9 percent) in handicrafts, and 10 respondents (10.5 percent) in processed foods.

The structured questionnaire was divided into five sections: general demographic information, current use of digital technologies, perceived opportunities from digital platforms, barriers to adoption, and market-related activities.

### *Data Analysis*

The survey data were processed using descriptive statistical methods in order to summarize the characteristics of respondents and their engagement in OCOP activities. Cross-tabulation was employed to compare the adoption of digital tools across producer types and product categories.

To complement the statistical analysis, the study applied SWOT analysis to identify internal strengths and weaknesses of OCOP entities as well as external opportunities and threats. PESTLE analysis was also used to contextualize value chain development in terms of political, economic, social, technological, legal, and environmental factors. Furthermore, Porter's value chain model served as a framework for mapping out the stages of OCOP production and distribution, with particular attention to where digital technologies could create added value.

The interview data were analyzed using thematic coding, which allowed for the identification of recurring issues such as digital infrastructure conditions, producers' awareness of e-commerce, and the role of cooperatives in promoting technology adoption. The integration of quantitative and qualitative findings ensured a holistic understanding of the study objectives.

## **Results**

### *Quantitative Results*

The survey of 95 respondents across six mountainous communes in Thanh Hoa Province provided a detailed picture of the OCOP entities and their characteristics. The data indicate that household producers dominate the OCOP structure at the commune level, while cooperatives and small enterprises make up smaller but still significant proportions. Agricultural products remain the core category, supplemented by handicrafts and processed foods.

Table 1  
Distribution of OCOP entities by type

Type of entity	Number of respondents	Percentage (%)
Household producers	58	61.1
Cooperatives	26	27.4
Small enterprises	11	11.6
<b>Total</b>	<b>95</b>	<b>100.0</b>

As shown in Table 1, household producers accounted for 61.1 percent of respondents, reflecting the traditional production structure of mountainous communes. Cooperatives represented 27.4 percent, serving as an organizational form for collective production and marketing, while small enterprises made up 11.6 percent.

Table 2  
Distribution of OCOP entities by product category

Product category	Number of respondents	Percentage (%)
Agricultural products	68	71.6
Handicrafts	17	17.9
Processed foods	10	10.5
<b>Total</b>	<b>95</b>	<b>100.0</b>

Agricultural products formed the majority with 71.6 percent, highlighting the dependence of OCOP activities in Thanh Hoa's mountainous communes on natural resources. Handicrafts accounted for 17.9 percent, while processed foods represented 10.5 percent, suggesting that value-added processing activities are still relatively limited.

Table 3  
Demographic characteristics of respondents

Demographic indicator	Category	Number	Percentage (%)
Gender	Male	49	51.6
	Female	46	48.4
Age group	Under 35 years old	19	20.0
	35–50 years old	41	43.2
	Above 50 years old	35	36.8
Education level	Lower secondary	32	33.7
	Upper secondary	39	41.1
	Vocational / higher	24	25.3

The demographic profile shows a balanced gender distribution. A majority of respondents were between 35 and 50 years old (43.2 percent), indicating that OCOP activities are largely managed by middle-aged groups with experience in production. Educational levels varied, with 41.1 percent having completed upper secondary school, 33.7 percent lower secondary school, and 25.3 percent vocational or higher education. This suggests that while there is a base of formal education among producers, specialized digital skills may still be lacking.

### *Qualitative Results*

The 12 semi-structured interviews provided complementary insights into the survey data, revealing the lived experiences of local stakeholders in applying digital transformation to OCOP value chains. Commune-level officials emphasized that while the province has issued detailed plans to support OCOP and digital transformation, the implementation at the commune level remains uneven. Officials noted constraints such as limited technical staff, insufficient funding for training activities, and unstable internet infrastructure. One official highlighted that “the policy direction is very clear, but at the commune level we lack both human and financial resources to fully realize these goals.”

Experts from agricultural extension services pointed out that producers are aware of the potential benefits of digital tools, especially in branding and market expansion. However, they also observed that adoption rates are slow due to gaps in digital literacy and skepticism about the effectiveness of online platforms. According to one expert, “digital transformation requires not only technology but also a change in mindset, and many producers still prefer traditional sales channels.”

Interviews with cooperative representatives and household producers revealed differences in attitudes. Cooperative leaders generally showed more openness to digital tools, with some reporting collective initiatives such as shared online marketing pages or pilot projects with QR code traceability. Household producers, however, expressed concerns about costs and uncertainty. One household producer mentioned, “I see others using online platforms, but I am not sure if it will bring more sales than working with traders.”

Overall, the qualitative findings reinforce the survey data by showing that while awareness of digital transformation exists, actual implementation is constrained by infrastructure, skills, and financial limitations.

Cooperatives appear to be in a stronger position to experiment with digital applications, while household producers remain cautious.

### *SWOT Analysis Results*

Based on both the quantitative survey of 95 respondents and the qualitative interviews with 12 stakeholders, a SWOT analysis was conducted to categorize the internal and external factors influencing the digital transformation of OCOP value chains in Thanh Hoa's mountainous communes.

Table 4  
SWOT analysis of OCOP value chains in mountainous communes

Factor	Key points identified in the study
Strengths	<ul style="list-style-type: none"> <li>- Rich natural and cultural resources are reflected in unique agricultural and handicraft products.</li> <li>- Strong community identity and traditional knowledge embedded in production practices.</li> <li>- Supportive policy framework from national and provincial governments that prioritize digital transformation and OCOP promotion.</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>- Predominance of household-based production (61.1 percent), leading to fragmented supply chains and limited collective branding.</li> <li>- Low levels of digital literacy, especially among middle-aged and older producers.</li> <li>- Limited capital investment for digital infrastructure and technology adoption.</li> <li>- Small share of value-added processing activities (10.5 percent), reducing incentives for digital engagement.</li> </ul>
Opportunities	<ul style="list-style-type: none"> <li>- National and provincial policies on digital transformation (Decision No. 749/QD-TTg, Decision No. 411/QD-TTg, and Thanh Hoa's provincial plans) create momentum for technology adoption.</li> <li>- Younger producers (20.0 percent under 35 years old) show higher digital readiness and openness to online platforms.</li> <li>- Increasing consumer demand for traceability and branding offers potential for OCOP products to differentiate in domestic and international markets.</li> <li>- Cooperatives can act as bridging institutions to experiment with collective digital tools.</li> </ul>
Threats	<ul style="list-style-type: none"> <li>- Poor and uneven digital infrastructure in mountainous communes, including unstable internet connections.</li> <li>- Competition from mass-produced goods and better-branded products in domestic and global markets.</li> <li>- Vulnerability of agricultural products to climate change and price fluctuations, which digital tools alone cannot fully mitigate.</li> <li>- Persistent skepticism among household producers about the effectiveness of digital platforms compared to traditional sales channels.</li> </ul>

## **Discussion**

### *Structural Features of OCOP Entities*

The survey results showed that household producers accounted for 61.1 percent of respondents, while cooperatives and small enterprises represented 27.4 percent and 11.6 percent, respectively. This structure is consistent with the pattern observed in rural Vietnam, where household-based production dominates but often struggles to achieve economies of scale (Vo & Nguyen, 2022). The reliance on households indicates that the OCOP program in mountainous communes is still deeply rooted in traditional production forms, which poses challenges in terms of resource mobilization, quality control, and coordinated branding. The limited share of cooperatives and small enterprises suggests that organizational forms capable of driving digital adoption remain underdeveloped (Widaryanti et al., 2021).

In terms of product categories, the overwhelming focus on agricultural products (71.6 percent) further reflects the dependence of mountainous communes on natural resources. While handicrafts (17.9 percent) and processed foods (10.5 percent) provide opportunities for diversification, their relatively small share indicates that value-added

activities have yet to be fully developed. This finding is in line with [Nguyen et al. \(2022\)](#), who emphasized that integrated value chains involving processing and branding are essential for enhancing competitiveness.

The SWOT analysis reinforces these observations by classifying strong community identity and abundant natural resources as key strengths, while the fragmented household structure and the limited presence of processing enterprises appear as weaknesses. These internal conditions directly influence the potential for digital transformation.

#### *Digital Transformation Readiness*

Interview findings revealed that commune-level officials recognize the importance of digital applications but face constraints in technical capacity and funding. This resonates with the literature emphasizing that policies on digital transformation are ambitious at the national and provincial levels (Prime Minister of Vietnam, 2020; 2022; People's Committee of Thanh Hoa Province, 2021, 2022, 2025) but often encounter implementation difficulties at the local level ([Hoang & Nguyen, 2022](#)).

Experts and producers repeatedly highlighted issues of digital literacy and infrastructure limitations, which slow down adoption. These observations echo [Pouliot & Sumner \(2013\)](#), who emphasized that the successful application of digital tools, such as traceability systems, requires both technological and organizational readiness. In Thanh Hoa's mountainous communes, where internet connectivity is unstable and training opportunities are scarce, the gap between awareness and practice becomes particularly evident.

Within the SWOT framework, these realities represent **weaknesses** in skills and infrastructure that hinder adoption, compounded by **threats** such as competition from better-resourced producers and unreliable connectivity.

#### *Opportunities from Digital Platforms*

Despite these challenges, the findings also point to emerging opportunities. Cooperatives, which represented 27.4 percent of the sample, demonstrated greater willingness to experiment with collective digital initiatives such as online marketing or QR code traceability. This suggests that cooperatives may function as bridging institutions, helping household producers access digital platforms that would otherwise be beyond their capacity. This role aligns with the findings of [Do et al. \(2022\)](#) in Dak Lak, where community-based OCOP models enhanced local participation and sustainability.

Furthermore, the demographic profile indicates that a significant proportion of respondents (20.0 percent) are under 35 years old. Younger producers are more likely to be digitally literate and willing to try new platforms, creating potential for generational change in digital adoption. This reflects [Crick & Crick's \(2016\)](#) argument that the first export order or initial engagement with new market systems often represents a turning point for small enterprises. In the context of OCOP, the first steps into digital platforms may generate similar transformative effects.

These findings align with the opportunities identified in the SWOT analysis, including favorable policy frameworks, the presence of digitally inclined youth, and growing consumer demand for branded and traceable products.

#### *Persistent Challenges*

At the same time, the results highlight persistent obstacles that require careful consideration. Household producers, who form the majority of OCOP entities, expressed strong hesitation toward digital adoption due to costs, uncertainty, and lack of skills. This reinforces the export barrier literature ([Arteaga Ortiz & Fernández Ortiz, 2010](#); [Kahiya & Dean, 2015, 2016](#)), which emphasizes that small-scale enterprises consistently face constraints that prevent them from exploiting international opportunities. For OCOP entities in mountainous areas, these barriers are magnified by geographic isolation, weaker infrastructure, and limited access to financial capital.

The limited share of processed foods (10.5 percent) also indicates that value addition is underdeveloped. Without stronger processing and branding, agricultural products may remain vulnerable to price fluctuations and competition, a risk already noted in global studies on commodity trade ([Ali et al., 2022](#); [Karlsson, 2021](#)). Thus, the absence of value-added production not only restricts economic benefits but also reduces the incentives for adopting digital platforms, which are often more effective for branded or differentiated products.

Within the SWOT analysis, these issues appear as **threats** related to competition, climate vulnerability, and producer skepticism about new platforms, which reinforce internal weaknesses and make digital transformation more challenging.

### *Implications for Value Chain Development*

The integration of quantitative and qualitative findings, supported by the SWOT framework, suggests that digital transformation in OCOP value chains cannot be approached as a purely technological issue. Instead, it must be understood as a socio-technical process that depends on organizational forms, producer capacities, and supportive policies. The findings highlight that:

Cooperatives play a pivotal role in bridging digital gaps, offering collective solutions that individual households cannot achieve. Training and capacity building are necessary to translate awareness into practice, especially for middle-aged and older producers who remain hesitant.

Policy support needs to be more localized, with resources and training programs directly tailored to the conditions of mountainous communes. Value addition through processing and branding should be prioritized, as it creates stronger incentives for producers to engage in digital platforms and international markets.

### **Conclusion**

This study has examined the application of digital transformation in managing and developing OCOP value chains in the mountainous communes of Thanh Hoa Province. Using a mixed-method approach with both survey data and interviews, the findings reveal a structural dominance of household producers, limited processing and branding capacity, and low levels of digital literacy. At the same time, cooperatives and younger producers emerge as key drivers for digital adoption, supported by national and provincial policies. The SWOT analysis highlights that while abundant natural and cultural resources and strong policy frameworks provide a foundation for growth, weaknesses in organization and capacity, along with threats from market competition and infrastructural constraints, continue to limit progress.

The study concludes that digital transformation should not be treated as a purely technological intervention. Instead, it requires localized policies, tailored training, and stronger cooperative structures that can bridge digital gaps. Moreover, promoting value addition through processing and branding is essential to create meaningful incentives for digital adoption and integration into broader markets. These insights contribute to both the academic literature on rural value chain development and to practical policymaking for sustainable economic transformation in mountainous regions of Vietnam.

### **References**

- Ali, T., Zhou, B., Cleary, D., & Xie, W. (2022). The impact of climate change on China and Brazil's soybean trade. *Land, 11*(12), 2286.
- Arteaga-Ortiz, J., & Fernández-Ortiz, R. (2010). Why don't we use the same export barrier measurement scale? An empirical analysis in small and medium-sized enterprises. *Journal of Small Business Management, 48*(3), 395–420.
- Bach, C. K., Pham, A. N. L., Huynh, A. H., Mai, N. H., Le, H. N., & Nguyen, K. D. (2024, August). The barriers of exporting OCOP products to foreign markets: A case study of OCOP business in the Mekong Delta regions. In *International Conference on Applied Economics and Business* (pp. 761–776). Cham: Springer Nature Switzerland.
- Crick, D., & Crick, J. (2016). The first export order: A marketing innovation revisited. *Journal of Strategic Marketing, 24*(2), 77–89.
- Do, V. C., Hoang, H. L., Chau, T. M. L., Nguyen, T. M. N., Duong, D. T., & Truong, T. T. (2022). Some results achieved in building a community-based OCOP model in Dak Lak Province. *Tay Nguyen Journal of Science, 16*(55). <https://doi.org/10.5281/zenodo.7324504>
- Government of Vietnam. (2024, May 9). Decree No. 47/2024/ND-CP on the list of national databases and their exploitation and use.
- Ho, K. L. P., Adhikari, R., Bonney, L., Teo, D. D., & Miles, M. P. (2023). Applying the community capital framework for social entrepreneurial ecosystem development: Vietnam's One Commune One Product program. *Community Development, 54*(3), 382–394.
- Hoang, T. H., & Nguyen, V. H. (2022). Vietnam's One Commune One Product (OCOP) program: From theory to policy and practical implementation. *Journal of Natural Resources and Environment Science, 41*, 76–92.

- Huang, Z., & Benyoucef, M. (2013). From e-commerce to social commerce: A close look at design features. *Electronic Commerce Research and Applications*, 12(4), 246-259. <https://doi.org/10.1016/j.elerap.2012.12.003>
- Kahiya, E. T. (2013). Export barriers and path to internationalization: A comparison of conventional enterprises and international new ventures. *Journal of International Entrepreneurship*, 11(1), 3-29.
- Kahiya, E. T., & Dean, D. L. (2015). Export barriers and business confidence: A quasi-longitudinal examination. *Asia Pacific Journal of Marketing and Logistics*, 27(2), 294-323.
- Kahiya, E. T., & Dean, D. L. (2016). Export stages and export barriers: Revisiting traditional export development. *Thunderbird International Business Review*, 58(1), 75-89.
- Karlsson, J. (2021). Temperature and exports: Evidence from the United States. *Environmental and Resource Economics*, 80(2), 311-337.
- Leonidou, L. C., Katsikeas, C. S., & Coudounaris, D. N. (2010). Five decades of business research into exporting: A bibliographic analysis. *Journal of International Management*, 16(1), 78-91.
- Lowe, P., Phillipson, J., Proctor, A., & Gkartzios, M. (2019). Expertise in rural development: A conceptual and empirical analysis. *World development*, 116, 28-37. <https://doi.org/10.1016/j.worlddev.2018.12.005>
- Nguyen, T. M. T., Truong, N. T., Lai, P. T., Do, M. T., & Do, T. L. (2022). Solutions for developing the medicinal value chain in Yen Thuy District, Hoa Binh Province. *Journal of Economics and Development*, 305(2), 163-172.
- People's Committee of Thanh Hoa Province. (2021, December 8). Plan No. 268/KH-UBND on implementing the One Commune One Product (OCOP) Program, 2021-2025.
- People's Committee of Thanh Hoa Province. (2022). Plan No. 157/KH-UBND on promoting e-commerce development based on e-commerce platforms.
- People's Committee of Thanh Hoa Province. (2025). Plan No. 122/KH-UBND on the National Target Program for socio-economic development of ethnic minority and mountainous areas in Thanh Hoa Province.
- People's Committee of Thanh Hoa Province. (2025). Plan No. 36/KH-UBND on implementing the One Commune One Product (OCOP) Program in 2025.
- People's Committee of Thanh Hoa Province. (2025, February 11). Plan No. 23/KH-UBND on implementing the National Target Program on New Rural Development (NRD) in 2025.
- Pouliot, S., & Sumner, D. A. (2013). Traceability, recalls, industry reputation and product safety. *European Review of Agricultural Economics*, 40(1), 121-142.
- Prime Minister of Vietnam. (2020). Decision No. 749/QD-TTg approving the National Digital Transformation Program to 2025, with orientation to 2030.
- Prime Minister of Vietnam. (2022). Decision No. 411/QD-TTg approving the National Strategy for Digital Economy and Digital Society Development to 2025, with orientation to 2030.
- Tran, T. (2023). Solutions for developing OCOP products associated with rural tourism in building new rural areas. *Dong Thap University Journal of Science*, 12(9), 88-96.
- Trang, N. T., Luan, V. M., Le Thanh, S. O. N., Nguyen Do Nhu, L. O. A. N., Tu, V. H., & Yabe, M. (2024). Performance and investment decision-making among OCOP entities: Implications for sustainable rural development in Hau Giang Province.
- Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of business research*, 122, 889-901. <https://doi.org/10.1016/j.jbusres.2019.09.022>
- Vo, H. T., & Nguyen, T. T. (2022). Solutions for developing the Cau Duc pineapple value chain in Hau Giang Province. *Ho Chi Minh City Open University Journal of Science – Economics and Business Administration*, 17(2), 138-151.
- Widaryanti, W., Putra, A., & Timotius, E. (2021). The implications of digital transformation on developing human resources in business practice in Indonesian: analysis of the publication. *International Journal of Business, Economics and Management*, 4(1), 157-164. <https://doi.org/10.31295/ijbem.v4n1.1425>