Changes and permanence in the fresh pork chain of Southern Vietnam

Anh Tuan Nguyen

THÈSE POUR OBTENIR LE GRADE DE DOCTEUR DE L'INSTITUT AGRO MONTPELLER ET DE L'UNIVERSITE DE MONTPELLIER

En Sciences Economiques

École doctorale EDEG – Économie et Gestion
Portée par

Unité de recherche MoISA

CHANGES AND PERMANENCE IN THE FRESH PORK CHAIN OF SOUTHERN VIETNAM

Présentée par NGUYEN Anh Tuan
Le 28/05/2024

Sous la direction de Paule Moustier
et Guillaume Duteurtre, Estelle Bienabe

Devant le jury composé de

Geneviève Thi-Diêu-Phuong Nguyen, Professeur, Université de Toulouse	Rapporteure
Véronique Alary, Chercheure, CIRAD	Examinatrice
Dao The Anh, Professeur associé, Vietnam Academy of Agricultural Sciences (VAAS)	Rapporteur
Philippe Lebailly, Professeur émérite, Université de Liège	Examinateur
Nguyen Mai Huong, vice-director RUDEC-IPSARD	Examinatrice
Paule Moustier, Chercheure, CIRAD	Directrice de thèse
Guillaume Duteurtre, Chercheur, CIRAD	Co-encadrant (invité)
Estelle Bienabe, Chercheure, CIRAD	Co-encadrant (invitée)

UNIVERSITÉ DE MONTPELLIER

L'INSTITUT agro Montpellier

ABSTRACT

The pig industry in Vietnam has been transformed by complex interactions between local, national and global dynamics. The chapter 1 explains the substantial changes that have affected the agricultural sector in Vietnam as a result of historical events, policy shifts, technological advancements and changes in social practices by using a sociotechnical transition framework and a value chain approach. The findings show that while the collapse of collectivism opened the way for the smallholder regime in the late 1980s, which rapidly empowered these actors and dominated in the 1990s. Our results also highlight the critical role of institutions and policies. The land issue emerges as a linchpin. Recognizing the importance of family farms and the new land reforms dissipated the historical bottlenecks, paving the way for the development of larger farms. Foreign direct investment emerged as a transformative force, serving not only as an economic stimulus, but as a conduit for spillover effects, introducing new technologies and fostering a competitive environment. The interplay of sociotechnical regimes, institutional dynamics, global events and foreign investment shaped a narrative of resilience, adaptation and restructuring in Vietnam's pig industry.

Chapter 2 investigates corporate strategies and their impact on the levels of integration within the pig value chain. It challenges the conventional view that changes primarily emerge downstream in value chains. By focusing on the restructuring upstream, the chapter explores the development of the contract farming model and the subsequent wave of investment in the livestock industry. The chapter then describes the significant impact of African Swine Fever (ASF) in 2019. Chapter 2 highlights the strategic shifts triggered by external shocks and the resulting financial challenges by testing the hypothesis that African swine fever causes a high level of uncertainty and creates a need to invest in specific assets that favor vertical integration in the pig chain, which may be at the expense of small farmers. Our results show that small farmers are elbowed out and replaced to a large extent by modern actors. More concerned about higher investments in biosecurity, modern farming (both contract farming and mega farm models) take its advance to be predominant. Foreign Direct Investment (FDI) in animal-feeding companies and domestic investors favor the mega farm model. By

transferring ownership of physical assets, FDI-feeding companies move from contract integration to ownership integration, thereby achieving their strategy of centralizing power.

The study goes beyond conventional value chain analyses, by introducing a key actor, the “Dau”, which operates in the "hidden middle" of the pig value chain. The result shows that Dau actor is distinct from conventional agents, as documented in the literature. Dau has a multifaceted role. Therein, Dau provides financial support for wholesale sellers (WS), by acting as a financial middleman and offering credit services. This unique feature distinguishes the Dau from other actors in the value chain. Using an institutional approach and by drawing on a historical analysis, the study provides insights into how the Dau's role contributes to the stability of the pig value chain. The Dau's credit services are identified as a crucial stabilizing force both upstream and downstream in the pig sector. The Dau facilitates the continuous circulation of money for collectors/traders upstream, which ensures the steady flow of goods downstream. The financial support provided by the Dau has two essential functions. First, it provides facilities to postpone the payment for pork cut wholesalers and retailers, which means there is a seamless flow of goods. Second, the Dau's financial guarantee is of high importance for collectors/traders, who link the upstream (production areas) and the middle segment (wholesale markets), thus maintaining stability upstream.

RESUME

La filière porcine au Vietnam a été transformée par des interactions complexes entre des dynamiques locales, nationales et globales. Le chapitre 1 explique les changements majeurs qui ont impacté le secteur agricole au Vietnam à la suite d'évènements historiques, de changements de politiques, d'avancées technologiques et de l'évolution dans les pratiques sociales par utiliser un cadre de transition sociotechnique et une approche centrée sur la chaîne de valeur. Les résultats montrent que, même si l'effondrement du collectivisme a ouvert la voie au régime des petits exploitants à la fin des années 1980, celui-ci a rapidement donné du pouvoir à ces acteurs et a dominé dans les années 1990. Nos résultats soulignent le rôle essentiel des institutions et des politiques. L'enjeu foncier apparaît comme un élément central. La reconnaissance de l'importance des exploitations familiales et les nouvelles réformes agraires ont dissipé les blocages historiques, ouvrant la voie au développement d'exploitations plus grandes. L'investissement direct étranger est apparu comme une force de transformation, agissant non seulement comme une relance économique, mais aussi comme un canal d'effets indirects introduisant de nouvelles technologies et favorisant un environnement compétitif. L'interaction des régimes sociotechniques, des dynamiques institutionnelles, des évènements mondiaux et des investissements étrangers a modelé un récit de résilience, d'adaptation et de restructuration dans la filière porcine au Vietnam.

Le chapitre 2 explore les stratégies des grands groupes et leur impact sur les niveaux d'intégration au sein de la chaîne de valeur porcine. Il remet en cause la vision traditionnelle selon laquelle les changements surgissent d'abord en aval des chaînes de valeur. En examinant la restructuration en amont de la chaîne de valeur, le chapitre étudie le développement du modèle d'exploitation sous contrat et la vague d'investissements dans le secteur de l'élevage qui a suivi. Le chapitre 2 met en évidence les changements stratégiques déclenchés par les chocs externes et les défis financiers qui en résultent en testant l'hypothèse selon laquelle la peste porcine africaine entraîne un niveau élevé d'incertitude et crée un besoin d'investir dans des actifs spécifiques qui favorisent l'intégration verticale dans la chaîne porcine, ce qui peut se faire au détriment des petits exploitants. Nos résultats

montrent que les petits exploitants sont évincés et remplacés dans une large mesure par des acteurs modernes. Plus préoccupée par des investissements plus importants en matière de biosécurité, l'agriculture moderne (à la fois l'agriculture contractuelle et les modèles de méga-fermes) prend de l'avance pour devenir prédominante. Les investissements étrangers directs (IED) dans les entreprises d'alimentation animale et les investisseurs nationaux favorisent le modèle de la méga-ferme. En transférant la propriété des actifs physiques, les entreprises d'alimentation animale financées par l'IDE passent de l'intégration contractuelle à l'intégration de la propriété, réalisant ainsi leur stratégie de centralisation du pouvoir.

L'étude va plus loin que les analyses des chaînes de valeur classiques, en introduisant le « *Dau* », acteur clé opérant au « centre caché » de la chaîne de valeur porcine. Le *Dau* se distingue des agents traditionnels documentés dans la littérature. Son rôle est multiple, dépassant celui de facilitateur de transactions. Le *Dau* offre un soutien financier aux grossistes, en agissant comme intermédiaire financier et proposant des services de crédit. Cette caractéristique unique différencie le *Dau* des autres acteurs dans la chaîne de valeur. En adoptant une approche institutionnelle et en s'appuyant sur une analyse historique, l'étude montre comment le rôle du *Dau* contribue à la stabilité de la chaîne de valeur porcine. Les services de crédit du *Dau* sont identifiés comme une force stabilisatrice cruciale, tant en amont qu'en aval de la filière porcine.

ACKNOWLEDGEMENTS

I extend my deepest gratitude to my PhD supervisors for their invaluable guidance and unwavering support throughout the duration of this thesis. Their direction and scientific contributions have played a pivotal role in the successful completion of this project. Moreover, I am immensely grateful for their availability, kindness, and encouragement, which served as a beacon of light during challenging times. I would like to express my sincere appreciation to Paule Moustier for her exceptional mentorship and support. Paule's wide-ranging expertise and critical insights have significantly enriched the research and contributed to my intellectual growth. Her unwavering belief in my abilities and dedication to grounding and concretizing this thesis were fundamental to its fruition. I am profoundly thankful for her reliability and steadfast commitment to my academic journey. I extend my heartfelt thanks to Estelle for her invaluable contributions to this thesis. Her insightful feedback and prioritization of our remote meetings amid her busy schedule have been instrumental. Estelle's constructive criticism and breadth of perspective have greatly enriched the project. I thank Guillaume for his trust and support from the project's inception. His invaluable insights laid crucial foundations for the initial publication. Moreover, his continual encouragement instilled in me a sense of confidence as I progressed through my thesis.

Then, I am grateful to the members of the thesis committee, Virginie Baritaux and Florent Saucède, whose feedback enriched this thesis since the beginning of the project for their theoretical contributions and original and critical perspectives.

Many thanks to Geneviève Thi-Diêu-Phuong Nguyen and Dao The Anh for accepting the position of rapporteurs in the thesis's jury and for reviewing this manuscript.

This thesis was made possible by financial support from the French Embassy in Vietnam. Particularly, I am immensely grateful to Ms. Vu Au Co for her tireless support and enthusiastic assistance during my time in France, which greatly contributed to creating optimal conditions for my studies.

I would like to express my gratitude to the researchers and administrative staff of the MoISA Research Unit for their warm welcome and support. Additionally, I extend my thanks to EDEG, SupAgro, and College Doctorale de Montpellier for their support and for organizing enriching activities and training.

Finally, I truly appreciate the unwavering support and encouragement from my family and friends. I am especially grateful to Luong Nhat Minh, my steadfast brother throughout this journey. And, of course, I also want to express my deep gratitude to Phương for her unwavering encouragement and trust from the very beginning of this adventure. Her willingness to listen, her groundedness and calm demeanor, as well as her unconditional support have meant a great deal to me.

OUTLINE

LIST OF TABLES

LIST OF FIGURES

Acronyms

AFTA	ASEAN Free Trade Area
APEC	Asia-Pacific Economic Cooperation
ASF	African Swine Fever
ASEAN	Association of Southeast Asian Nations
CF	Contract Farming
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
CSF	Classical Swine Fever
EO	Economics of Organization
EVFTA	EU-Vietnam Free Trade Agreement
FDI	Foreign Direct Investment
FMD	Foot and Mouth Disease
GSO	General Statistics Office
GCC	Global Commodity Chain
GDP	Gross Domestic Product
GVC	Global Value Chain
H1N1	Swine Influenza
HCMC	Ho Chi Minh City
LEP	Law on Environment Protection
MLP	Multi-Level Perspective
OECD	Organization for Economic Cooperation and Development
PHFD	Porcine High Fever Disease
PRRS	Porcine Reproductive and Respiratory Syndrome
PVC	Polyvinyl Chloride
RUDEC	Rural Development and Environment Centre
SOEs	State-Owned Enterprises
TCE	Transaction Cost Economics
UNTCAD	United Nations Commission for Trade and Development
WTO	World Trade Organization

GENERAL INTRODUCTION

Over the last 30 years, Asia has witnessed a profound and enduring post-socialist transition, marked by significant changes in its agricultural landscape. This transformation has been characterized by the emergence of diverse forms of capitalism, with different countries adopting differing economic models and market orientations (Duteurtre et al., 2021). One key aspect of this transition has been the interplay between the drivers of change and the potential coexistence of traditional farming practices and the burgeoning agribusiness sector.

In Vietnam, after a tremendous change in policies and institutions, the shift in the agricultural sector mirrors the broader transformation of economies in the region. The impact of such transitions has been well exemplified by the 1986 "*Đổi Mới*" economic reforms, which have played a pivotal role in reshaping Vietnam's agricultural sector and have had far-reaching effects on the country's economy as a whole that provided Vietnam with opportunities to participate in the world economy and transformed the country's agriculture toward modernization.

In what follows, I will highlight recent changes in food and agricultural value chains in relation with globalization and urbanization. I take a deep dive into the specific case of the pig value chain in Vietnam, shedding light on its evolution and the various actors and drivers of change. I then summarize the main research questions, approaches and methods used in the thesis.

The Globalization Perspective and Agricultural Transformation

The global food and agricultural commodity value chains have undergone profound and transformative changes in the past two decades. This transformation is a global phenomenon that transcends borders and regions and refers to the process of integrating agricultural production, processing, and distribution across the world. It involves the expansion of trade, investment, and technology transfer in the agricultural sector (FAO, 2022). The globalization of agriculture has been driven by trade liberalization, technological advances, and the increasing demand for food and agricultural products worldwide. This transformation can be seen as a multifaceted process that unfolds on several fronts, involving downstream changes driven by urbanization, shifts in dietary preferences, and transformations in the intermediating systems such as retail, wholesale, logistics, and processing (Kaplinsky, 2004; Mendez & Popkin, 2004; Spooner, 2015). Simultaneously, upstream transformations involve changes in farming practices and farm input supply chains. According to Reardon and Timmer

(2014), from the downstream/midstream side, the food system is pulled by (1) changes in demand: (a) urbanization, (b) changing diets; and (2) changes in the "intermediating" system: (c) retail, wholesale, logistics, and processing. Additionally, the growth of downstream activities is closely linked to the development of retail systems, as evidenced by the widespread expansion of supermarket chains. There has been an increased focus on product safety and quality standards, which has led to a greater demand for quick access to information and product traceability (Henson & Reardon, 2005; Reardon et al., 2004).

Among these factors, urbanization, for one, stands out as a prominent driver of change (Laborde et al., 2019). As more people migrate to urban centers, there is a shift in demand for a variety of food products. Changes in dietary preferences accompany this demographic transition. The allure of urban living often translates into more diverse and sophisticated diets. This, in turn, exerts pressure on the food system, prompting it to adapt and evolve. A 2016 World Bank report foresees a dramatic increase in urbanization in Vietnam to about 50% by 2025, accompanied by a growing middle class. Dietary patterns will shift, with reduced consumption of rice and increased consumption of animal products, fruits, vegetables, and processed foods.

Moreover, the transformation of value chains is not limited to the consumption end, but also extends to the intermediating systems, including retail, wholesale, logistics, and processing. The rise of supermarket chains has been a hallmark of this change. Supermarkets, with their emphasis on safety and quality standards, have altered the way food reaches consumers. Shoppers now seek information and traceability of products more diligently, prompting supply chains to adapt to these demands. Reardon et al. (2014) used a "quiet revolution" concept as a framework to illustrate the modernization process in the agricultural sector primarily in Asia. These authors pointed out that although the traditional value chain still dominated, the intermediate (or transitional) value chain was rapidly emerging, almost fully concentrated in the middle segment, which is characterized by parallel trends: (1) shortening of chains with the disappearance of the role of some intermediaries, especially collectors; (2) private and public investments in processing; (3) higher vertical integration in the chain; (4) the targeting of more quality-demanding demand; and (5) the generation of higher value-added. Furthermore, the middle segment was favored by public investments in

communication, logistics, storage, and credit, which makes the role of collectors less necessary.

As regards production, upstream transformation is characterized by: (d) farming intensification; (e) changes in the farm input supply chain (Reardon & Timmer, 2014). Notably, this evolving food ecosystem has led to a profound shift in the production systems, characterized by the emergence of mega-farms—large-scale, high-tech, and closed-process production operations. These changes, which are considered integral to the broader transformation of food systems, have created a landscape of promising opportunities and daunting challenges for development (Caron et al., 2018; Ruben et al., 2021).

Under globalization, the dynamics of the food system and agricultural commodity chains have undergone substantial transformation, primarily driven by the forces of liberalization and privatization (Swinnen & Maertens, 2006). These shifts have been instrumental in reshaping the agricultural landscape across the world. The liberalization of investment regimes has played a pivotal role, opening doors for increased foreign investment in various facets of the agricultural sector, including agribusiness and the food industry. The repercussions of such changes extend significantly to farmers (Dries & Swinnen, 2004), with implications reaching deep into the agro chains. Over the past two decades, particularly as a consequence of the global economic crisis in 2008-2009, a noteworthy trend has emerged—large corporations are increasingly investing in agriculture worldwide. This surge in foreign investments has not only infused capital into the sector, it has also had transformative spillover effects, influencing the restructuring of domestic agro chains across diverse regions. The insights of Aldaba (2012) underscore the role of foreign investments in catalyzing this shift.

Furthermore, this period has witnessed the establishment of new agricultural models marked by technological advances, innovative techniques, and improved linkage protocols, reflecting a concerted effort to enhance productivity and efficiency in the sector. (Anseeuw & Ducastel, 2013)highlight the 2008 food price crisis as a significant turning point that reignited interest in agriculture as a strategic focal point for both public policy and private investors. This crisis catalyzed a "rediscovery" of the essential role that agriculture plays in the broader economy, prompting renewed attention and investment in the sector. Overall, the interplay of globalization, liberalization, and privatization has not only redefined the structural dynamics

of agricultural systems but has also spurred a wave of innovation, investment, and strategic reevaluation within the global agricultural landscape.

Globalization has also led to the modernization of agricultural practices, including precision farming, biotechnology, and sustainable practices, in order to increase efficiency and yields and meet the demands of a global market. Advanced farming techniques and technologies have integrated national and regional agricultural systems into the global economy, resulting in the standardization of crops, quality control measures, and compliance with international trade regulations. As a result, modernization of agriculture leads to a centralization process that involves a high level of vertical integration, consolidation, and specialization, which has been highlighted by researchers such as Reardon and Timmer (2007). Modernization leads to a concentration of farming in areas where production inputs are more readily available and where processing industries and consumer markets are easily accessible, as Knickel et al., (2017) indicated. Therefore, the integration of agriculture becomes a means for nations to participate in and benefit from the global economic system.

Policy and private investments

The evolution of food and agricultural commodity value chains is not just a natural consequence of market forces but is also influenced by a web of policies and institutional changes. As regards the issue of policy options for transforming agriculture in Africa and Asia, Laborde et al., (2019) conclude that successful agricultural transformation requires a combination of policies, including price policies, public investment in research, extension services, electricity, and irrigation, land reforms, support for research institutions, and improving access to credit. Indeed, the case of Vietnam serves as a compelling illustration of the dynamic.

Vietnam has undergone a structural transformation of its economy in the past few decades, with agriculture's share of GDP falling from around 40% in 1990 to 16.3% in 2016. This pattern is consistent with Vietnam's rise as a middle-income country, with the country's GDP per capita increasing by a factor of 3.6 between 2002 and 2021. In tandem with this remarkable economic development, agricultural productivity has also risen, and a series of economic liberalization reforms have resulted in Vietnam becoming a major exporter of rice, coffee,

aquaculture products (e.g., pangasius, shrimp), and starch (processed from cassava) among other products (World Bank, 2016).

The 1986 "*Doi Moi*" economic reform triggered a broad-based economic transformation in Vietnam that dismantled the largely planned economy, opened a closed economy to international markets and trade, and initiated pro-business reforms. After these policies, Vietnam sustained high economic growth rates that catapulted the country from one of the poorest to a lower emerging market economy within 25 years. Real per capita GDP tripled between 1990 and 2015, per-capita GDP increased 10-fold, and the poverty rate (living on less than US$1.90 per day) has fallen from more than 60% in the 1980s to below 5% of the population (Baum, 2020).

Transitioning from a socialist country to a market economy involves privatizing economic activities. In this process, it is crucial to promote the development of the private sector, which can create new job opportunities and generate fiscal resources for the government to carry out further reforms (Tran Van Tho, 2006). In other words, for the success of gradualist reforms, it is essential to efficiently develop a new private sector, and foreign direct investment (FDI) plays a vital role in this process. FDI has a dynamic impact on the transitioning economy in at least two ways. Firstly, FDI brings in new financial, managerial, and technological resources that push the economy's production possibility frontier. Secondly, FDI not only creates new private firms (foreign-owned firms) in the economy, but through linkage effects and other transactions, it may also transfer know-how and technology to SOEs and domestic private firms.

Intensive private and foreign direct investment has been crucial in driving the modernization of farming practices and developing the agricultural industry into a capitalist system (Dunning, 2002). The increasing use of advanced technologies, mechanization, genetically modified organisms, and improved irrigation systems are some of the modernization strategies that require significant capital investment (Wang et al., 2019). Private entities, both domestic and foreign, play a significant role in financing, owning, and managing agricultural enterprises. The adoption of modern technologies and mechanized processes is primarily driven by the need for efficiency, increased productivity, and global competitiveness. Private investments from large-scale farms backed by private investors or multinational corporations bring not only

capital but also managerial expertise and market-oriented approaches, further aligning farming practices with capitalist principles.

Foreign direct investment is instrumental in the globalization of agricultural commodity chains (Wilkinson, 2009). Multinational corporations invest in various stages of the agricultural supply chain, from production to processing and distribution. This integration into global markets often results in the standardization of farming practices to meet international quality and safety standards (Raynolds et al., 1993). Conforming to these standards can lead to the adoption of modern, technologically advanced practices, that also enhance the competitive capacity (Alvarez & Marin, 2013). However, the involvement of private and foreign investors in agriculture also raises concerns. Critics argue that the pursuit of profit in a capitalist framework may prioritize certain crops or practices that are economically lucrative but may not align with sustainable or equitable agricultural development (Jorgenson & Kuykendall, 2008). Additionally, the concentration of land ownership in the hands of a few large-scale enterprises, often associated with private and FDI investments, can lead to social and economic disparities, impacting smaller farmers and rural communities (Häberli, 2014; Krieger & Leroch, 2016; Krieger & Meierrieks, 2016; Santangelo, 2018; Yang & He, 2021).

In Vietnam, the "Doi Moi" reform marked a turning point in its agricultural landscape. The dismantling of state control and the rise of the private sector facilitated an environment conducive for economic growth (Pingali & Vo-Tong, 1992; Tran, 1998). The reform started a process of liberalization and privatization that helped foster economic growth and transformed Vietnam's agriculture into a modernized system. As the country embraced globalization, liberalization, and privatization, it started experiencing profound changes in its food system and agricultural commodity chains. One of the notable impacts of these changes has been the liberalization of the investment regime, which has encouraged foreign investment in agribusiness and in the food industry (Tran, 2006). Indeed, foreign investments have not only contributed to the transformation of domestic agro chains but have also had spillover effects on the broader economy (Nguyen & Nguyen, 2008; Raynolds et al., 1993; Tran et al., 2016).

I now review the main characteristics and factors of change of the pig industry in Vietnam that illustrate the trends highlighted above. I first highlight major features of the chain in

terms of consumption, distribution and consumption, and then explain how diseases have affected the sector in recent years.

Major characteristics of the pig chain in Vietnam

The pig sector in Vietnam holds a pivotal position in the country's agricultural landscape, reflecting a dynamic development process that has played a crucial role in shaping both rural and urban economies (Duong et al., 2014; M. L. Lapar, 2014). Over the years, Vietnam's pig industry has undergone significant changes, transitioning from traditional, small-scale farming models to more diverse and modernized ones that include more extensive commercial operations. This transformation has been driven by a growing demand for pork, which is a staple in the Vietnamese diet and is deeply ingrained in the culinary and cultural fabric of the nation.

Pork, which accounts for about 70% of all livestock products (Lemke et al., 2008), is the most ordinary meat in Vietnam and is largely consumed by almost all Vietnamese (Duong et al., 2014). The data from the General Statistics Office [GSO] in 2010 shows that the consumption of pork is on the rise, with estimates of average per capita consumption of approximately 24.7 kilograms (Duong et al., 2015). Most Vietnamese consumers prefer lean pork (Lapar et al., 2011). With rising awareness of food safety and the existence of toxic residues in pork, consumers are willing to pay a premium for improved meat quality (Thi Nguyen et al., 2019).

The sector's development has not only contributed substantially to ensuring domestic food security but has also emerged as a critical player in the country's economic growth. Pork production and trade make notable contributions to Vietnam's agricultural GDP, with both small farms and larger commercial enterprises participating in meeting the increasing demand. However, challenges, including disease outbreaks, have prompted the industry to adapt and modernize. The Vietnamese government has actively engaged in initiatives to enhance the efficiency, sustainability, and biosecurity of the pig sector, recognizing its significance in maintaining the agricultural economy.

Pig farming is commonly integrated in agricultural systems in Vietnam, serving as a significant contributor to family income or as a financial reserve (Huynh et al., 2006). Historically, raising pigs has been a customary practice in rural households, and the use of surplus food as pig

feed has been a common tradition. This practice is regarded as a method of saving resources (Kinh & Hai, 2008).

Pig production systems are broadly classified based on scale and type. According to Duong et al. (2014), smallholder pig producers are estimated to contribute a minimum of 80% to the overall pork production. Over the years, the total number of pig producers has gradually decreased as production has shifted towards larger-scale operations. Livestock farming is predominantly concentrated in two regions in the country - the Red River Delta and the South East, which contribute to, respectively, 39% and 30% of the total (Lapar, 2014). Large commercial farms in the South East mostly raise pigs. The pig population has recently signs of instability influenced by unfavorable changes in output and input prices and disease outbreaks. Nevertheless, pork remains the most consumed meat in Vietnam, accounting for approximately 70% of the total meat consumption in 2022 (Statista Research Department, 2023) and constituting an average of approximately 13% of farm household income (Duong et al., 2015).

Recently, Dong et al. (2019) identified a relatively comprehensive connection involving vertical integration among stakeholders through contract farming in the pig value chain in Vietnam. While there is a need for increased attention to the terms of agreements, policies, and the business environment to optimize the interests of all parties, these authors provide crucial evidence that the livestock industry aligns with global trends. Their study highlights a significant transformation in the pig value chain, with evolving patterns of linkages among actors over time. The emergence of private corporations, including FDI companies, has marked pivotal moments.

According to Nguyen Thi Thuy et al., (2020), the pig industry in Vietnam is indeed moving toward modernization and vertical integration, yet it seems to affect the upstream rather than the downstream segment of the chain. Although there has been a rise in the number of supermarket chains in the domestic market, most pork is still sold through traditional wholesale markets as per Dong et al. (2020). Rural development center (RUDEC) (2015) found that around 70% of pigs are sold through the wholesale market in Ho Chi Minh City. Moreover, as argued by Tisdell & Clement (2009), the opening in Vietnam for imported pork is relatively small due to the necessity of non-fresh meat and its main retail outlet being supermarkets.

This is because of consumers' habit of buying fresh produce from traditional markets rather than from supermarkets or self-service convenience stores (Maruyama & Trung, 2007), even though traditional markets are notorious for poor hygiene conditions and the products sold there are often contaminated with bacteria beyond the allowable limits set by Vietnam's standards (Ngo et al., 2021; Nguyen-Viet et al., 2019).

Market institutions are found differently between the North and the South of Vietnam (Le Goulven, 1999). Accordingly, market institutions are private in the North; therein, private trader networks reduce information costs and minimize potential opportunism in rural areas, while private, violent institutions enforce contracts and prevent reneging risks in cities. Conversely, market institutions are mainly public in the South. Slaughterhouses are all governed by local authorities that provide public services, and carcasses are sold in wholesale auction markets.

While consumers can evaluate the leanness of meat in the market, other attributes, such as food safety, cannot be directly observed. This leads to asymmetric information about meat quality. Intermediaries such as collectors and wholesalers act as a bridge to transfer information about buyer preferences to farmers (Duong et al., 2014). These intermediaries have the highest bargaining capabilities and play a major coordinating role in directing the flow of goods to the market (Le Thi Minh et al., 2017).

In Southern Vietnam, pork wholesale markets located in Ho Chi Minh City (HCMC) are a typical traditional distribution channel in the Vietnamese pig value chain. The accumulation of a large volume of goods purchased in this market, which is transported from neighboring provinces, has created an exciting story with a diversity of participating actors, especially an intermediary agent, called "Dau," a local term for intermediaries in the pork wholesale market in Ho Chi Minh City, who plays a distinctive and crucial role in facilitating transactions. The Dau's unique features include long-term contracts to own dedicated outlets, investments in physical and human resources to provide support services and the provision of credit services. These services are integral in facilitating the rapid and productive operations that take place in the wholesale markets. Therein, the significance of cash as a determinant of investment has been emphasized in the case of financially constrained firms due to capital market imperfections and information asymmetry (Fazzari et al., 1988).

Despite the vigorous discourse on the pros and cons of the pork market in Vietnam, empirical research on the functioning of these markets and the role of typical actors remains limited. Especially while relationships in these markets are primarily governed by "market relation" governance and are built on foundations of trust, the provision of credit support, such as advance payment or credit-supporting production, is a significant facet of these intermediaries' roles. The role of an agent like Dau in credit support is pivotal in maintaining stable relationships between producers and wholesale market agents. It is crucial in cases of financial constraints, given capital market imperfections and information asymmetry.

Furthermore, although changes in the pig value chain have been marked by the diversification of business strategies, traditional actors, particularly those in the middle of the value chain, have displayed remarkable resilience amidst the wave of modernization. This resilience in the middle section not only is all the more impressive considering pressures caused by sanitary epidemics like African swine fever but also stands as a testament to how traditional actors can adapt and endure change, even in the face of significant challenges. The dynamics at play raise intriguing questions about the future of intermediation and the role of traditional actors in modern markets.

How diseases affect the pig industry

Globally, sanitary crises caused by diseases are the risk that involve the biggest losses, in which small-medium scale farmers are often considered the most vulnerable actors. Some common infectious diseases in the pig production sector are foot and mouth disease (FMD), porcine reproductive and respiratory syndrome (PRRS), classical swine fever (CSF), porcine high fever disease (PHFD), and swine influenza (H1N1) (Nampanya et al., 2013; Neumann et al., 2005; Nieuwenhuis et al., 2012; Shankar et al., 2012). What is more, small-scale farmers are the most affected as well as the most vulnerable, especially those in less well-served areas or that are challenging to reach by public veterinary services (Duong et al., 2014).

In Vietnam, although the national authority has promoted many schemes to deal with emergencies, implementation at the local level has been less than profitable and also ineffective at controlling diseases or reducing transmission and the accompanying economic losses (Duong et al., 2014). Lemke et al. (2008) specify that poor handling at the primary level (i.e., a commune or village) is a serious obstacle to disease prevention. Veterinary staff are

only loosely controlled and have limited training. Diseases may be mis-identified and disease incidence is often nit reported. Consequently, animal health treatment is either insufficient or inappropriate, consequently facilitating the rapid spread of pandemics. Likewise, in some cases, policy implementation is inappropriate or even careless. Much evidence exists showing that transmission has occurred rapidly at the national level due to failure to simultaneously coordinate or strictly implement disease surveillance, including vaccination, animal transportation control, and slaughter inspections.

Since 2019, African swine fever, a viral disease, has been affecting pigs with up to 100% case fatality rate and has caused a serious crisis in the pig production sector (FAOSTAT, 2022). Unlike other diseases, given the magnitude and consequences of ASF, it is considered by experts to be a "game-changing shift" that pushes small actors into a decisive situation of either downscaling or quitting production or alternatively upgrading to large-scale farms with higher levels of biosecurity (Nguyen-Minh et al., 2023). Furthermore, ASF is believed to cause a significant change in the structure of the livestock production system by eliminating most of the small- to medium-scale farmers and replacing them via a robust expansion of the mega-farm [1]system. In fact, while more than 90% of outbreaks have happened in small- and medium-sized farms with poor biosecurity practices, the remainder occur modern farms with higher biosecurity and technology levels that are likely to benefit from the epidemic outbreak (Nguyen-Thi et al., 2021).

Research questions and structure of the thesis

I have highlighted major changes in both the global and in the specific context of Vietnam related to globalization, the expansion of private investment, particularly of foreign direct investment, and the spread of animal epidemics. The major question addressed by this thesis is: what are the impacts of global changes related to policy, investment and disease, on the Vietnamese pig value chain, especially in terms of agribusiness development? Agribusiness development is considered to combine private investments in infrastructure and technology with the development of contractual arrangements (Cook & Chaddad, 2000; Reardon & Barrett, 2000). The

[1] Mega-farm mentioned in this study is defined as having the capacity of 2,500 pig or more according to the definition of the US Department for Agriculture

case of Vietnam is particularly interesting to address the issue because of the coexistence of a small-scale and large-scale farms on the one hand, traditional trade and modern distribution on the other.

To address the research question, I used three complementary approaches and focuses that form the bases of three chapters published as journal papers (see Table 1). In the first chapter, I use a historical approach based on the sociotechnical transition perspective to the whole chain to understand the emergence of mega farms that coexist with the small-scale sector, in relation with broad economic and policy dynamics. In the second chapter, I use the framework of transaction cost economics to refine the analysis of the determinants of vertical integration at the different stages of production, input and output markets in relation to the context of disease crises. In the third chapter, I focus on the intermediaries operating at Ho Chi Ming City wholesale market and explore the reasons for their permanence. In chapters 2 and 3, I use insights from the "economics of organization (EO)," a framework frequently referred to for its incorporation of non-price relationships in market transactions (see Table 2). EO provides an insightful viewpoint on the market, portraying it as a dynamic platform where institutional arrangements and organizational structures hold significant sway (Täuscher & Laudien, 2018).

Table 1. Thesis structure

Chapter 1: The sociotechnical transition in the Vietnam pig value chain: The emergence of mega farms	
Chapter 2: Vertical integration in the hog chain in Southern Vietnam: The role of Disease and financial issues	**Chapter 3:** The role of “Dậu” as a key intermediary in the pork wholesale market of Ho Chi Minh City

Table 2. The three focuses of the thesis

		Changes Concentration-integration	Permanence Role of small-scale production and traditional intermediaries
Approach/ literature	Historical dynamics/socio-technical transitions	Chapter 1	
	Bilateral arrangements/economics of organisation	Chapter 2	Chapter 3

The three chapters' analytical keys, questions, and hypotheses are introduced below.

In Chapter 1, I use the sociotechnical transition concept with a multi-level perspective framework to characterize the current transition of the pig sector in Vietnam and underline the motivations forced by the technical, economic, and institutional influences. The transformation of the agricultural structure in Vietnam has been shaped by a multitude of factors. Indeed, a variety of historical events, shifts in policies, technological advances, and changing social practices have collectively influenced changes in productive relationships. These relationships are commonly characterized by diversity and fragmentation, as highlighted by Huyen et al., (2019). A comprehensive understanding of these transformative events necessitates an interdisciplinary or even transdisciplinary approach. As emphasized by Duteurtre et al., (2021), such an approach is essential to unravel the intricate pathways of change involved in the multiple dimensions of this agricultural transition.

Using this concept, I simultaneously review the literature relating to the changes in terms of policies, practices, scales, and subjects. I also investigate the relevant historical events to explain the evolution of farm models, which are now more concentrated. The analysis aims to answer the question: 'Will the transformation of agriculture, with the participation of powerful companies that can speed up the modernization process and result in a higher degree of specialization, lead to the exclusion of the majority of small-scale farmers and their replacement by mega farms in Vietnam or poor/emerging economies in general?'

Chapter 2 focuses on corporate strategies between parties (companies, farmers, domestic investors) and their influences on levels of integration aimed at economizing the transaction cost and enhancing the capabilities, e.g., finance, in the supply base that may shape the patterns of governance and changes.

Parallel to the strategy of scaling up farm size following the shift in level of integration, adverse events such as animal disease outbreaks are considered catalysts to force the process of modernization in the pig sector because these events are regularly considered to have the most influence on pig production (Nieuwenhuis et al., 2012; Shankar et al., 2012; Sharma et al., 2020). This context creates a situation where the collapse of small farmers opens the chance for big companies to rise and dominate. Although small and medium-scale farmers are often shown to stand up to, or recover from small or short-term shocks (Xu et al., 2022; H. Zhang et al., 2014), conversely, what happens if the shocks are more serious, last longer, and occur on a bigger scale? In 2019, an outbreak of African swine fever, a viral disease that affects pigs and has an up to 100% case fatality rate for which no vaccine is currently available (Wu et al., 2020), resulted in a major crisis in the pig production sector (FAO, 2022).

To link the issues of disease and finances, in Chapter 2, I use value chain analysis to examine the assumption that businesses will likely find a new, more appropriate model to reduce transaction costs and upgrade the biosecurity level. To better understand the character of the operation and ongoing tendencies in linkages of companies with their partners, this chapter hypothesizes that disease outbreaks in pig value chains create a high degree of uncertainty concerning the business. They also require specific investments in biosecurity measures and new technical expertise. The increase in the degree of vertical integration in pig chains, in the form of contracts or salaried labor, reduces small farmers' autonomy and may exclude them from value chains.

Finally, Chapter 3 focuses on a distinct intermediary who works in the wholesale market, customarily called "Dau". By identifying and analyzing the role of this actor, this chapter sheds light on the role of financial issues in enabling some actors to become more powerful in the value chain. The stable role of this actor also indicates that the pig value chain integration is still incomplete. The modernization of the distribution system began in the early 1990s with the introduction of state-operated supermarket chains (Venard, 1996). These supermarkets

introduced formidable competition into the traditional market system (Cadilhon et al., 2006). two decades after the establishment of the first supermarket, the modern distribution network comprised 20% of the overall distribution landscape (Masayoshi et al., 2014). The fact that approximately 70% of pig consumption depends on the wholesale market in Ho Chi Minh City is evidence for the efforts being made by this market to safeguard its position amidst the considerable pressures of modernization (Nguyen Manh Cuong, 2014).

In a context in which rural agricultural economies are commonly challenged by unforeseen events, and in the absence of formal insurance mechanisms, households have to resort to their social networks and to selling their assets as coping mechanisms (Minten et al., 2012). As a result, individuals with access to informal insurance arrangements are better positioned to stabilize their consumption patterns, as demonstrated in studies such as the one conducted by Rosenzweig & Wolpin (1993). This also highlights the role of credit services provided by the "Dau" intermediary in traditional pork market operations.

Methods used in the thesis

Leveraging insights from the literature covered in Chapters 1 and 2, for my thesis, I used a qualitative and empirical approach, focused on extracting noteworthy analytical components from the literature, including specific case studies. The examination of changing power dynamics within the concept of globalization, capitalism, modernization, and understanding the development of Vietnamese pig value chains necessitates a historical approach with a particular emphasis on chronology.

The comprehensive research approach used in Chapter 1 integrates both primary and secondary data. The primary data were collected during field trips in 2020 and 2021. In-depth interviews were systematically conducted with key representatives of different stakeholders, as detailed in Table 1 (Chapter 1). These interviews aimed to extract information on the historical context of the businesses, changes in the scale of activities, inter-party relationships, perspectives on the transformation of the pig sector, and the impact of disease outbreaks on their operations. Meticulous interviews were conducted with key actors, including members of staff of the Authorities, company managers, and investors in mega-farms, to obtain a holistic understanding (see Appendix).

Secondary data were sourced from publications and databases, both in Vietnam and worldwide. Policy reviews were conducted to assess the economic improvements, particularly in agriculture, resulting from government decisions. Additionally, data on foreign direct investment (FDI) companies were gathered through personal contacts with people familiar with these companies, thereby enriching the study with insights from the perspective of the companies concerned. This set of diverse data facilitated a comprehensive examination of changes related to strategies, relationships, actions, plus from the viewpoint of the companies.

In Chapter 2, to test my hypotheses, I applied a dual approach combining secondary data analysis, including that conducted by Dong et al. (2019, 2010), and interviews with a diverse panel of stakeholders in the pig value chains (PVCs) in southern Vietnam. A literature review focused on Vietnamese pig chains, provided insights into the organizational structure of the chains and the characteristics of the transactions, particularly investments and sources of uncertainty. Dong et al. (2019, 2020) notably highlighted vertical integration in the pig industry through mergers, acquisitions, and the involvement of foreign direct investment (FDI) entrepreneurs. While Dong et al. (2020) provided insights into the hierarchical big firm as the highest form of integration, my study aimed to address the remaining knowledge gaps in explaining the diffusion of large-scale farms, especially the mega-farm model. Building on Dong et al.'s (2020) work, I sought to clarify aspects that may be vague and introduce a novel perspective on defining a new form of production cooperation, the mega farm, while documenting the diversity and variety of vertical integration (Ruzzier, 2009).

Between March and June 2020, I conducted interviews with a diverse panel of stakeholders deeply involved in the pig value chain in southern Vietnam. The aim of these interviews was to acquire comprehensive information on the past changes to their businesses, changes in the scale of their activities, investments made since they began pig farming, the impact of disease outbreaks on their operation, and the dynamics of relationships with suppliers and customers. Additionally, I collected official statistics from the Department of Agriculture and the Department of Resources and the Environment, explicitly focusing on the number and scale of pig farms in June and July 2020, and in March 2021.

Given the difficulty involved in obtaining information on mega farms and their connections with Vietnamese investment organizations and corporate companies, the first author of the second article (i.e. Chapter 2 of this thesis) decided to strategically set up a project involving investment in a pig mega farm. This planned project facilitated interactions with key industry players, including the vice president of CP Company, Vietnam, representatives of a mega-farm investment company, a construction company, and a consulting agency, who actively participated in discussions related to the mega-farm project.

Chapter 3 was mainly written using a qualitative approach to address the challenge represented by the presence of an unidentified actor in the pig wholesale market and by recognizing the practical limitation to the number of actors who could be interviewed? and the amount of information collected. Following Yin's (2003) perspective, case study research is deemed valuable to enhance our understanding of individuals, groups, and associated phenomena. The aim of the qualitative approach, specifically phenomenology, is to delve into the fundamental truths of human experiences by scrutinizing them (Byrne, 2001).

Yin contends that case studies, akin to experiments, are conducive to theory creation but do not always encompass a broad spectrum of attributes. The primary objective of case studies is to generalize theories rather than to provide a representative snapshot of a particular population. Consequently, case study research is oriented towards enhancing comprehension through developing and refining theories, emphasizing theory-based generalization rather than statistical analysis (Sterns et al., 1998).

The pattern-matching technique emerged as a highly desirable strategy in qualitative research, especially in case studies (Trochim, 1989).

Data were first collected in the field in 2021 to compile fundamental information about "Dau" and their activities in wholesale markets in Ho Chi Minh City. Subsequently, a second field trip was conducted from March 12 to March 22, 2023, with the active involvement of key actors, including "Dau," collector-wholesalers, traders, wholesale market managers, wholesale market staff - veterinary, and Authority staff. Additionally, secondary data on the quantity of pork imported to the market were collected with the collaboration of the Ho Chi Minh City Agricultural Support Center and the Department of Industry and Trade.

Now let us turn to Chapter 1, which provides a historical overview of the pig sector in Vietnam, starting from the late 1980s.

CHAPTER 1:

THE SOCIOTECHNICAL TRANSITION IN THE VIETNAM PIG VALUE CHAIN:

THE EMERGENCE OF MEGA FARMS

This chapter has been presented as “Vertical integration in the hog chain in Southern Vietnam. The role of Disease and financial issues” in the XII EAAE Congress, Rennes, 30/08/2023 and SFER, Journées de Recherches en Sciences Sociales, Paris-Saclay, 15/12/2023

INTRODUCTION:

After a tremendous change in policies and institutions, the "Doi Moi" reform helped Vietnam join the world economy. Under the influence of globalization trends, liberalization and privatization have contributed to changing the food system and agricultural commodity chains. Moreover, liberalization of the investment regime facilitates foreign investment in agribusiness, the food industry, and farther down the chain, with major implications for farmers (Dries & Swinnen, 2004) ; Aldaba R. M., 2012).

Pig value chains in Vietnam have undergone tremendous growth in the past two decades. Booming urbanization, dietary diversification, and institutional improvement have created both promising opportunities and challenges for this sector. Public authorities often consider small-scale value chains to be an essential part of the food system transformation. However, the skyrocketing increase in the number of mega farms - characterized by large scale, high tech, closed production processes - creates competition between two models in which the traditional farming model is attempting to find ways to adapt or protect itself from exclusion.

In the last two decades, and especially since the 2008 economic crisis, investment in agriculture by large corporations has been observed in many regions and continents. Gradually, new models have been established with improvements in technology and chain coordination. Anseeuw & Ducastel (2013) point out that the food crisis led to renewed interest in agriculture as a "rediscovery" by both public policy makers and private investors. Although the participation of powerful actors will speed up the modernization process and result in a higher degree of specialization, the question is, will the transformation of agriculture lead to exclusion of the majority of small scale farmers and their replacement by "mega farms" in Vietnam and in poor or emerging economies in general? This study uses the transformation of the Vietnamese pig industry as an illustration of such a process and to contribute to the international literature that is relatively sparse on these issues (Jayne et al., 2019).

We start by presenting the theoretical background on sociotechnical transition and multi-level perspective, then the data used in our analysis. The results will be presented and discussed, and the chapter closes with a conclusion summarizing the main outputs of our analysis.

THEORICAL BACKGROUND:

Sociotechnical Transition

The change in Vietnamese agricultural structure has occurred under the influence of many factors. Different historical events, changes in policies, technologies, and social practices, have driven changes in productive relationships, which are typically characterized by diversity and fragmentation (Huyen et al., 2019). A comprehensive explanation of such changes requires an interdisciplinary or even transdisciplinary approach applied to the pathways of change involved in the multiple dimensions of a transition (Duteurtre et al., 2021).

The concept of sociotechnical transition was coined based on the view that social-economic change is accompanied by technological development. Sociotechnical change is expressed as shifting assemblies of associations and substitutions, a reweaving of elements. Changes in one element in the network can trigger changes in other elements (Geels, 2002). Also, (1) far-reaching changes take place in technological, organizational, institutional, political, economic, and socio-cultural dimensions; (2) many actors are involved for long periods (e.g., 50 years and more). In this process, fundamental changes occur to technological and institutional structures, as do consumers' perceptions of what constitutes a particular service (or technology) (Markard et al., 2012).

The socio-technical transition framework can be applied to the economic domain to analyze the transition to a sustainable economy (Lawhon & Murphy, 2012). This may involve studying the interactions between economic systems and the technologies and social structures that support them, and identifying key drivers of change in both economic and sociotechnical systems. This framework could also be used to explore how the sustainable process is facilitated or hindered by existing sociotechnical systems and to identify opportunities for action and policy making.

Multi-level perspective (MLP)

The MLP is a middle-range theory that conceptualizes overall dynamic patterns in sociotechnical transitions. The MLP views transitions as resulting from the complex interactions of developments at three analytical levels: regimes, niches and landscape. Regimes form the ‘deep structure’ (the locus of established practices and associated rules),

taking responsibility for the stability of an existing sociotechnical system (Geels, 2004). MLP refers to the semi-coherent set of regulations that orient and coordinate the activities of the social groups who reproduce the different elements of the sociotechnical systems. Niches are considered as ‘incubation rooms’ for radical novelties at the local level and as the locus for radical innovations. The innovations can stabilize into new configurations that challenge the dominant regime, and are ultimately of consequence in a new regime. The sociotechnical landscape refers to 'exogenous' conditions beyond the direct influence of niche and regime actors, such as overall demographic and environmental trends, policy direction, and social value. The landscape evolves under the influence of directions or shocks or evolves gradually (See Geels, 2011; Geels & Schot, 2007).

However, in many socio-technical systems, including in the food system, there is no clear separation between the two levels, niche and regime, 'as socio-technical elements, but not entirely alternative practices, translate from niches into regimes and components of each appear in the other' (Smith, 2007:447). Rotmans & Loorbach thus proposed a hybrid class termed 'niche-regimes' (Rotmans & Loorbach, 2010) to account for the procedure of empowerment in niches that greatly contribute to fulfilling societal functioning but cannot replace the dominant regime yet.

DATA COLLECTION

This study combines primary and secondary data. The primary data were gathered during field trips in 2020 - 2021. In-depth interviews were conducted with key representatives of the different stakeholders (Table 3) to get information on the history of their business, the changes in the scale of activities, relationships between parties, their points of view on the transformation of the pig sector, and the impact of disease outbreaks on their business (see Appendix). The key actors, such as members of authority staff, the company manager, and investors in mega farms, were carefully interviewed to obtain a general overview.

Table 3. List of stakeholders interviewed

Place	Nature of interviewees	Number
Dong Nai province	Independent farmer	18
	Contracted farmer	05
	Mega-farm investor	02
	Company manager	03
	Authority staff	03
Hochiminh city	Slaughterhouse	01
	Wholesale market actor	06
Binh Phuoc province	Company manager	01
	Mega-farm investor	02

Secondary data were collected from publications and databases both in Vietnam and worldwide. Policy was also reviewed to see how the economy, including agriculture, improved due to changes resulting from government decisions. Data on FDI companies were also gathered through people with whom the authors were acquainted who worked for these companies. These data helped deepen the study of changes from the company's point of view.

The transition of Vietnam's economy can be divided into three stages: (1) FDI introduction and private sector development (1991-2008), (2) smallholder domination and large-scale farm growth (2009-2019), and (3) disease and mega-farm expansion (2019-2022). The "Doi Moi" policy, foreign investment, and WTO membership played significant roles in the country's economic development. The African swine fever crisis led to difficulty for small and medium holders in the livestock industry, resulting in the predominance of modern mega-farms with better biosecurity measures.

RESULTS

The different stages of transformation of the pig sector are presented below and summarized in Figure 1.

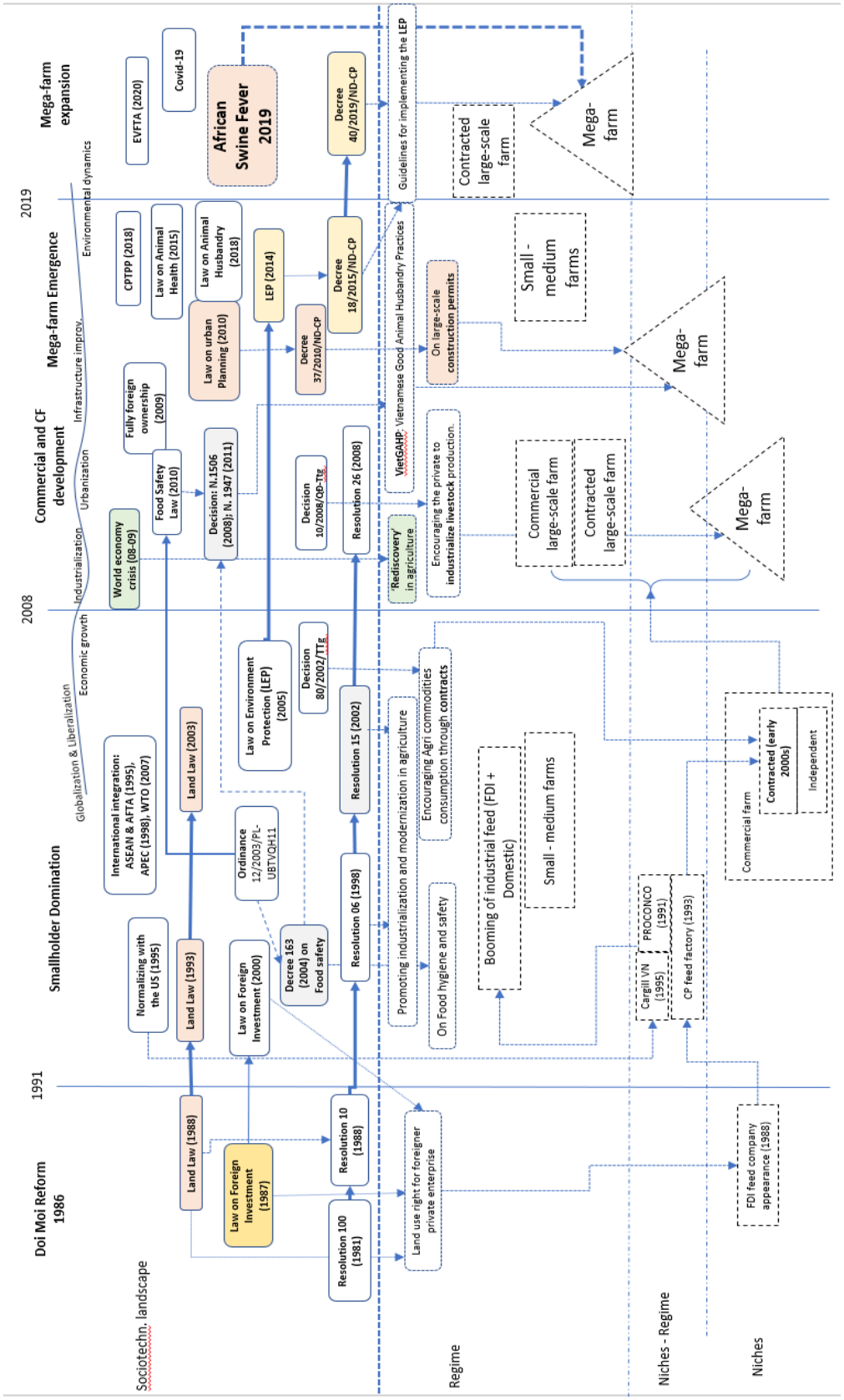


Figure 1. Sociotechnical transformation of the pig sector in Vietnam

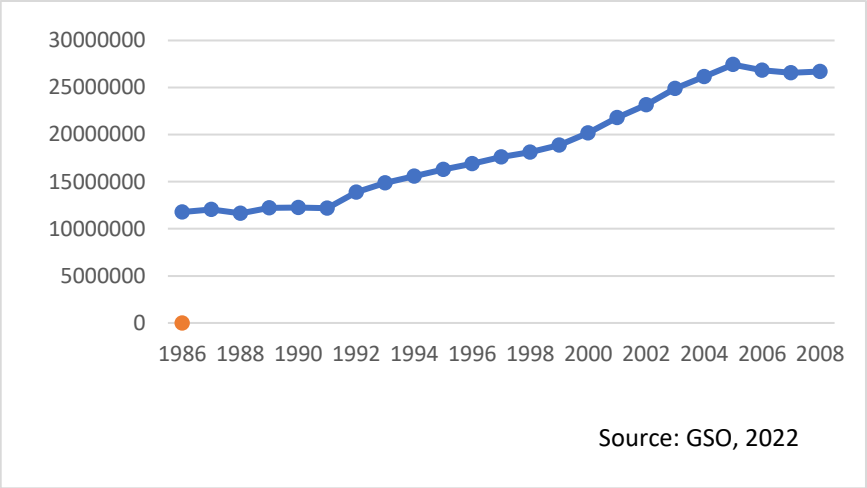
Stage 1: 1991 – 2008: Development of the private economic sector and foreign direct investment (FDI)

Resolution 10 was regarded as an initial achievement in land reform and its tremendous impact on productivity (Pingali & Vo-Tong, 1992). In the new land allocation policy, through Resolution 10, the 1993 land law revised in 1998, 2003 and 2013, effectively concluded the regime shift from collective to private land holdings by reallocating land equally to farmers and granting them long-term use rights (Nguyen-Minh et al., 2021). On the other hand, the policy helped remove the bottleneck related to land decision rights, leading to the rapid growth of private agricultural production and land accumulation (Akram-Lodhi, 2004).

Demographic and economic growth, urbanization, the development of infrastructures, market liberalization and international integration, contributed to the dramatic change in the pig value chains. Consumers have also become more discriminating, demand more specific quality and safety attributes in their food and its traceability (King & Venturini, 2005; Reardon & Timmer, 2014). Also, the strong preference for fresh and unrefrigerated pork contributed both to an increase in the number of street vendors and to the expansion of modern retail outlets after the 2000s (Ma. L. A. Lapar et al., 2009). As a result, the pig value chain in Vietnam became more complex and today involves new and different types of actors.

Thanks to the above advantages, Vietnamese agriculture underwent significant changes that led to the development and domination of a small-scale regime. During this stage, pork accounted for about 70% of all livestock products. The supply of pork increased dramatically while changes in other livestock products were less significant (Lemke et al., 2008). The total number of pigs increased from 12 million in 1991 to 26 million in 2008 (Figure 2), having peaked at nearly 27 million in 2005 (FAOSTAT, 2022). Therein, small-scale pig production accounted for 80% of total production, state-owned enterprises (SOEs) for 4–5%, and private commercial farms for 10–15%. The private commercial farms are located around Ho Chi Minh City (Lapar et al., 2003).

Figure 2. Changes in the total number of pigs from 1986 to 2008



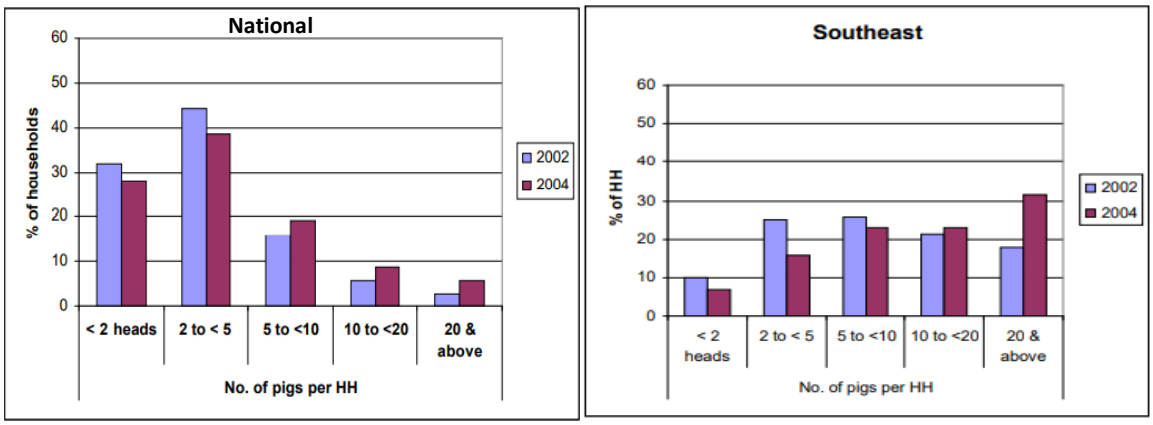
The government promoted larger private pig production units in order to expand the pig sector. This included joint stock companies resulting from the transformation of SOEs (Law 14 on state-owned enterprises, 2003; Decree 64, 2003), cooperatives (Law on Cooperatives, 2003), and private commercial enterprises. At the same time, after normalizing relations with the US in 1995, Vietnam joined different trade associations and signed several bilateral trade agreements, including the ASEAN Free Trade Area (AFTA) (1995), Asia-Pacific Economic Cooperation (APEC) (1998), a bilateral trade agreement with the US (2000), and the WTO in 200. In 1995, Vietnam benefited from joining the ASEAN Free Trade Area (AFTA) using links to the growing regional market. A bilateral trade agreement with the US signed in 2000 removed punitive tariffs on exports to the US, and granted Vietnam normal trade status, after which there was a rapid change in export destinations in favor of the US. By joining the WTO, which requires participants to reduce tariff and non-tariff trade barriers to international trade, exports increased rapidly (Athukorala & Yamashita, 2006). With opportunities for a low tax rate, feed sectors also profited from importing raw materials (corn, soy bean).

The promulgation of the Foreign Investment Law in 1987 was an essential step toward integrating Vietnam in both regional and global economic systems. Thanks to an increasingly advantageous business environment, many new feed-processing factories were built in the 1990s (Lapar et al., 2003). From the 1990s on, Vietnam encouraged foreign investors to build factories. The Thai company CP was established in 1988 near Ho-Chi-Minh city, and the company has built a dozen factories in almost 20 years. Proconco, a company created during

the French colonial era in Vietnam, set up in 1991 in the port of Bien Hoa, 10 km north of Ho-Chi-Minh city, then in the port of Hai Phong, in the North of the country. In 1995, after the signing of economic agreements between the United States and Vietnam, the American company Cargill also set up in Bien Hoa and gradually extended its distribution network throughout the country. In 1999, there were 105 feed manufacturers with an annual output of 2.8 million tons, 62% were private owned, 22% were government owned, 12% were foreign-owned or joint ventures, and 4% were cooperatives (Lemke et al., 2008). In 2009, this figure increased to 260 commercial feed companies. The top 17 companies account for 73% of total feed production. Only one company in the "top 10" is Vietnamese (Cesaro et al., 2019).

Until the early 2000s, pig production in Vietnam was primarily based on traditional methods and a small scale. The PPLPI's (Pro-Poor Livestock Policy Initiative project, 2007) report shows that the national rate of livestock households keeping less than five units was about 70% in 2002 and in 2004, but this rate is much lower in the South-East (see Figure 3). There is indeed a significant increase in the group of households keeping more than 20 units (nearly double) between 2002 and 2004. This increase seems to be linked to the joining of FDI firms located in the Southeast region. This result is also aligned with a demonstration from Cesaro et al. (2019), who showed a massive dissemination of feed outlets, induced by feed manufacturers, contributing to changing livestock practices in the Southern region of Vietnam.

Figure 3. Average n° of pigs per household at national level and in the south-eastern region



Source: PPLPI project, 2007

Although the number of SOEs dropped abruptly from around 12,000 in the late 1980s to around 3,000 in 2005, their productivity improved substantially and has substantially fueled economic growth since the reform. In the early 1990s, SOEs increased their output by over 40% while the number of employees was reduced by 13%, and their productivity continued to increase (Thoburn, 2013). VISSAN, the giant slaughter-processing factory launched in 1974 by the government of South Vietnam before unification, is one example in the pig sector. After being nationalized, VISSAN was transformed into a state-owned company. VISSAN's duty was to fill more than 90% of the demand for pork by Ho Chi Minh City (1975 - 1985) and also exported to countries of the former Soviet Union.

Two remarkable niches emerged at this stage. First, formal contract farming was introduced in the 2000s by large processing firms (mostly large FDI firms like CP and VISSAN) since the first appearance of animal feed in Vietnam in 1991. The pig contract farming in Vietnam corresponds to the production-management contract described by da Silva & Ranking (2013). This type of farm is characterized by a medium to large herd, uses mostly commercial feed, applies stricter biosecurity and hygienic measures, and is contracted to a company (Costales et al., 2008). The second niche was the appearance of modern retail systems. In fact, after the first supermarket appeared in Vietnam in 1993, an estimated 70 additional supermarkets were quickly opened in Ho Chi Minh City and another 20 in Hanoi (Venard, 1996). The number of supermarkets and shopping malls increased rapidly from 10 supermarkets and two shopping centers in 1995 to 400 supermarkets and 70 shopping centers in 2007 (Maruyama & Trung, 2011). Investments in the supermarket system were made by large private companies, and among these companies, were FDI companies involved in vegetable and livestock production. For example, in 1998, the Bourbon Group of France, one of the major FDI investors, opened the first branch of its hypermarket chain, Cora, in Vietnam. The Bourbon Group had various business interests in agriculture, including sugar refining (Hagen, 2002).

In short, the improvement of the institutional environment contributed to the development of the economy and of agriculture. Participation in vital international organizations accompanied by the enactment of necessary amendments creates a more equal "playing field" for actors taking part in the economy, especially those in the private sector. The introduction of FDI firms and the blossoming of private investors fueled the modernization

process, which helped the livestock sector turn from traditional small-scale farming to large-scale farming by applying advances in technology and new inventions in livestock production. Also, the maintenance and development of smallholders in a more liberal economic environment were the positive results of both a supportive policy and institutional arrangements (Akter et al., 2003).

Stage 2: 2008 – 2019: Domination of smallholders, diffusion of commercial and contract farming and the introduction of mega farms.

The landscape was still undergoing a shift in economic development, urbanization, and global trading. According to UNTCAD's report concerning World Investment Prospects Survey in 2007, Vietnam is considered an attractive location for FDI by 11% of the respondents because of the size and growth of its domestic markets and the availability of cheap labor, and is ranked number six worldwide. Continuously, in 2008, FDI inflows to the country recorded an increase of nearly 20%, at $8 billion, from 2007 (UNTCAD, 2009).

In 30 years, the urbanization rate increased by 14.3 percentage points, from 20.1% (1989) to 34.4% (2019), with an average annual growth rate of 2.64% / year between 2009 and 2019, lower than in the period 1999-2009 (3.4% / year) (NCIF, 2019). The increase posed many challenges to agricultural production, with an increase in consumption when quality and hygiene are more strictly controlled. Indeed, steady growth of per capita pork consumption was observed in the country, rising from 8.1 kg/capita/year in 1990 to 31.3 kg/capita/year in 2018 (OEDC, 2018).

Along with the pressure of population growth, the government has to pay more attention to the quality and standardization of agricultural products because of the strict requirements of the high-standard pacts Vietnam joined, including the WTO, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the EU-Vietnam Free Trade Agreement (EVFTA). The continuous improvement of institutions and of state policies for food security, technological innovations, national nutrition, and national food safety strategies is gradually creating match points between downstream and upstream, including domestic and international chains.

During this stage, pig production continued to expand and was still dominated by small-medium scale holders but expansion was slower than in the previous stages. In addition, this

period also witnessed a dramatic increase in the system of large scale farms, including mega farms. The emergence of large-scale farms was partially the result of state policies that favor modern large scale supplies. At the beginning of this stage, in 2008, as highlighted by public administrations, upgrading of the farm scale was encouraged under the "trang trai" label, which translates as "commercial farms" in the literature we reviewed. The term “commercial farms” includes contract farmers who mostly cooperated with FDI companies and, since the previous stage, had been considered to occupy a niche. In the later phase, accompanied by some external circumstances, several regulations (analyzed above) supported the creation of "private companies" (“Doanh nghiệp”) in agriculture and agro-industry. Moreover, the law on animal husbandry, issued in 2018 in Vietnam, is a crucial legal framework regulating livestock activities in the country. Accordingly, the law encourages modern, environmentally livestock farming models which must comply with regulations on waste, emissions, noise, and food safety (Law on Animal Husbandry, 2018). Importantly, organizations and individuals raising livestock on a large scale must be granted a "Certificate of eligibility" promulgated by the provincial authority instead of by district-level or communal as previously. This point is considered a critical condition to screen candidates who have a sufficient resource to invest in the mega farm model. As a result, corporate farms also emerged in the pig sector, initially directed by large companies, investing in the model of "mega" farms.

Stage 3: 2019 - 2022: African Swine Fever disease and the expansion of mega farm model

2019 - 2020 was a challenging period for Vietnam's livestock industry (according to the Department of Livestock Production) because of African Swine Fever, but it is a good stage to see how the livestock sector attracts private investment. By December 2019, Vietnam had indeed to destroy 5.95 million pigs, weighing more than 340,000 tons, equivalent to about 25.5% of the national pig herd in 2018. The number of sows decreased sharply from nearly 4 million to only 2.7 million, a 33% reduction compared to the previous year (Vietnam General Statistics Office report, 2021). In 2020, even though the figure slightly increased, the total of number of pigs was not yet sufficient to restore the pre-ASF situation.

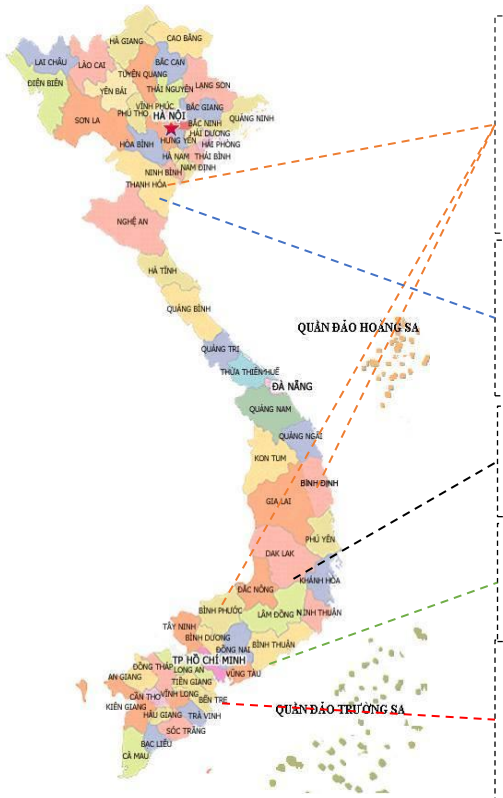
In a context that appeared to have a major effect on all the actors, the actual results show a surprising increase in investment in primary production by large firms. Our field survey showed that the mega farm was emerging as a result of multinational corporation strategy of

promoting vertical integration. The new farm model is clearly distinguishable from all the others, even from the contract farming model mentioned in previous section. Dong et al. (2019) describes this new model as follows: "the farmer and/or investor delegates swine production to the firm to focus on the legal controlling large–scale land and owning facilities like housing and farm infrastructure rather than hiring labor for a long–term operation that is fully managed by the firm." This model emphasizes building a farm with a mega capacity and is feasible for an investor but not for a small scale farmer, in line with the statement by Costales et al. (2008) that integrators in the Vietnamese pig sector prefer to engage with a limited number of highly capitalized large firms rather than deal with many smallholder producers.

Mega farms are built in new locations where the breeding conditions are met: far from residential areas, with a good environment, low land prices, and suitable policy support. Our survey showed that mega farms continued to perform well and made higher profits during the epidemic than small-medium farms that were severely affected (81.76% of these farms had to stop their business according to Dung, 2020). In fact, mega farms were located in a large isolated area. The barn system was completely closed and included a modern industrial treatment system (water, air, feed, waste, etc.). What is more, workers on the farm were under strict surveillance and were not permitted to leave the premises. The reasons given by the head of a mega farm were to help limit the spread of the disease and to increase the stability of production practices.

Big companies accompanying their partners are the main ones leading this impressive investment trend. Based on information collected in September 2021, in figure. 4, we give a summary of some outstanding pig mega farm projects in the period 2019-2021. It can be seen that, instead of businesses choosing to hold back due to the impact of the epidemic, they took advantage of this opportunity to expand and integrate the production system (due to the shrinking of small and medium-sized farms).

Figure 4. Some outstanding pig mega-farm projects in 2019-2021



New Hope (China)**:** Three super mega farm projects in Binh Phuoc, Binh Dinh and Thanh Hoa:
Capital: 200 million US$ with capacity for 27,000 sows:
+ In Thanh Hoa: a Grand Parents' farm for 1,200 pigs, a farm for 7,500 sows, a fattening farm for 72,000 pigs.
+ In Binh Dinh: a farm for 6,000 sows.
+ In Binh Phuoc: a farm of 13,500 sows, currently is the

Domestic investor: a high-tech livestock production complex in Thanh Hoa, 2020: Capital: 1.5 billion US$. Capacity: 180,000 tons of meat, 1.2 million tons of animal feed, for a total herd of 67,500 sows producing 1.5 million pigs annually.

Deheus (Netherland) **+ Domestic investor**: a new mega farm with an investment of approximately 62 million US$ (Sept 27, 2020)

C.P (Thailand) + Domestic investor: cooperating with investors to start the mega Farm Project in Dak Nong for 110,000 pigs/year, including 4,800 sows.

JAPFA (Indonesia):
1. Invest 22 mil.USD in Binh Phuoc (2020). Capacity: 48,000 pigs. The project is expected to supply about 130,000 pigs, equivalent to more than 14,000 tons of pork per year.

Source: Summarized from company reports and investment magazines published between 2019-2021

DISCUSSION

Interpreting the transformation of the pig value chain.

In the first stage, the critical changes in policy are designed to meet an urgent need caused by the asymmetry of the planned economy, which refers to the information gap between central planners and market participants that leads to the misallocation of resources and inefficiency. The disintegration of the "collectivist" regime created an innovation niche for private smallholders. Economic reform involved a series of changes to better adapt to the circumstances that prevailed at the time. By stimulating the private sector by recognizing family farming as the principal agricultural production model and enacting the Land law in terms of the "right to the private use of land" these first changes helped Vietnam overcome its primary problems.

The second stage corresponded to domination of the "smallholder" sociotechnical regime, which was a response to a radical change in the landscape: the collapse of the collectivist economy and a new context comprising interactions at global scale (Duteurtre et al., 2021). Although the smallholder regime remained relatively stable in the early 1990s, smallholders faced restrictions that prevented them from accessing financial and technological resources (Lemke et al., 2008). Conversely, the market limitations of this regime, accompanied by the change in international cooperation including normalization of relations with the West (led by the US), provided an ideal opportunity to join the global market in the 2000s, a period characterized by consolidation, specialization/differentiation, and organizational and institutional change (Reardon & Barrett, 2000). Some outstanding supportive policies in the sociotechnical landscape during this stage, including the Law on Private enterprise (1990) and the Law on Foreign Investment (1987, 2000), promoted agriculture industrialization. Via contracts, FDI companies gradually penetrated deeper into the Vietnamese economy. In fact, the contract farming model set the scene for the subsequent establishment of large scale farms and modern livestock production. It is also considered to be an innovation niche that challenges the current smallholder regime.

The stage following 2008 saw substantial changes in the pig sector that emerged as a new regime of "mega farms." Although pig production continued to grow and remained dominated by small-medium scale holders, this sector witnessed a marked increase in the number of large scale farms. After analyzing the circumstance and patterns of food system transitions, we underline three key elements in the changes in the sociotechnical landscape that resulted in the emergence of a new regime.

Firstly, the global food crisis (2008-09) led to a major change in investment trends that shifted the awareness of both the public and private sectors. Indeed, concerns about population growth and food security following the crisis renewed interest in agriculture as a strategy of "rediscovery." The participation of external actors with more financial ability helped agriculture by means of strong investment in scale and technology (see Anseeuw and Ducastel, 2013 for an illustration).

Secondly, on the one hand, the transformation of the sociotechnical regime relied on significant technical innovations and a new scientific context of digital technologies that

enabled economies of scale. The new regime also corresponded to a new industrial context: being more concentrated and internationalized, major processing industries were able to invest in large-scale integrated production facilities (Duteurtre et al., 2021). On the other hand, the State facilitated this process by promulgating several supportive policies to promote agricultural industrialization/ modernization and to encourage integration and concentration in livestock production.

Thirdly, the major crisis caused by ASF in 2019 had severe economic consequences that threatened the livelihoods of small scale farmers and other actors in the value chain, hence jeopardizing food supplies. ASF created a wave that is considered a "game-changing shift." In the context of a significant reduction in the number of small farmers, in parallel, contract farming, which previously only existed in a niche, now emerged to take advantage. Also, conglomerate mergers mainly boost vertical coordination in the pig industry, including the robust introduction of mega farms.

The re-configuration of value chains created a structure that allows the coexistence of smallholder and mega farms. Although the mega farm regime cannot completely replace the former smallholder regime, it can have a significant impact by excluding small and medium-scale farmers. Indeed, the former contract farming joined by large-scale farmers often takes advantage and shows a superior ability to cope with crisis, while independent farms managed by smallholders are often severely damaged. Moreover, conglomerate merger strategies led by large companies mainly boost vertical coordination in the pig sector.

CONCLUSION

This study used the sociotechnical transition framework to investigate the transformation of the pig sector in Vietnam. The results support the literature which documents that the collapse of collectivism led to the introduction of a smallholder regime in the late 1980s that was rapidly empowered and dominated in the 1990s. The changes in the new context of technological improvement and industrialization were responsible for transforming the sector to integrate a new sociotechnical regime of mega farms.

Geels (2019) noted that sociotechnical transitions are ‘interpretive’ and ‘contested’ processes, as actors can have contradicting motivations and interpretations, resulting in multiple pathways being proposed to achieve different normative goals. The present study

emphasizes the multidimensional nature of sociotechnical change. With the coexistence of different stakeholders in the sector, it is appropriate to one can argue that the transition results in parallel and sometimes intertwined—pathways or, in other words, in the superposition of several regimes (Duteurtre et al., 2021).

This study also highlights the significant impact of FDI companies on the transformation of Vietnam's agriculture and pig industry. At the same time, the changes in government policy have played an essential role in guiding the transition path of the industry.

TRANSITION 1

Structure of the thesis

Chapter 1:

The sociotechnical transition in the Vietnam pig value chain: The emergence of mega farms

Chapter 2:

Vertical integration in the hog chain in Southern Vietnam: The role of Disease and financial issues

Chapter 3:

"Dau"- A unique form of commission agent in the pork wholesale market of Ho Chi Minh City

The first chapter has characterized the current transition of the pig sector in Vietnam and underline the motivations forced by the technical, economic, and institutional influences. The findings of the chapter have showed that while the collapse of collectivism opened the way for the smallholder regime in the late 1980s, which rapidly empowered these actors and dominated in the 1990s, the emergence of a new regime of mega farms was a result of sociotechnical improvement. Private and FDI groups are having a significant impact on the transformation of Vietnamese agriculture and of the pig industry.

In the second chapter, I focus on the corporate strategies interacting among parties (such as companies, farmers, and domestic investors) and their impact on the degree of integration, with the goal of reducing transaction costs and improving capabilities (such as financial resources) within the supply chain, can shape governance patterns and induce changes. In particular, the chapter tests the hypothesis that African swine fever causes a high level of uncertainty and creates a need to invest in specific assets that favor vertical integration in the pig chain, which may be at the expense of small farmers.

CHAPTER 2:

VERTICAL INTEGRATION IN THE PIG CHAIN OF SOUTHERN VIETNAM - THE ROLE OF DISEASE AND FINANCIAL ISSUES

This chapter has been presented as “Vertical integration in the hog chain in Southern Vietnam. The role of Disease and financial issues” in the XII EAAE Congress, Rennes, 30/08/2023 and SFER, Journées de Recherches en Sciences Sociales, Paris-Saclay, 15/12/2023

INTRODUCTION

In Vietnam, livestock diseases are documented as the cause of major economic losses, especially for small-scale farmers in places that are difficult for public veterinary services to reach (Dzung et al., 2015; Nga et al., 2014). Pham et al. (2017) estimated losses per pig holding due to *Porcine Respiratory and Reproductive Syndrome* (PRRS) at between 38% and 63% of gross farm margins depending on the size of the farm and on the production system. While costs caused by outbreaks of Foot and Mouth disease (FMD) to date were lower, they still accounted for a 19% - 32% drop in the gross farm margins of pig holdings. Although national authorities have promoted many schemes to deal with emergencies, implementation at local level has failed to control diseases and to reduce their transmission and accompanying economic losses (Nga et al., 2014).

The first outbreak of African swine fever (ASF) was reported in early February 2019 on a small farm in Northern Vietnam and the disease spread across the country in seven months. ASF is a viral disease that affects pigs and the case fatality rate can reach 100%, it thus represents a major crisis for the pig production system with drastic economic impacts on, and challenges to, the livelihoods of pork producers, small-scale farmers, and other actors in the value chain, and hence threatens food supplies (FAO, 2022).

Given the magnitude and consequences of ASF, unlike other diseases, experts consider it represents a “game-changing shift” that pushes small actors into a critical situation in which they have to choose either to downscale or quit production, or alternatively, to upgrade to large-scale farms with higher levels of biosecurity (Nguyen-Minh et al., 2023). In this paper, we investigate whether the ASF disease crisis can be considered as a "driver" that forces the livestock industry to restructure, starting upstream. The paper is organized as follows. Section 2 gives a theoretical background and hypotheses. In Section 3, our methodology and data collection are presented. In Section 4, we go through the main results on the pig value chain reviewing the impacts of the disease crises, the form of modern farms, and the institutional transition of the pig chain. In Section 5, we discuss the results in relation with the hypotheses. We finish with the conclusions in Section 6.

THEORICAL BACKGROUND

We first summarize major insights of transaction cost economics and of global value chain analysis. Then we concentrate on the issue of vertical integration, and present the main hypotheses in relation with coordination in the pig value chain.

Transaction cost economic (TCE)

Transaction Cost Economics relies on two basic behavioral assumptions, "bounded rationality" and "opportunism", meaning that economic agents are rationally bounded and tend to be opportunistic thus creating market transactions that involve risks and hazards, the alleviation of which would entail transaction costs (Tiongco et al., 2008). Williamson (1981) argues that transaction costs are governed by the nature and level of uncertainty, asset specificity, and frequency of the transaction, and that transaction cost reduction is the principal rationale for vertical integration (Kessler & Stern, 1959).

Uncertainty is an amorphous concept that reflects people's inability to forecast the possibility of events happening in the future (Bloom, 2014; Knight, 1921). Knight (1921) proposed distinguishing between "uncertainty" (unmeasurable probability, or indeterminable chance) and "risk" (known chance, or measurable probability). Hardaker et al. (2015) proposed considering uncertainty as imperfect knowledge and risk as uncertain consequences, particularly possible exposure to unfavorable consequences. The profit is the reward for bearing risk in business: no risk means no gain. Crane et al. (2013) point out that as there is a possibility of loss (risk), there should also be an opportunity for profit.

In the TCE approach, asset specificity refers to the degree to which a particular asset or resource is specialized or dedicated to a specific transaction or production process, which can be either physical or human (Williamson, 1979). Hill (1990) points out that a high level of asset specificity in transactions could lead to the risk of opportunism, which is enough to justify replacing the open market with a hierarchy. Accordingly, when the degree of physical asset specificity is high, the parties to a transaction may be more likely to use vertical integration or long-term contracts (hybrid governance) to guarantee the asset is used efficiently (Whyte, 1994; Williamson, 1991). While vertical integration and long-term contracts are supposed to help mitigate the risk of hold-up occuring when one party has the ability to extract rents from the other due to the specialized nature of the physical asset, employment contracts and

relational governance can foster trust and cooperation between the parties when the human asset specificity level is high, which can be crucial in cases with a high degree of uncertainty or complexity (Williamson, 1981).

Chamberlain & Anseeuw (2017) argue that more frequent transactions, together with higher asset specificity of the investment and higher uncertainty, will lead to tighter control requirements by the investing partner and, thus, to a more hierarchical structure.

Global value chain

Partly inspired by TCE, the global value chain (GVC) and global commodity chain (GCC) concepts try to explain the social and organizational structure via the commodity chains of a specific product or service. Therein, the critical aim of the GVC approach is to highlight: (1) how the most influential players ("lead firms") organize and drive the activities of the chain; (2) how the chain is governed; and (3) the movement of chain actors from low to high value-adding activities ("upgrading") (Humphrey & Schmitz, 2002; Lee, 2017).

In addition to the consideration of the complexity of transactions (which is close to the concepts of uncertainty and asset specificity), GVC refers to capabilities in the supply base that may shape the governance patterns and changes (Gereffi et al., 2005; Humphrey & Schmitz, 2002).The capabilities of the supply base refer to the skills, knowledge, resources, and infrastructure available within a company's network of suppliers and other partners (Humphreys et al., 2004; Simchi-Levi et al., 2001). These capabilities can have a significant impact on the structure of governance by influencing the way in which work is organized and responsibilities and resources are allocated (Rogelberg, 2016) or allow buying companies to actively control the network of suppliers (Choi & Krause, 2006). Indeed, Argyres (1996) supports the proposal that firms outsource when suppliers have superior capabilities, even if the transaction costs are high. Contractual arrangements are termed captive when suppliers have limited capacity to change buyers which come together with low suppliers' capacity, they are termed modular when suppliers have capacity to change buyers due to their higher technical capacity (Gereffi et al, 2005).

Vertical integration in agri-food value chains

Mighell & Jones (1963) defined "vertical integration", along with contract, as types of "vertical coordination" that include all possible ways of harmonizing the vertical production and marketing stages. Both contract and vertical integration are beneficial in reducing the transaction costs associated with relationship-specific transactions, in which contracts provide some safeguards against opportunistic behavior, and vertical integration eliminates the exchange relationship (Martinez, 2002). While vertical integration refers to the internal coordination of stages (within the firm) which is employed in the case of two formerly independent assets that come under unified ownership (Bijman, 2008), contract production represents external coordination (via market price) (Mighell & Jones, 1963). Kessler & Stern (1959) explain the boundary in the concept of vertical integration (taken with a broad meaning) by two primary types: (i) Ownership integration - integration by stock or asset acquisition; (ii) Contract integration - vertical contractual arrangements i.e. agreements on specific requirement, output, exclusive dealing, franchise, consignment, and agency. These notions were used by Ward (1997) in his study of integration in the U.S cattle and poultry sectors. The principal difference between ownership- and contract integration lies in the ability to control coordination of the organizations involved. Ownership integration involves direct control and sanction enforcement, while control is more indirect when contract integration is utilized (Kessler & Stern, 1959). In other words, vertical integration means ownership and full control of the neighboring stages of production or distribution (Perry, 1989). As Peterson et al. (2001) argue, ownership is associated with the vertical coordination continuum, but not identical to it, meaning that single ownership is not required for vertical integration, but centralized control is.

Summary of hypotheses

From our review of the context and literature, we draw the following hypotheses:

Disease outbreaks in pig value chains create a high degree of uncertainty concerning the business. They also generate requirements in terms of specific investments in biosecurity measures as well as the need for new technical expertise. These increase the degree of vertical integration in pig chains, in the form of contracts or mega farm that reduce small farmers' autonomy and may exclude them from value chains.

METHODOLOGY AND DATA COLLECTION

To check our hypotheses, we combined the collection of secondary data with interviews with a panel of stakeholders of pig value chains (PVCs) in southern Vietnam. Secondary data were collected from a literature review on Vietnamese pig chains to produce knowledge on the organization of the chains and the characteristics of the transactions in terms of the investments required and on sources of uncertainty. Dong et al., (2019, 2020) recently illustrated the vertical integration of the pig industry in Vietnam through conglomerations of mergers and acquisitions, with the involvement of foreign direct investment (FDI) entrepreneurs. Although this study brings many insights on the integration process, its explanation of the diffusion of large-scale farms, especially the mega-farm2 model, is limited.

We also collected official statistics from the Department of Agriculture, Department of Resources and Environment about the number and scale of pig farms June and July 2020, as well as in March 2021.

We conducted interviews with the panel of stakeholders involved in the pig value chain in southern Vietnam between March and June 2020 (see Table 4) to obtain information on the history of their business, changes in the scale of their activities and on the type of investments they had made since they started raising pigs, on the impact of disease outbreaks on their business, and on relationships between their suppliers and customers (see Appendix).

As it is very difficult to get information on mega- farms and their links with Vietnamese investment organizations and with corporate companies, the first author planned to set up a project of investing in a pig mega farm himself, which involved interacting with the vice president of CP Company, Vietnam, with representatives of a mega farm investment company, a construction company, and a consulting agency who participated and discussed the mega farm project.

[2] Mega-farm is defined as having a capacity of 2,500 pigs or more (Concentrated Animal Feeding Operations - US Department for Agriculture).

Table 4. List of stakeholders interviewed

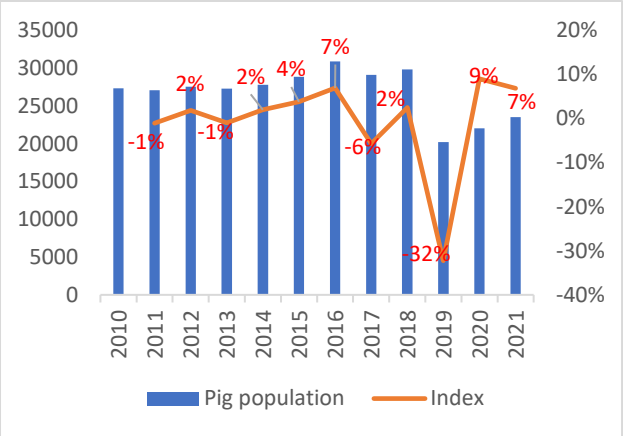
Date		Place	Interviewee	Nr of obsevations
March	7-18	Dong Nai (Thong Nhat province)	Self-breeding farmer (Self-F), contract farmer, company manager	Self-F: 15 Contract-F: 5 Manager: 01
April	23- 28	Binh Duong	Self-breeding farmer	10
	1- 5	Ho chi minh city	Wholesale market actors: Dau and collectors	Dau: 03 Collector: 03
	16-25	Binh Phuoc	Large scale farm	CP manager: 01 Investor: 02
	26-27	Ho chi minh city	Slaughterhouse	01
May	1-10	Dong Nai (XuanLoc province)	Large scale farm investor Self-breeding farmer Veterinarian Feed company manager Staff of distric and provincial authority	02 03 01 02 02
June	1-7	Tay Ninh	Big size farms investor	02

RESULTS

The impact of African swine fever (ASF) on the pig value chain

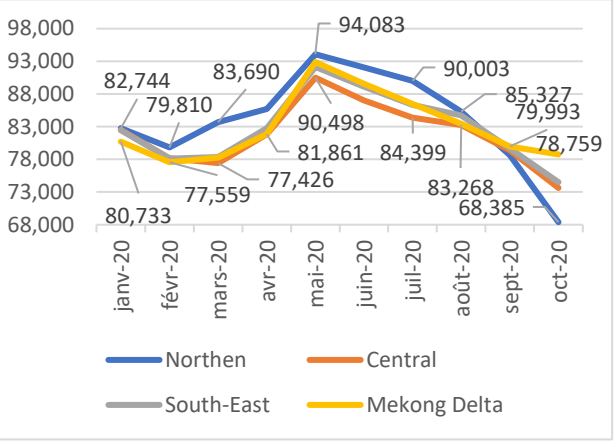
Due to ASF, by December 2019, the national pig herd was reported to have been reduced by 32%, and pork meat production by around 14% compared to 2018 (GSO, 2021). Although the government quickly came up with support policies to encourage pig re-herding, including interest-free loans, and financial support for the purchase of drugs to guarantee biosecurity and to overcome the losses, in 2020, volumes had only increased by 9%, and today, the pre-ASF total has not yet been restored (Figure 6). Moreover, the imbalance between supply and demand is responsible for the price fluctuation (Bui & Gilleski, 2020), which induced an unprecedented price increase and established a new level that peaked in May 2020 (Figure 7).

Figure 6. Changes in pig population between 2010-2021



Source: GSO, 2022

Figure 5. Changes in prices caused by African swine fever



Source: ANOVA Feeding comapys' report, 2022

Pig producers had to stop not only due to epidemiological problems but also due to other difficulties such as the scarcity of breeders (T. D. Tran, 2020). On the one hand, due to the exceptionally high fatality rate and frequent occurrence of the disease in small- and medium size farms, ASF is reported to have caused 49% of pig producers to switch to other activities including raising chickens or super meat ducks (T. D. Tran, 2020). Moreover, the General Statistics Office reported that the number of pig farming households decreased by 911.629 from nearly 3 million households in April 2019 to around 2 million households in January 2021, (equivalent to a 31% reduction). It also reported a decrease in the number of pig farms. Data extracted from the MARD investigation shows that in March 2020, there were 9.924 pig farms, i.e. a decrease of 4.557 pig farms (31%) compared to the pre-ASF period. In addition, the sharp reduction in the number of sows was observed, from nearly 4 million to only 2.7 million (equivalent to a 33% reduction compared to 2018) (GSO, 2021), resulting in a shortage of piglets, another obstacle to re-herding.

In contrast to the bleak circumstance of small- and medium-scale producers, large-scale producers involving big companies (see details in the following section) and mega-farms, which involve higher levels of biosecurity and high technology growth, are less likely to be affected and may even benefit from the outbreak, as evidenced by increased supply and income (Ngoc Que et al., 2020). The production of 16 livestock companies is reported to have grown by 160% and 155% in the first quarter of 2021 in comparison to January 2020 (Doan,

2021). These actors took advantage of the outbreak to increase the number of sows by more than 30% and the pig herds by 71% compared to before ASF.

Ar regards pig trade, the drastic decrease in the number of small-scale farmers pushed many collectors to quit their jobs. A good example is the case of two traditional collectors, who used to collect live pigs from locals, transport them to the slaughterhouse and play the role of wholesalers, who had to quit their job due to ASF. When asked why they decided to stop collecting pigs, one collector replied:

> *"The situation in the pig industry has been becoming unstable for many years, making my business tough. Currently, small-scale farmers in this area have to stop completely because of ASF, so if I want to collect enough pigs to go to market, I have to travel a long way, sometimes several hundred kilometers if I have to go to other provinces to collect pigs. It means that even if the number of pigs is stable, my costs have increased significantly.*
>
> *At the same time, the price of pork is so high that consumption is going down, so the number of pigs sold is very low. This job no longer suits me and makes me tired, so I decided to quit the job and find another."*

Instead, dedicated wholesalers affiliated with big companies easily collect as many pigs as they want. These traders only need to make a reservation one day before the transaction and transfer money to the company, and can then proceed to the mass storage areas (for big companies like CP and CJ) or directly to the farms (for companies like JAPFA, Fivestars).

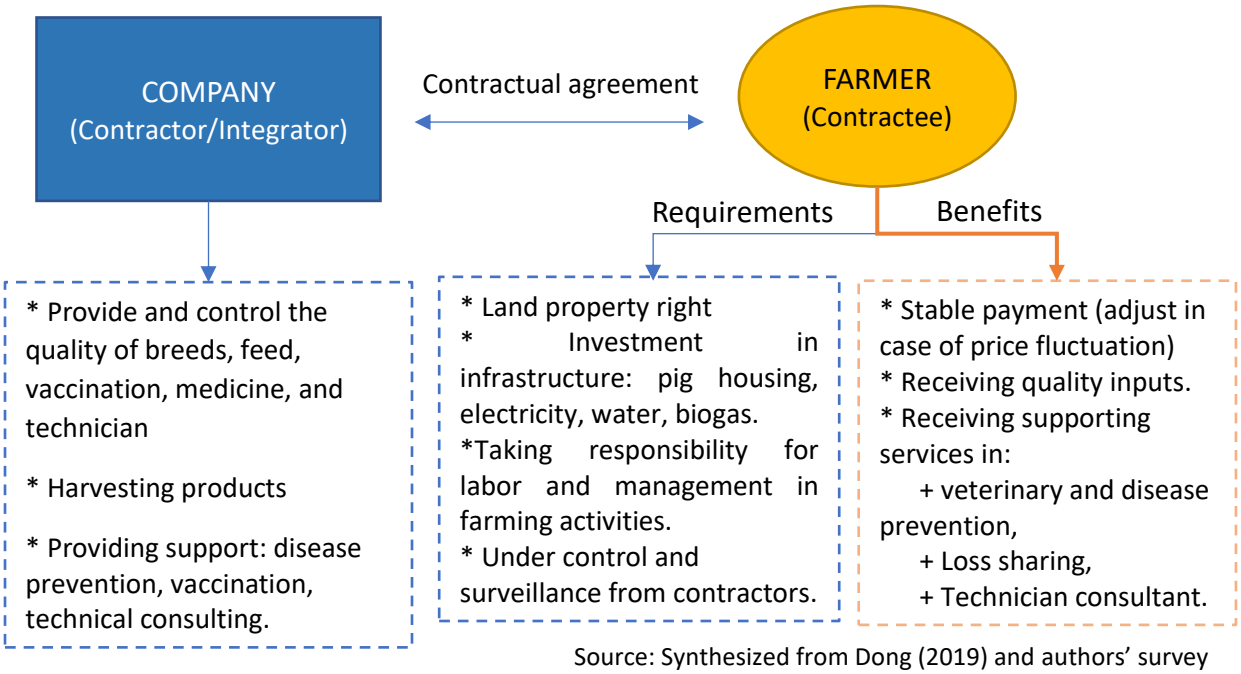
Contract farming (CF) between feeding companies and farmers- a form of contract integration

From the late 1980s on, foreign corporate companies expanded business in the Vietnam animal feed sector. The Thailand Charoen Pokphand Group (CP), one of the world's biggest animal feed and livestock producers, started business in Vietnam in 1988 (CP corporation website) and became the first industrial feed manufacturer in the 1990s (L. M. Lapar et al., 2003). Other well-known companies arrived later, including Cargill, CJ, Newhope, FiveStars, Deheus, and GreenFeed, who also contributed to the modernization of the Vietnam pig industry. Notably, linkage between feed mills and farmers was formalized as the contract farming model in the early 2000s (PPLPI, 2007). The growing popularity of contract farming has led to the involvement of large-scale farmers with a lot of capital in a captive governance structure (Costales et al., 2008; A. T. Nguyen, 2016). Also, the bigger the pig companies, the more they undergo vertical expansion into farming activities (Dong et al., 2020).

Pig contract farming in Vietnam corresponds to the production-management contract described by da Silva & Ranking (2013). Under this type of contract, companies specify how inputs, including piglets, medication, feed, and animal health programs, are to be used to control disease and they inspect the production processes. At the same time, producers agree to comply with precise production methods and input regimes, meaning that farmers have delegated a substantial part of their decision rights over breeding practices to companies that take on most of the market risks.

Contract farming refers to cooperation between feeding companies and large-scale farmers who invest in a farm with a capacity of more than 300 pig heads (Dong et al., 2019). In this model, the company supplies the farmers - who are responsible for piglet production or fattening - with the inputs they need but asks farmers to invest in housing and infrastructure designed by the company. Pig farmers sign contracts in order to (1) increase their ability to access output markets, (2) reduce capital investment, and (3) gain access to information on prices, technology, managerial skills, credit, veterinary, and extension services (PPLPI, 2007). These significantly reduce costs and inspection time, increase productivity, and improve quality. As a risk reduction strategy, farmers involved in contract farming are asked to fulfill primary conditions to qualify for capital before taking part in this model, which is considered as a barrier to smallholders. This type of coordination is basically related to contract integration, which was reviewed above. The specifications and benefits are described in Figure 7 below:

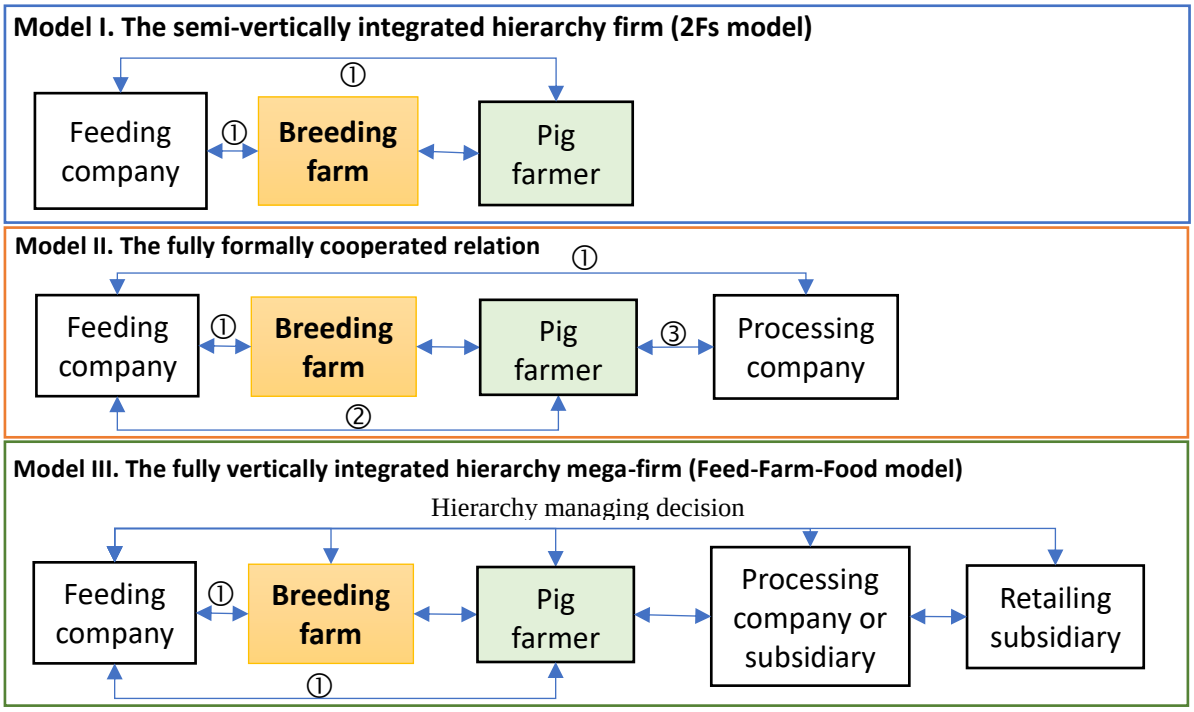
Figure 7. Requirements and benefits sharing between company and farmer in the contract farming model



Source: Synthesized from Dong (2019) and authors' survey

In order to explore the shift, this study focuses only from the side of production where the FDI and domestic firm invest in the model of mega farm. Figure 8 is synthesized from the graph of integration in Dong's study which especially generalize the expansion of FDI companies from the upstream side. Dong et al.'s study points out three forms of integration in the pig value chain in Vietnam. In the first form, farmers are directly involved and responsible for their farms' management and operation but under the supervision of feeding companies. In the second form, change comes from the shift in the linkage-expanding strategy toward the downstream side. Selling to independent traders (the first form) has been replaced by bilateral agreements between the feeding and processing companies (the second form), or the conglomerate acquisition helps the firm extend the chain downstream with the retailing subsidiary and govern the chain with hierarchy (the third chain).

Figure 8. Contract farming scheme in the pig value chain



Contract types:
① Bilateral contract for production & marketing,
② Bilateral contract for feed supplying
③ Bilateral contract for feed supply& production

Source: Adapted from Dong (2020)

Dong's research (2020) highlights the prevailing patterns wherein large corporations progressively extend their integration downstream, particularly foreign direct investment (FDI) enterprises. More precisely, these corporations engage with upstream entities, such as farmers, through livestock production contracts. Simultaneously, they also merge/acquire additional processing and retail firms downstream. Additionally, the existence of pig farmer (hog farmer is mentioned in Dong's study) is always found in the three models.

The involvement of pig farmers in the cooperation implies that the feeding company's control power is not centralized. In fact, Dong et al. (2020) conclude that "this is referred to as the full-formal cooperated relation institution (model) because it is an official cooperation program fulfillment of all activities of a swine-to-pork chain, but the relationship is not under the management of a single company."

Thanks to the strong linkage with the company and sufficient investment in biosecurity measures, the contract farming model has shown its effectiveness in preventing and dealing with ASF. The results obtained in Thong Nhat district (Dong Nai province) show that the non-contract model was seriously affected by ASF as it experienced a more than 50% decline in

2019, and up to 74% decline in 2022 compared to 2018. In contrast, the CF model has shown stability. Although the number of contract farms decreased by 8% in 2019, the number recovered strongly in 2020, indeed, increased by 27%, and remained stable at 93 farms (Figure 9 and Figure 10).

Figure 10. Changes in Non-contract (>50 pig head) number compared to previous year

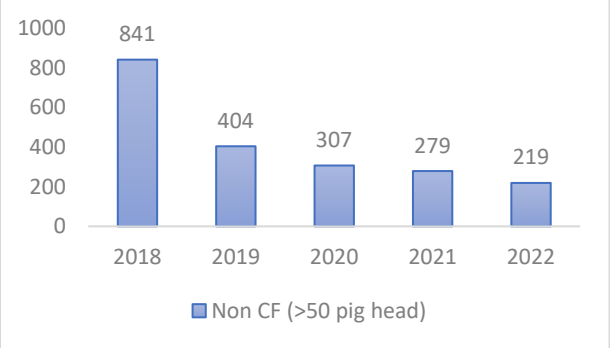
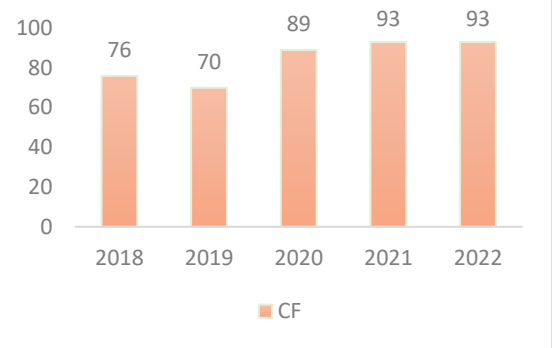


Figure 9. Changes in contract farming number compared to previous year



Source: Annual reports of Department of Economic and Agriculture, Thong Nhat District

Although contract farming is a model that has specific advantages for both farmers and companies, it involves the risk of opportunism by both sides (Eaton & Shepherd, 2001). Risks involving the buyer include the risk of abusing its power as the only provider of inputs.

One farmer we interviewed said:

"I need to have a good relationship with the company manager even when I am not satisfied with his terms because I don't want to face the problem of lacking breeding piglets and medication."

Another farmer told us:

"I had to bribe the manager to be sure he'd supply me with healthy piglets."

Risks faced by the supplier include the risk of opportunism such as selling on the side. Two of the farmers we interviewed have a second farm (without a contract) to use some of the leftover inputs, such as medicine and feed. Because of compensation and deductions based on mortality and on average weight, farmers will transfer pigs from outside farms to contract farms to secure their income. This action can jeopardize the company in terms of disease prevention or product homogeneity.

Contracts help farmers reduce risk, but that is not the elemental reason for their development (MacDonald et al., 2004). Although considered a form of risk-sharing, contracts do not cover all risks taken under force majeure circumstances (such as war, disaster, systematic disease,

and fire). The results observed in the field show that if ASF infect the contract farm, the companies do not punish farmers, but they do not supply piglets or aids to disinfect and decontaminate the farms. It is, however, a bit different from Dong et al.'s study (2019), which concludes that some of the contract farms had to terminate contracting with the feeding company due to the ASF.

The emergence of mega farms – a form of full vertical integration

In Vietnam, the mega farm was introduced in a new corporate form between a feeding company and a domestic investment company (investor). As a part of the competitive advantages, Foreign Direct Investment (FDI) feeding companies hold resources and capabilities that other firms cannot easily replicate. Incremental improvements in technology and specialized knowledge or skills allow companies to scale up and enjoy economies of scale while significantly overcoming the limitations in the previous contract farming model. Indeed, mega farms usually raise a minimum of 5,000 boars and 2,400 sows on an average of 8 to 10 hectares (concluded from interviews with those who invested in CP).

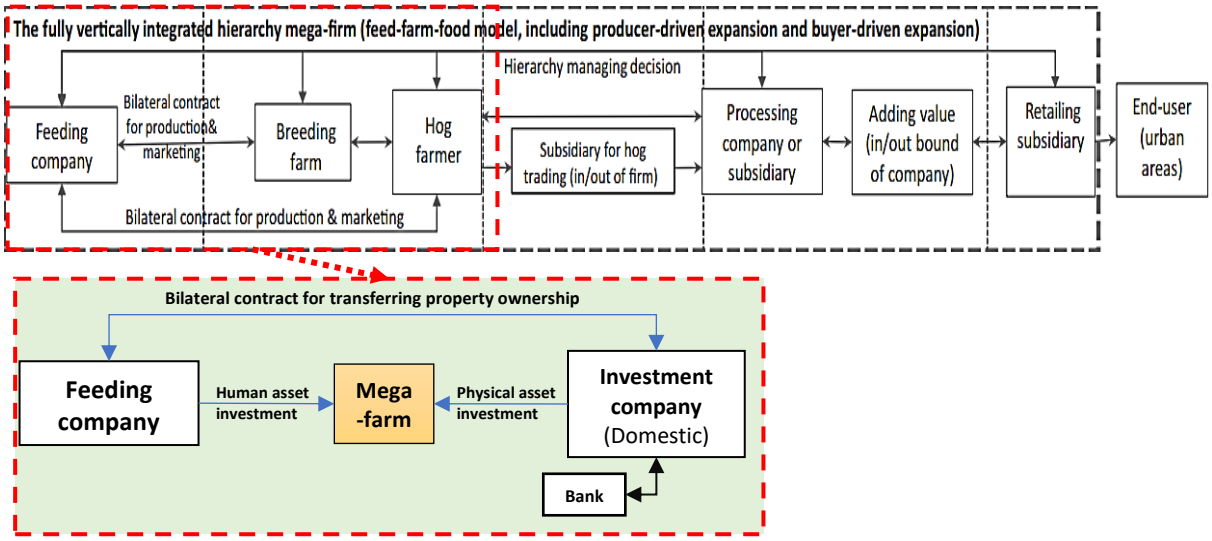
Compared to Dong et al.'s (2020) study, which highlights the latest (full) vertical integration form of hierarchy mega-firm, our study has found a new insight regarding the coordination between feeding companies and domestic firms. Accordingly, the shift in cooperation have kicked out the play of farmers and replaced them by production staff employed by the company. This illustrates the shift in strategy of finding a bigger opportunity concerning financial issue and reducing the risk of opportunism in the model of contracting farm.

Domestic investors usually are local groups or companies. These actors are outstanding by the higher capacity of capital and technology because the farm scale expansion to increase productivity requires higher investor ability to access the resources. In this model, the domestic company invests in all of the infrastructures, which can be listed as housing, road, electricity system, equipment, and waste treatment system. On the other hand, the feeding company invests in production performance in all activities. In other words, the domestic company is responsible for investing in physical assets, while the feeding company takes responsibility for human asset investment (Figure 11).

The profit of local investors comes from the compensation from the feeding company in the form of a loan. Through the bilateral contract for transferring property ownership of physical

assets from local investors, the feeding companies achieve their strategy of centralizing power and increasingly shifted from contract to ownership integration.

Figure 11. Mega farms: A new structure of full vertical integration

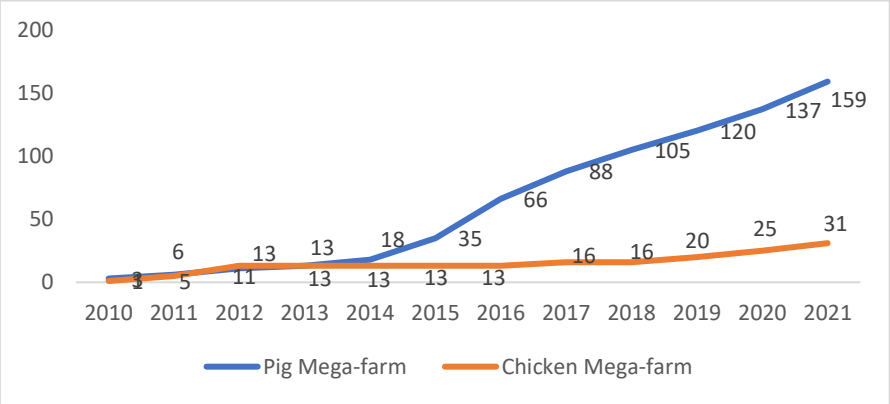


Source: Adapted from Dong et al. 2020 and author's survey

Many recent studies have reported that mega farms have become dominant while smallholder farmers suffered the most from ASF. According to a 2022 study by Nguyen, there was a significant increase in mega farms between 2019 and 2021, and results collected in Binh Phuoc, a province bordering Dong Nai, apparently reflect this trend. Accordingly, starting in 2014, pig farms received more investment than chicken farms. During the ASF period, in 2019, there was a further 15% increase in the number of mega farms in Binh Phuoc (Figure 12); this figure has continued to increase by 51% in 2021 compared to 2018. The CP Group's 2020 annual report also supports this trend, as they reported a 26% increase in revenue from their livestock segment in Vietnam, mainly from the pig sector, compared to the previous year,

which accounted for more than 18% of the company's total revenue (CP report, 2020). Hence the degree of integration has shifted from contract integration to ownership integration.

Figure 12. Changes in number of pig and chicken mega-farm in Binh Phuoc province



Source: Department of Agriculture and Rural Development, Binh Phuoc province

The forming of mega farms is specified below (Figure 13):

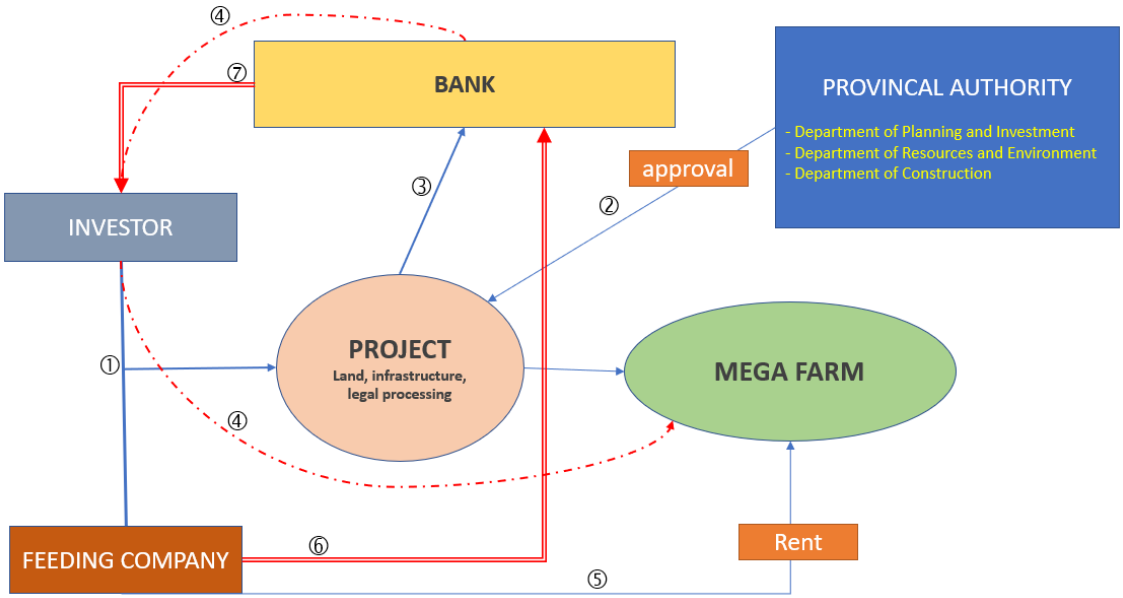
First, Vietnamese investors, usually private corporations with massive capital and financial resources, can get involved in the mega farm model even if they have no previous farming experience. Once the company selects investors based on their qualifications, a project plan is drawn up. The plan has to be submitted to the provincial authority for approval.

Second, once the project has been approved, banks will be involved in providing loans related to Decree 55/2015 ND-CP in the credit policy for agricultural and rural development. If the bank is confident the project is feasible, loans may cover up to 80% of the total investment (Agribank regulations, consulted in December, 2022). These loans will be used to construct pig housing and infrastructure (such as roads, electricity system, waste treatment system.)

Third, when construction is complete and has been inspected, the company signs a contract for a long-term lease (15 years). The company pays the rent through the bank and it is gradually deducted from the loan. Depending on the original amount of the loan, a project normally takes an average of 4 to 7 years to break even (based on the investor's responses and the author's own experience).

The first author's project involved setting up a mega farm for 2,400 sows, and its cost was estimated at approximately three million US dollars. It required legal ownership of the land, which may account for 20-25% of the total cost. If the investor has no collateral from another transaction, a bank will not get involved at this stage. Consequently, owning a lot of land of low value as an asset will make this investment more effective. Installation of the electrical system and basic facilities accounts for 5% of the total cost, the rest is construction of pig housing, staff's home and installing the necessary equipment.

Figure 13. New form of cooperation between feeding companies and investors



①→⑦: Procedure orders

Source: author's survey and experience

DISCUSSION

The outbreak of African swine fever (ASF) created a high degree of uncertainty in the business and was evaluated here as a test case, referred to as a "game-changing shift," that led to the disappearance of small-scale farmers from the pork value chain (PVC) and their replacement by more prominent, modern actors. Considered from the point of view of the crisis concept, ASF called for an urgent response by the actors. For this reason, ASF indirectly facilitated the mega farm model, a pre-existing trend that developed strongly.

Watts & Hahn (1993) underlined the fact that the key to success in developing partnerships is to focus on cultivating partners' capabilities and versatility in technology and product development competencies. Through significant investment in infrastructure, personnel, and

biosecurity measures, the contract farming (CF) and the mega farm models demonstrated their efficacy in disease prevention and maintaining stable production systems. Accordingly, the CF model involves coordination between feed companies and farmers, who might be considered small investors, to help the parties share their risks. This is entirely consistent with the explanation given in the case of the US regarding capital and risk by Ward (1997). By asking the producers to provide part of the capital, capital requirements are reduced by the integrators. Thus, some production risks are effectively transferred from the companies to the producers because risks follow the capital investment (Ward, 1997). Moreover, as a hybrid model, CF allows companies to achieve the goal of control, almost to the same extent as vertical integration, while still retaining flexibility. The contract offers the parties a flexible choice of commitments, which helps improve bargaining power or allows the company to pay a premium and partially shift the risk to other corporate units (Kessler & Stern, 1959).

However, because of given bounded rationality, all complex contracts are inevitably incomplete and the power of control is not completely integrated in the contract. Contract farming still has some limitations that affect the transaction costs in that opportunism has been clearly demonstrated (Minot & Sawyer, 2016). Indeed, some risks remain for both companies and farmers as shown by our results. Glover (1987) argues that market imperfections and the weak bargaining position of farmers may leave room for manipulation. Precisely, using intentionally difficult (rigorous) terms in the contract could allow integrators to take advantage of farmers and abuse their power (Rehber, 2000). Conversely, farmers have the inducement to cheat the feeding company to maximize compensation by mingling the source of pigs or cheating the inputs of feed and medicine. This is aligned with the idea that a probability of increasing profit provides an incentive for farmers to break the contract (Prowse, 2012).

A mega farm reflects an upgrade to a higher level of vertical coordination. The company's strategy to pursue the highest coordination of vertical integration, demonstrated by expanding the mega farm system while maintaining or even reducing the contract farming model typically supports the transformation broadly in the direction of “modernization” with capital intensification and technology upgrading (Reardon et al., 2014)in the livestock industry. Moreover, removing farmers out of the mega-farm model helps the company to almost completely eliminate opportunistic behaviors. In addition, the global value chain is

also involved in explaining supply-based capabilities. Particularly, the governance is turn from the captive (in the form of CF) to modular when the domestic investors are likely to have higher capacity of money, and technology. Through the transfer of ownership of the physical assets from domestic investors, the feeding company achived their stratey of centralizing power.

The fact that companies became increasingly dominant when the outbreak of ASF caused a major shock to small-scale farmers helped invent a new scenario. In particular, large-scale farms, although not more numerous, are responsible for supplying most of the products on the market. Furuseth's study of the pig industry in North Carolina shows that it not only increased the pig population but also geographically imploded the pig farm allocation. That is to say, more meat is produced by fewer farms in fewer places (Furuseth, 1997).

CONCLUSION

Although economic growth has created huge markets for farmers, small and medium-scale farmers are known to face a variety of constraints, including, among others, information fragmentation, technology, market, and support services (Antwi & Seahlodi, 2011; Karimuribo et al., 2011; Patr et al., 2014). However, reality shows that livestock production has entered a new era with a general shift toward industrialization, and intensified production has gradually become standard in the livestock industry (Nierenberg & Mastny, 2005).

Disease is the main risk that can affect farmers' performances at any scale (Tran & Nguyen, 2012), and decision-making under uncertainty is hence a prominent feature of agricultural production (Moschini & Hennessy, 2001). The impact of African Swine Fever has been shown to be detrimental to small farmers and to partially alter the structure of the PVC, by simultaneously creating a favorable environment for big actors, which has negative consequences for the employment of members of the rural population who have few qualifications. As Ruzzier (2009) emphasizes that, in a dynamic investment environment, high levels of quasi-rents may create a rationale for non-integration (contrary to TCE). In fact, Marion W. Dixon (2015) illustrates the wave of farm relocation to new intensified production areas in Egypt due to avian influenza, led by the big poultry corporate. She believes that the most capitalized firms have benefited most from the institutional infrastructure to adopt a changing set of biosecurity measures. Also, Simon R. Bush (2016) emphasized that the disease

had significantly shaped the structure of the shrimp aquaculture value chains. In this case, processors took advantage thanks to the large number of producers who were affected by diseases which allowed processors to build up mixed forms of coordination - seeking captive relations with high-capacity producers while maintaining market relations with the low-capability ones.

The upgrading of strategic choices along the vertical coordination continuum was identified by analyzing coordination strategies between companies and their partners, i.e. farmers involved in the contract farming model and investment companies involved in the mega farm model, Accordingly, coordination is initially established based on the terms used in the integration clause of the contract. Subsequently, by transferring ownership of physical assets, companies move to the form of ownership integration thereby achieving their strategy of centralizing power.

From a positive perspective, the presence of ASF can be seen as a condition that promoted investment and disease prevention measures. Modern models, both contract farming and mega farms, associated with high investment in biosecurity, dealt with the disease effectively. In addition, ASF also accelerated modernization of the PVC by favoring investors who invest in the mega farm model because of its efficiency. Yet mega farms are not exempt from the risk of disease, as concentrating a huge number of pigs in one place favours the rapid spread of the disease and high mortality rates.

Since the influence of ASF is mainly on pig farmers, this study paid most attention to production and the upstream area. Additional studies of middle and downstream agents are needed to identify the effects of ASF on the structure of the PVC. In addition, this study was conducted using data from sources in southern regions, and consequently cannot be extrapolated to the national level. Further studies conducted in northern and other regions are needed to complete the reflection.

TRANSITION 2

Structure of the thesis

Chapter 1:

The sociotechnical transition in the Vietnam pig value chain: The emergence of mega farms

Chapter 2:

Vertical integration in the hog chain in Southern Vietnam: The role of Disease and financial issues

Chapter 3:

"Dau"- A unique form of commission agent in the pork wholesale market of Ho Chi Minh City

Chapter 2 has focused on corporate strategies between parties (such as companies, farmers, and domestic investors) and answered the hypothesis of whether African swine fever causes a high level of uncertainty and creates a need to invest in specific assets that favor vertical integration in the pig chain, which may be at the expense of small farmers. Our results show that small farmers are elbowed out and replaced to a large extent by modern actors. More concerned about higher investments in biosecurity, modern farming (both contract farming and mega farm models) take its advance to be predominant. Foreign Direct Investment (FDI) in animal-feeding companies and domestic investors favor the mega farm model. By transferring ownership of physical assets, FDI-feeding companies move from contract integration to ownership integration, thereby achieving their strategy of centralizing power.

Chapter 3 focuses on a distinct intermediary who works in the wholesale market, customarily called "Dau". This chapter attempts to further explain the asymmetry in the process of modernization. Particularly, the transition in the pig value chain has been shown in the chapter 1 which illustrates the involvement of private and FDI groups significantly impacts on

the transformation of the pig industry. This process causes an upgrade in the level of integration shown in chapter 2. Chapter 3 aims at identifying the role of Dau and how they are positioned in the wholesale market, and hence understanding the reasons for their permanence as traditional operators together with other traditional market actors.

CHAPTER 3:

THE ROLE OF "DẬU" AS A KEY INTERMEDIARY IN THE PORK WHOLESALE MARKET OF HO CHI MINH CITY

INTRODUCTION

Though it is argued that the pig value chain in Vietnam is modernizing and becoming more vertically integrated (Nguyen Thi Thuy et al., 2020), the majority of pork products is still consumed through traditional wholesale markets (Dong et al., 2020). The wholesale market is a physical meeting place where professional agents assemble to conduct transactions involving tangible products with other professionals. The product being traded is intended for business-to-business exchange rather than for direct sale to the final consumer (Cadilhon et al., 2003).

As an illustration, RUDEC (2015) showed that approximately 70% of the pigs were purchased through these wholesale markets in Ho Chi Minh City. This significant role of the traditional marketing system goes along with the participation of a wide range of intermediaries (traders, wholesalers, slaughterers, retailers). It has a significant impact on the performance of the pig value chain in directing interprovincial flows (Huynh et al., 2006), in terms of bargaining capabilities, and in overseeing and coordinating goods flows to the markets (le Thi Minh et al., 2017). In a context of asymmetric information in agri-food markets (Nga et al., 2014) occurring when one party has information which the other lacks (Raj, 2022), wholesale markets still play a crucial role in mitigating these effects by acting as centralized hubs where buyers and sellers can interact directly. This sustained key role also results from the permanence of the shopping habits of buying fresh produce from traditional markets rather than from supermarkets or self-service convenience stores (Maruyama & Trung, 2007).

Modernization and globalization of Southeast Asian countries are assumed to result in the adoption of Northern-based, neoliberal development visions (Reardon & Swinnen, 2004). These visions prioritize modern retail outlets while discouraging traditional entrepreneurial trade. However, in Vietnam, traditional trade sites continue to supply essential fresh food to city citizens (Gerber et al., 2014).

Interestingly, in the pork sector in Ho Chi Minh City (HCMC), a specific agent, known locally under the name “Dau”, acts as a key intermediary in the wholesale markets. This agent has sometimes been mentioned in newspapers (Do, 2006); it has first been documented by (Nguyen, 2016). As developed in this chapter, this actor is identified and distinguished for

playing a specific role in facilitating the transactions between wholesalers, who also commonly act as collectors, and their buyers. “Dau” is characterized by three unique features:

(1) Having a long-term (50 years) contract with the State to rent outlets in a dedicated place inside the wholesale market;

(2) providing tailored supportive services, such as processing and transportation via specific investments in physical and human resources;

(3) and providing credit services.

As developed in this chapter, the services provided by “Dau” actors are seen as critical in facilitating transactional activities at the wholesale markets in HCMC; and ensuring that the latter operate expeditiously and productively with an average trade of 500 tons of meat daily corresponding to the trade in the two biggest wholesale markets in HCMC.

Relationships between ‘Dau’ actors and other actors are primarily based on market governance, in association with relationships of trust (A. T. Nguyen, 2016). Dau actors provide a significant source of credit in support of pork transactions, and overall play a significant role in the pork wholesale market system in Southern Vietnam. Indeed, credit support (advance payment or credit-supporting production) helps keep the relationship between producers and wholesale market agents stable (Celine et al., 2009). The role of cash has been emphasized as having a powerful influence on investment in the case of firms facing financial constraints related to capital market imperfections and information asymmetry (Fazzari et al., 1988).

Surprisingly, despite vigorous arguments on the pros and cons of the wholesale markets operations for the pork sector in Vietnam, little empirical research has been conducted on the functioning of these markets and notably on the role of the ‘Dau’ who are specific actors operating on these markets. Globally, the transformation and conventional modernization of the agri-food systems have been characterized by the restructuring of the midstream system, together with farming intensification and rapid urbanization (Reardon & Timmer, 2014). In Vietnam, despite long standing investments towards conventional food system transformations, wholesale markets - and with them notably Dau actors -, are still striving to maintain their positions amidst considerable pressures of modernization. Transformations

downstream, as evidenced by the development of supermarkets (Cadilhon et al., 2006; Masayoshi et al., 2014), is in step with the more recent transformations happening upstream in the agricultural sector, with foreign direct investment (FDI) firms increasingly investing in mega-farm models. The modernization of the distribution system was initiated in the early 1990s by introducing state-operated supermarket chains (Venard, 1996), which posed intense competition to the conventional market system (Cadilhon et al., 2006). However, after two decades since the first supermarket was established, the modern distribution network only accounted for 20 percent of the total of food distribution (Masayoshi et al., 2014). Furthermore, while the substantial investments made by FDI enterprises have significantly contributed to establishing expansive livestock farms and increased levels of integration upstream (D. D. Dong et al., 2020), it is interesting to note that this change only substantially happened very recently in response to the major shocks from epidemics (including ASF on the animal side and COVID-19 on the human side). Even so, the midstream and downstream sector still recorded strong resilience and steadfastness. This is why it is worth points to investigating how traditional actors in this middle segment could resist changes and maintain their intermediation role even in this context of adverse events and increasingly pressing conventional modernization trends both upstream and downstream.

For this purpose, exploratory research was conducted to scrutinize the system of intermediation in the pork value chains operating through wholesale markets in HCMC. This study, more particularly, analyzes the role of Dau actors' as critical intermediaries in wholesale market operations related to pork sector. The main objective of our study is to identify the role of Dau in providing services and how they are positioned in the market. We want to better explain the interaction between Dau actors and other partners in the value chain and in the wholesale market especially; and hence understand the reasons for their permanence as traditional operators together with other traditional market actors.

To do so, we first review the literature on the role and operation of intermediaries in food markets. Then we will present our method of data collection, main results that we will discuss in relation with the literature. Finally, we will summarize our main results and recommendations.

LITERATURE REVIEW

A market, in the realm of economics, is a dynamic system where buyers and sellers interact to exchange goods, services, or resources. To analyze markets and market transactions comprehensively, including considering non-price relationships, this study builds on the rigorous framework proposed by the "economics of organization (EO)" (Moustier, 1996). Indeed, EO theories focus on institutions and organization that include the social rules, conventions or other elements of the structural framework of social interaction (Bardhan, 1991). The market can be viewed as the platform where agents interact, aiming to optimize their positions and economic outcomes. Institutions, in the form of rules, norms, and regulations, shape the environment in which these economic agents operate. Organizations, as critical actors within this platform, provide the structural framework for agents to make decisions, exchange goods and services, and adapt to changing market conditions (Nabli and Nugent, 1989). In other words, organizations are the players of the game while institutions are the rules of the game (North (1990). As agents strategize and seek to improve their positions, the interplay between institutions and organizations becomes crucial, influencing the market efficiency, competitiveness, and evolution. EO offers a critical perspective on the market as a dynamic platform where institutional arrangements and organizational structures play a pivotal role. EO, therefore, serves as a vital lens through which we can better understand and address the complexities and challenges inherent in market dynamics.

The platforms are generally characterized by the open business models that inherently rely on independent participants to co-create value, often serve as intermediaries or infrastructural entities enabling market activities (Täuscher & Laudien, 2018). They can provide a digital or physical space where buyers and sellers can connect, trade, and access valuable resources, thereby playing a pivotal role in shaping the organization and operation of markets.

The market structure encompasses different characteristics that influence how competition and pricing manifest strategically. These include:

(1) the level of concentration among sellers and buyers; seller and buyer concentration pertain to the total number of market participants and their size distribution.

(2) the extent of product differentiation; this relates to how easily various product qualities can substitute for each other and,

(3) the ease with which new entrants can participate in the market. This comprises several factors, such as government-established entry regulations, the dissemination of information regarding supply, sales opportunities, and storage, the criteria and standards for product quality, the terms of sales contracts, and associated penalties. Furthermore, it involves assessing the accessibility of trade-related resources and facilities, such as storage, credit, transportation, market stalls, and scales, along with the convenience of using these resources. Lastly, it entails access to information about supply and demand conditions and prevailing prices.

To explore the efforts of participants in a business interaction and to understand purposeful actions made by business actors to create, modify, or even maintain institutional arrangements, Michel et al. (2019) recommend to use the institutional network approach. Indeed, business-to-business marketing is primarily concerned with the interaction between two organizational actors (Rich, 2003). The concept of business interaction has been associated with that of a business network (Möller & Wilson, 1995), which refers to a collection of interconnected business relationships. Therein, the role and position of the actors involved are emphasized when analyzing changes and dynamics in business relationships and networks (Dabholkar et al., 1994). Simultaneously, Michel et al. (2019) emphasize the importance of viewing intermediation as an institution with its own set of rules.

Intermediaries in value chains are sometimes criticized for increasing transaction costs and reducing efficiency. This argument suggests that each intermediary adds a layer of complexity to the chain (Gu & Hitt, 2001; Kuzmin & Suvorova, 2023). Additionally, intermediaries may introduce delays, errors, and inefficiencies in transactions. However, it is important to recognize that intermediaries also play valuable roles in value chains. The existence of intermediaries has been discussed in the literature as a solution to deal with chain coordination problems (Arya et al., 2015). Indeed, intermediaries can help bringing certain benefits to different chain actors, such as more frequent interactions with customers, or access to superior information, higher expertise, or better reputation (Biglaiser, 1993; Gabre-

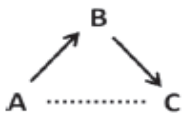
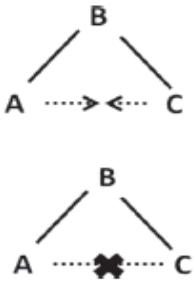
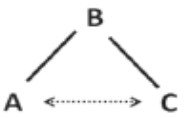
Madhin, 2001). Their participation can also help ensure proper inventory or aggregation of supply and demand (Arya et al., 2015), control quality implementation (Lund-Thomsen et al., 2021; Spulber, 1996), or provide financial services (Lemeilleur & Codron, 2011; Minten et al., 2012; Spulber, 1996). The category of intermediary actors has been documented for its capacity to help reduce transaction costs related to the costs of searching, negotiating, monitoring/enforcing customer (Arya et al., 2015; Biglaiser, 1993; Lund-Thomsen et al., 2021; Spulber, 1996), (Janssen & Sol, 2000), (Peng & York, 2001). Intermediaries can improve trade efficiency by providing services that facilitate trade (Charlebois, 2009) or by consolidating demand and needs from multiple buyers and sellers across a wide geographical area (Baumann, 2022). Moreover, beyond reducing transaction costs and information asymmetry, intermediaries are embedded in socio-cultural settings (Ebata, 2022).

In everyday language, Dau can be considered an intermediary, but this term is quite general and cannot help this study clarify the characteristics of actor Dau. However, categorizing an actor into a particular type of intermediary can be analytically challenging. There are no consistent ways in the literature to define actors involved in intermediation, for instance, middleman, broker, or commission agent may be used for this purpose. To handle that, we adopted a conceptual framework from Obstfeld et al. (2014), who use the brokerage concept to emphasize a particular structural pattern in which two otherwise disconnected partners are connected through a third party and the social behavior of third parties. Moreover, Obstfeld et al. have expanded brokerage theory by conceptualizing brokerage as a process that changes interactions between two or more parties in various triadic structures. This conceptualization helps to clarify significant differences in behavioral orientations towards brokerage and their connection to sources of brokerage motivation and opportunity.

Obstfeld et al. (2014) proposes a framework that analyzes brokerage actions as being underlain by three possible processes: *conduit*, *tertius gaudens*, *and tertius iungens* (see figure 14). Precisely, *conduit* brokerage is the act of relaying information from one party to another without attempting to alter the preexisting relationship between them. *Tertius gaudens* brokerage is when a broker takes advantage of unfamiliarity, competition, or conflict between parties. In contrast, *tertius iungens* brokerage pursues a coordination strategy via introducing or facilitating communication between two parties. Therein, *tertius iungens* brokerage, the last basic form of brokerage, involves the broker's introduction or facilitation

of two other parties. Accordingly, on the one hand, in the open network where buyers and sellers have no prior tie, a middleman will bring them together to generate a new cooperation. On the other hand, in the closed network, the middleman is in charge of coordinating new collaborative action between buyers and sellers. On contrary, the *tertius gaudens* orientation is emphasized in structural holes theory, which is essentially a broker who can use their position to benefit themselves by pitting people against each other (Obstfeld, 2005). In *tertius gaudens* brokerage, the broker strategically takes advantage of unfamiliarity, competition, or conflicts between parties, either by actively maintaining them or by choosing not to act. This approach involves a deliberate effort to create an advantage by exploiting the disconnection between two parties, but it can also be as simple as leveraging or preserving unfamiliarity between people who are not on equal footing.

Figure 14. The framework of brokerage process

	Three Forms of Brokerage Process		
			
	Conduit	*Tertius Gaudens*	*Tertius Iungens*
Open Network (absence of A-C tie)	*B transfers information, knowledge, or other resources between A and C where A and C have no prospect of meeting*	*B plays A and C against one another or keeps A and C apart*	*B introduces A and C where A and C have no prior tie*
Closed Network (presence of A-C tie)	*B facilitates transfer between A and C and may help synthesize new knowledge*	*B cultivates conflict, competition, or separation between A and C (divide et impera)*	*B coordinates new collaborative action between A and C*

In this framework, Obstfeld et al. consider B under the terms of a broker, which is often defined as a person playing in between others like A and C. To help understand better the specificity of Dau actors, this study goes further to identify this category of actor by drawing on the distinction made in the literature between brokers and commission agents. For

example, Hailu (2016) found that brokers play a critical role in assisting the wholesalers who govern the vegetable value chain in Ethiopia. And Reddy (2013) found that commission agents and brokers co-exist in ensuring the complex linkages in the sorghum grain value chain in India.

Generally, commission agents are defined as those who act on behalf of principals in charge of negotiating with buyers, and are compensated through a commission, which is a percentage of the transaction price. They thereby have specific stakes in the transaction itself (Lemeilleur & Codron, 2011). On the other hand, brokers, rather than focusing on and specializing in marketing the product on behalf of the seller as do commission agents, concentrate on providing a range of services, which can be tailored to different actors, to facilitate transactions (M. Zhang & Li, 2012). This is consistent with the distinction made in commercial law, Ghadami & Jebelli (2017) figure out that commission agents, who are responsible for and executing missions for the commander while being a contracting party to the transaction and receiving benefits dependent on the negotiated transaction, and brokers who act between buyers and sellers and are not directly involved in transactions, receiving a specific amount independently of the transaction price. Observed diversity in the different types of intermediaries facilitating market transactions may challenge some of the above distinctions (Lemeilleur & Codron, 2011; Minten et al., 2012).

More specifically, commission agents can operate on behalf of farmers, as in the case mentioned by Lemeilleur & Codron (2011), but also on behalf of buyers, as in the paddy sector in the Philippines studied by Fuentes (1998), where commission agents were viewed as an employee of rice millers. Table 5 below specifies the key characteristics based on which these two types of actors have been differentiated, and hence provides an analytical grid to help scrutinize the role of Dau in wholesale market activities.

Table 5. Characteristics of commission agents and brokers from the literature review

	Commission agents	Brokers
Representation	Representing sellers (Lemeilleur & Codron, 2011; Selvaraj & Ibrahim, 2012) or buyers (Fuentes, 1998)	Working independently (Thorpe & Maestre, 2015) Involving, facilitating a transaction but not necessarily representing a specific actor in the chain (Ghadami & Jebelli, 2017).
Goods possession	Can temporarily possess goods (Levi et al., 2020; Ziegler et al., 2019), but do not own them (Lemeilleur & Codron, 2011)	Not covered in the literature
Insurance and credit facilitation	May offer insurance or credit services. (Gill, 1996; Rana & Maharjan, 2022; Ziegler et al., 2019)	May assist in arranging insurance coverage if required or connecting customers with financial institutions for credit support. Ensure actors have the long-term capacity, financing and incentives (Thorpe & Maestre, 2015).
Other services provided	Ensure quality inspection, packaging (Lund-Thomsen et al., 2021)	Provide technical expertise (Thorpe & Maestre, 2015) Support monitoring processes, solve conflicts (Thorpe & Maestre, 2015)
Market access	Have access to a network of buyers. (Ziegler et al., 2019)	Have access to a network of buyers/sellers. Facilitating contact between potential partners. (Thorpe & Maestre, 2015)
Price negotiation	Negotiate prices on behalf of the seller (Kumar et al., 2013; Lemeilleur & Codron, 2011; Levi et al., 2020)	Negotiate prices for the benefit of their clients (Ghadami & Jebelli, 2017)
Compensation	Earn a commission or fee based on sales generated (Lemeilleur & Codron, 2011; Selvaraj & Ibrahim, 2012).	Earn a brokerage fee for successful transactions (Shudon, 2008). This fee is normally fixed (Munneke & Yavas, 2001).

This study builds on resource-based theory, which considers a firm's resources and capabilities as the primary determinants of its competitive advantage. In alignment with the notion of institutional network, resources are viewed here as a prerequisite for acting to

influence institutional arrangements (Rojas, 2010). This theory provides a frame to analyze the resources that provide the necessary capacity to modify actor's positions and either challenge or protect existing institutional structures (Maguire et al., 2004). Accordingly, a firm's resources must be valuable, rare, inimitable, and non-substitutable to provide a sustainable competitive advantage and the resources can be categorized into tangible (e.g. physical assets) and intangible (e.g. knowledge, culture, reputation) (Barney, 1991). Through resource-based theory approach, the intermediaries, who can use the resources of skills, knowledge, and negotiation capabilities in transactions, can play a critical role in the chain. Intangible resources are close to capabilities that, as proposed in the global value chain analytical framework, may shape the governance patterns (Gereffi et al., 2005; Humphrey & Schmitz, 2002) by affecting the way in which work is organized, and responsibilities and resources are allocated (Rogelberg, 2016).

Dau actors' long-term existence, especially in the context of an extremely dynamic wholesale market context, provides a strong rationale for assuming that this actor has some oligopolistic features and controls of some barriers of entry. The traditional marketing system is generally viewed as inefficient due to a lack of proper organization (Ebata, 2022; Suryaningrat et al., 2015; Utomo et al., 2021); it is often characterized through attributes of market imperfections, which have a profound impact on the efficiency and functioning of markets (Crawford et al., 2018; H. De Silva & Ratnadiwakara, 2008; Schmitz, 2021). These imperfections create barriers to access, largely constraining the entry and participation of new players. Although it can be complicated to single out the different barriers which are often mutually supportive (Gable et al., 1995), outstanding barriers can be briefly summarized as:

(1) Economic barriers, which refer to high requirements such as capital-intensive investment (Siegfried & Evans, 1994), economies of scale (Schmalensee, 1981), or cost advantages enjoyed by existing players (Karakaya & Stahl, 1989);

(2) Legal and regulatory barriers, which refer to challenges that new entrants have to deal with, e.g., complex licensing procedures, stringent safety or quality standards that new entrants may find challenging (Kovacic, 1992; Sobel et al., 2007);

(3) Limited distribution channels and networks or exclusive agreements between incumbents and partners, which can make it difficult for new players to reach customers effectively (Porter, 1997);

(4) Market concentration barrier, which highlights that a few prominent players with a significant market share can dominate a market and then create barriers to new entrances (Abenoja & Lapid, 1991);

(5) Technological barriers, such as if incumbents hold patents, intellectual property rights, or exclusive access to critical technologies, it can make it difficult for new entrants to compete effectively (Levin, 1978).

EMPIRICAL METHODOLOGY

Because of limitation in the number of these actors as well as information collection, we have designed a research study based predominantly on a qualitative approach. Yin (2003), indeed, proposed that case study research can be valuable to contribute to our knowledge of individuals, groups, and related phenomena. Accordingly, phenomenology is a qualitative research approach that aims to understand the fundamental truths of human experiences by examining them in detail (Byrne, 2001).

Yin argues that case studies are similar to experiments in that they can be used to create theories but cannot represent a wide range of attributes. The goal of case studies is to generalize theories and not to represent a "sample." This implies that case studies are primarily intended to improve understanding by developing and refining theories rather than providing a representative snapshot of a specific population; therefore, rather than statistical analysis, case study research can be generalized through theory (Sterns et al., 1998).

Pattern-matching technique is considered one of the most desirable strategies for analysis in qualitative research, especially case study research (Trochim, 1989). This method relates to comparing an observed pattern with a predicted one (theoretical one). Following the basic model proposed by Trochim (1989), this study first reviews in different literature streams of intermediaries with behaviors and operations modes that can be related to the Dau actors, which are the focus of the case study, with a view to develop the theoretical realm of the key characteristics of market intermediaries (see Table 5 above which contrasts commission

agents and brokers). The study then develops specific characteristic for "Dau" in the observation realm. The matching characteristic in each realm are quantified and described in matrices. Based on the number of characteristic matched between the theoretical realm and the observation realm, this study identifies which type of intermediary the "Dau" corresponds more to and what are the implications of their presence and roles for the market dynamics at play in Vietnam in the pork sector.

Empirical context, scope of the case study and data collection protocol

Ho Chi Minh City (abbreviated HCMC) is the most populous city in Vietnam, with a population of around 9.3 million in 2019. To serve the demand of its inhabitants, HCMC requires a massive volume of agricultural goods. For example, the total demand for fresh vegetables in HCMC had been estimated by Tan Loc (2002) at 438,000 tons per year. As another illustration case regarding pork consumption, Nguyen Manh Cuong (2014) indicates that more than 70% of pigs raised in Dong Nai (a neighboring province of HCMC) are consumed in HCMC.

As indicated in figure 15 below, pigs collected in Dong Nai province and consumed in HCMC are from two sources:

Independent farmers working with collectors,

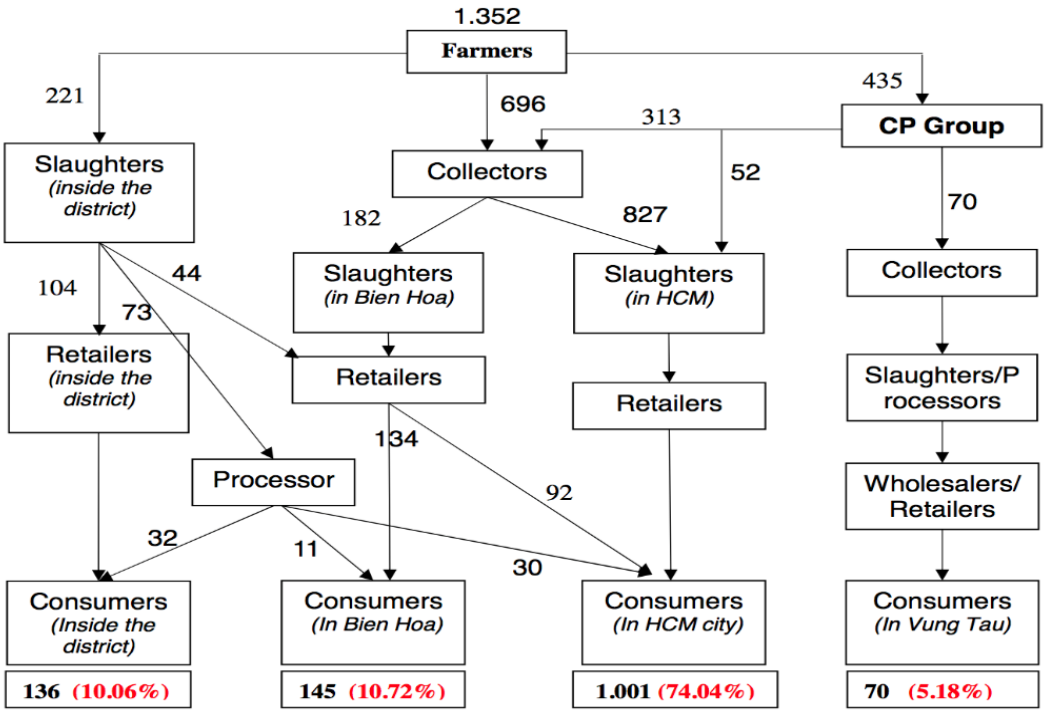
Contracted farmers, working under the control of companies such as CP Group.

Pigs are transported to slaughterhouses in HCMC and after that, to the wholesale markets.

The mapping of the pig value chain in Figure 2 as proposed by Nguyen Manh Cuong has missed a critical point. Indeed, the existence of the wholesale market was not mentioned in the third channel, which describes more than 70% of goods that go to HCMC with the flow as below:

Farmers - Collectors - Slaughterhouses – Retailers - Consumer

Figure 15. Mapping of the pig value chain in Dong Nai province



Source: Nguyen Manh Cuong, 2014, REVALTER project's report

In fact, the slaughterhouse does not sell the product directly to retailers. Hoc Mon wholesale market has always been cited as the biggest place to distribute a large amount of pork transported from Dong Nai province (Thai Hang et Ngoc Minh, 2014; Le Hang, 2021). It is important to note that the collector in this channel plays two principal roles, the role of a collector and of a carcass wholesaler. Therein, after collecting, collectors transport alive pigs to slaughterhouses in HCMC. Then, carcasses are transported back to the wholesale markets. Collectors receive carcasses from the slaughterhouses at the wholesale market and then play the role of carcass wholesalers.

To the best of our knowledge, the identification from a research perspective of the specificity of the Dau actors was first established by Nguyen Anh Tuan in 2016. This initial observation consisted in acknowledging the existence of this type of actors as participants in the operations of the wholesale markets, especially in the context of the pig industry; however, these actors have not yet been properly documented in the literature.

Agricultural wholesale markets in HCMC, namely Hoc Mon, Binh Dien, and Thu Duc, are the key entry points for the supplies of fresh produce to this city. Pork is primarily sold in Hoc Mon and Binh Dien markets, with Hoc Mon being the largest in terms of volume traded. Hoc Mon has almost three times the number of traders and products as the other two other wholesale markets in the pork sector. Therefore, the case study focuses on analyzing Hoc Mon market; however, insights from the other two markets are also included and examined, notably when a comparison is needed.

Primary data was first collected in 2021 to gather basic information about Dau and their activities in the wholesale markets in Ho Chi Minh City. Then, a second field trip was conducted from March 12 to March 22, 2023 to better scrutinize the role of Dau and of related actors in the pork supply chains operating in the Hoc Mon market (see Appendix). This included interviews with the actors listed in Table 6 below.

Table 6. List of stakeholders inteviewed in March 2023

Actors	Number
Dau	02
Collector- Wholesaler	04
Trader	02
Wholesale market manager	01
Wholesale market staff - veterinary	04
Agricultural Support Center staff	01

In addition, secondary data on the quantity of pork consumed in the Hoc Mon and Binh Dien markets was also collected with the support of the Ho Chi Minh City Agricultural Support Center and the Department of Industry and Trade.

RESULTS

Wholesale markets operations in HCMC and the first recognition of Dau

Pork wholesale markets were initially formed as temporary wet markets, which satisfied the demand for fresh meat by the dwellers living in HCMC. These markets, such as An Lac and Pham Van Hai, started in the 90s and operated in a central urban area, which allowed quick delivery and represented a clear competitive advantage in the cultural context of Vietnamese consumers shopping frequently at markets for fresh pork. Moreover, at that time, there were no official wholesale markets specializing in pork; traders chose markets close to the main road and not too far from the city center (see figure 16). In fact, Pham Van Hai and An Lac markets (red triangle) were two chosen places for gathering traders and acting as wholesale markets. Accordingly, the Pham Van Hai market was a gathering place for traders from the northern area of Ho Chi Minh City who originated mainly from the neighboring province (Dong Nai), while traders from the southwest area gathered at An Lac market. As a typical characteristic, pork wholesale markets always operate during the night (from midnight to 7 a.m.). Importantly, these markets only provide pork carcasses, and buyers must buy large volumes each time.

Because of lacking equipment and services to help collectors facilitate their work, some collectors consider this gap in providing facilitating services as a business opportunity. They rent out the places from the market's management board, hire labors to speed up the transaction between buyers and sellers. The most distinctive service is that Dau provides a credit guarantee between wholesalers and their customers to ensure that the wholesaler avoids the risk of not being piad back by their customers. Initially, the transactions were performed directly between the collectors and buyers. However, the following characteristics have created market barriers and at the same time opened room for a specific business opportunity:

(1) Geographical gap/ scope: collectors come from different neighboring provinces, notably from Dong Nai;

(2) Market specification: Before 2005, no official centralized wholesale markets for pork existed in Ho Chi Minh City. These markets functioned as temporary markets; therein, collectors rented space in Pham Van Hai and An Lac markets for nighttime activities from

midnight until 7 a.m. After each pork market session, participating actors had to ensure that the market area had been cleaned for other activities during the day;

(3) Massive volume of products: within the rush hours, a large volume of products is traded to ensure the large demand of Ho Chi Minh City and of the neighboring provinces;

(4) Diversity of buyers: buyers not only originate from HCMC but also from other areas. As the product supply is vast in volume and range, these wholesale markets also attract retailers from neighboring provinces coming to look for products at reasonable prices;

(5) Large transaction value and cash requirement: Pork is one of the largely traded commodities with a high transaction value - about $1 billion US dollars/day. Furthermore, the need to pay in cash at the time of the transaction is a common feature of agricultural wholesale markets in Vietnam.

Witnesses who have been operating on the wholesale markets from its earliest days have stated that the emergence of Dau as a specific agent was purely coincidental in response to market circumstances and not a planned decision from market management or public authorities. In particular, one interviewed wholesaler and one Dau both confirmed the following statement:

"Initially, Dau was a collector from Bien Hoa (the capital of Dong Nai province) and Trang Bom (the livestock capital of Dong Nai province) who brought pork from Dong Nai to sell it in HCMC markets. The huge quantity of pork and the long time to transport the produce caused opportunities for a few collectors to switch to being Dau. Since then, Dau has rented fixed stalls at markets and collected commissions from the collectors. Gradually, Dau was accepted as a feature of pork wholesale markets."

While these actors initially emerged based on their own initiatives, they have since been incorporated by the public authorities in the formal management of the markets. These authorities, together with the market management board, allow Dau actors to take responsibility in market operations, and they have even assigned them roles in some core market responsibilities. This is, for example, stated in a State report in which the role of Dau is specified as part of an explanation of the role of market manager:

"The Management Board has assigned Dau to decide on its own on hiring workers to serve his business and Dau is responsible for public order, food safety, and hygiene. In case of any related problems occurring, Dau must be the first to take responsibility." (Do, 2006)

Authorities' recognition, accompanied by relative conditions in the wholesale market's characteristics, has allowed Dau to increasingly perfect its role in operations at wholesale markets. According to Do's (2006) explanation, instead of taking over waste management (such as cleaning and dispensing of leftovers) and demanding rental fees for the service, the authority has transferred this responsibility to Dau. Indeed, Dau is responsible for adjusting the number of workers and equipment to optimize operating costs. At the same time, the management board focuses on managing the entire market operation and of the surveillance of the goods' overall quality.

Although Dau has business premises, these actors had to register with the government as an enterprise to operate legally. Indeed, in the legal documents consulted – such as for example in Decision N. 2449/QĐ-UB, 2003, these actors are called "doanh nghiệp" (enterprises) or "hộ kinh doanh cá thể" (individual business households).

Market relocation supports the empowerment of Dau

In 2003, the authority decided to build up two official agricultural wholesale markets named Hoc Mon and Binh Dien (indicated by the red square shape in figure 16) following the Decision 1393/QD-QD. This decision required to stop commercial pork activities in the old markets as Pham Van Hai and An Lac; and encouraged all actors to move to Hoc Mon and Binh Dien markets. More specifically, actors in the Pham Van Hai market mostly moved to the Hoc Mon market, and those who worked in the An Lac market moved to the Binh Dien market.

Initially, this relocation encountered many efficiency problems related both to the sustained habit of gathering at the old markets and to the lack of infrastructure in the new ones (M. H, 2008). Although the relocation decision was issued in 2003, new markets only came into proper operation around 2007 - 2008. To create clear momentum in incentivizing relocation, the government encouraged Dau actors to rent the stalls (floors) at an affordable price, and for a long renting period of 50 years. Furthermore, Dau actors also receive special incentives from the State through different supports which secure, and even strengthen, their position in wholesale markets, including:

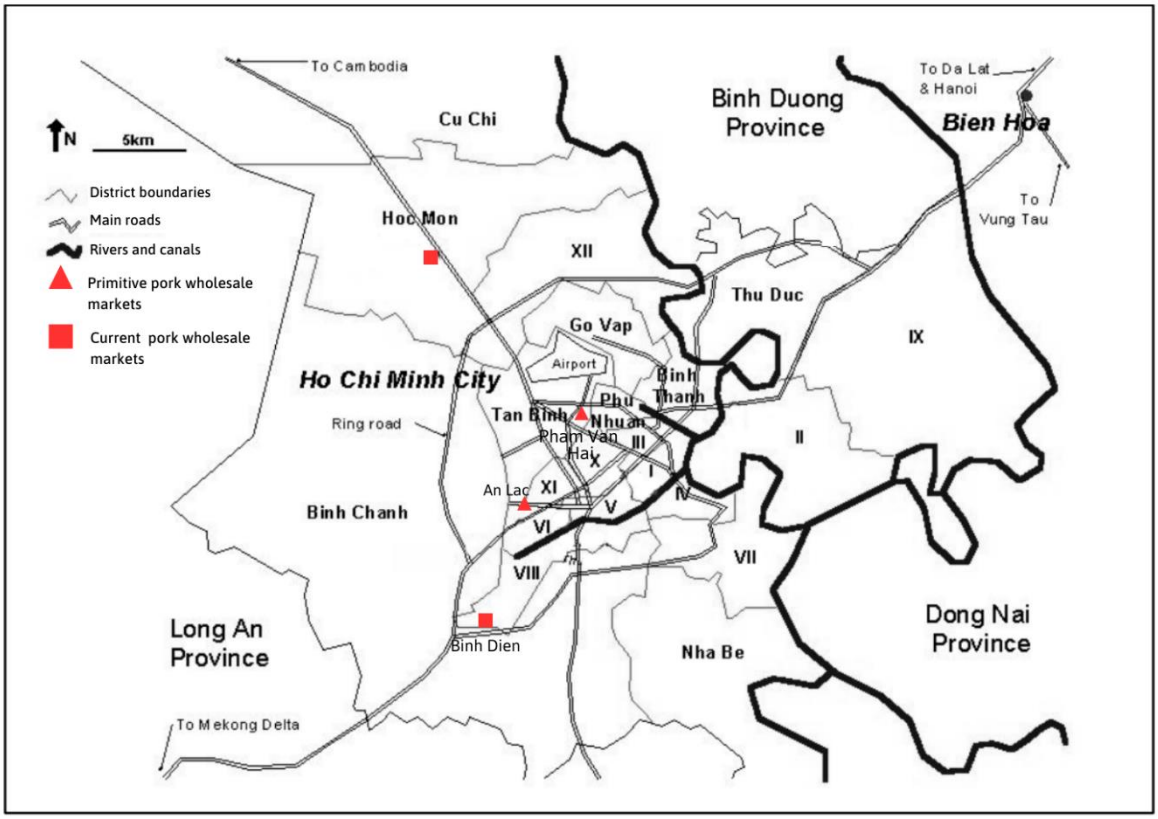
(1) priority rights to rent premises in new markets;

(2) a preferential policy price for a stall equal to 50% of the commercial price: the State can transfer a premise to anyone who wants to rent, at the price without incentives (commercial price), but Dau can rent it for half of it;

(3) A debit payment is permitted, therein, 30% advanced payment and the remaining of 70% are paid in installments over 7 years at an interest rate of 8.4%/year (Decision N. 2449/QĐ-UB, 2003).

Owning premises at the wholesale market is at the core of Dau's specific position and role in the chain's operations. The relocation has strengthened the position of the collectors who invested in stalls into becoming a specific intermediary, Dau, in the pork value chains operated on these wholesale markets.

Figure 16. Location of pork wholesale markets



According to the interviews with Dau actors, when stalls started to be rented, no specific conditions or privileged relations with public authorities were needed to access these stalls and positions:

"Initially, no one wanted to move to the new market, so these positions were almost empty. It was only after a few years that they began to gather here, and it took me a while after there was a new market to invest a stall here."

"At first, I bought the stall for 1 billion VND. After a time, that space costs about 3-5 billion; if it is transferred now, the price is about 10-14 billion."

However, the number of Dau actors is limited by the size of the wholesale markets; and the fact that public authorities recognize Dau formally helps these actors gain many benefits from transactional activities. This also allows Dau to increasingly consolidate their exclusive position. According to the survey with Dau actors, only about seven people were operating at the Pham Van Hai market from the outset. This figure increased to 15 when the market moved to Hoc Mon; with the trading volume gradually rising from 2400-2600 heads/day at the Hoc Mon market in 2008 (Department of Animal Health, 2008) to 5000-6000 heads/day in 2016.

Transactional characteristics and Dau identification.

Hoc Mon market includes 20 stalls located in an internal hall and about 80 stands located externally. The internal hall is used for selling pork carcasses, and the external one is used for selling pork cuts. Dau actors and their team work in the internal hall, which has hanging bars for the carcasses. Each team consists of an average of 5 to 9 people: Dau is the boss, and he employs an accountant and several laborers who play the role of chopper and porter. The stalls in the market hall are of the same size and contain the same equipment, including a desk with a computer for Dau and his accountant. Two heavy-duty electric scales are directly in front of the desk opposite the hanging bars.

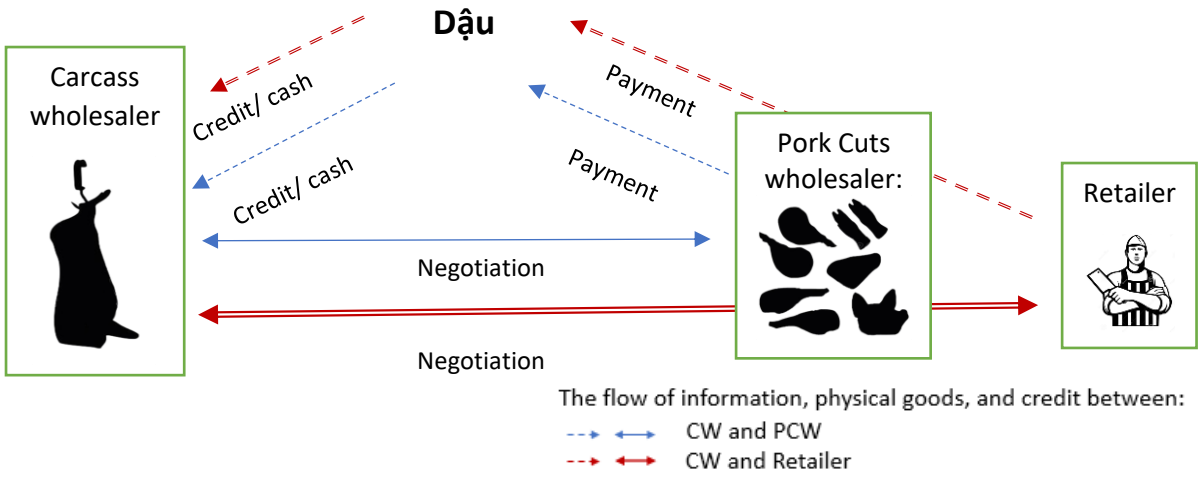
Three main stakeholders can be observed as operating on the premises of the wholesale market and directly participating in pork transactions:

(1) Carcass wholesalers (CW): these people, who also play the role of traditional collectors, sell carcasses in large quantities; (2) Pork cut wholesalers (PCW): these people are sub-

wholesalers who buy products from CW and then divide them into pieces to sell them to retailers who want to buy different parts or also directly to consumers; (3) Retailers: these people preferentially buy different parts from PCW and sell them in other markets. However, there are still a large number of retailers who buy directly from CW and bring pork to retail markets.

In the above corresponding channels, Dau participates in facilitating the transactions between CWs and their customers, namely PCWs and retailers (see Figure 17). Importantly, according to our observations and information collected, Dau remains outside of the bargaining/auction process.

Figure 17. The position of Dau and the interaction of actors in the wholesale market



Below, we analyze further the main distinctive characteristics of the transactional processes.

Product assessments: Consistently with not taking actual part to the transaction itself, Dau does not participate in the product assessment process which totally occurs between CW and the buyers. Assessments are divided into quality and quantity. In terms of quality, the buyers rely primarily on personal experience. The carcass is inspected mainly based on basic sensorial operations, i.e. by touching and looking at it. Regarding food safety, the product sold in the market is controlled externally by a team of veterinarians belonging to the State authority. Products must be inspected for safety criteria before being shipped into the market. In terms of quantity, the buyers know the exact weight of the product via electronic scales.

Price: The price is also established between buyers and sellers without involving Dau. The price is difficult to predict because it relies on the specific supply and demand during the transaction. Prices are generally very fluctuant and dependent on product quality and the

bargaining power of buyers and sellers. However, there is daily price monitoring from the market management, and these prices are used as a benchmark to help sellers and buyers start a negotiation. Commonly, the price is higher at the beginning and will be lower by 1000-2000 VND at the end of the market section. The products have to be sold within a session to avoid deterioration.

Quality control: Although Dau is not directly involved in the negotiation, they are partly responsible for hygiene and safety issues. As indicated above, Dau is registered with the market board to keep the carcasses away from the floor and ensure that the equipment is in satisfactory sanitation conditions. Indeed, Dau must ensure that the chopping and transportation processes are undertaken correctly. After the carcasses have been removed from the hanging bars, laborers hired by Dau must process and quickly transport them to the buyers.

Processing: After the price is confirmed, laborers quickly unload every piece of carcass from the hanging bars, which commonly weigh about 80 kg. The carcasses are weighed with electronic scales under the surveillance of both the accountant and the buyer. Then, the laborers chop carcasses into 3-4 pieces to simplify transportation. This process is performed very quickly as part of facilitating the transaction for the CW, i.e. ensuring freshness, and saving time on every deal and complete the market session quickly. To ensure this, the laborers are required to have professional techniques.

Shipping: Dau is also in charge of shipping the cuts to buyers' pick-up points. Once processed, pork cuts will be transported by wheelbarrow to the buyer picking points. For the PCW, this consists of their stalls located in the external market areas. Otherwise, the cuts will be transported to the retailers' private vehicles. According to the survey, retailers sometimes need to pay a small extra fee to the laborers when a long distance is implied. It is worth noting that Dau has to pay a fixed charge to use wheelbarrows. The market management board collects this amount.

Relationship: Dau has long-lasting relationships with all parties, although there is no formal agreement entailed. Interviews with CW show that each of them has chosen one particular Dau to work with for more than ten years. Furthermore, credit service is also a key to maintain the relationships. Furthermore, credit service is also a key to maintaining relationships. A

CW's response reveals that Dau usually ensures the payments are made transparently to strengthen their relationship. The CW and PCW who have a long-term relationship with Dau can even get credit support from Dau if needed.

Payment: Dau directly participates in the payment process between CW and buyers, which is mandatory for those participating in transactions at the wholesale market. The payment does not go directly from the buyers to the CW but through Dau. Dau then charge the commission fee based on the weight of the carcasses sold, i.e the commission costed 100.000 VND (~4.3 USD) per one hundred kilograms at the time of the survey, and this fee is charged on the revenue of CWs.

In this transaction, Dau provides a credit service through allowing PCW delayed payment for a short period (of usually one week); he ensures payment transfer to CWs immediately after closing the market session. This connects to the nature of the transactions downstream and help maintain fluid operations in the chain. As an illustration, a PCW declared that:

"Dau allows me to acquit in 5-7 days because I also let my customers delay in 3-5 days. The debt collected from customers will be used to pay Dau."

Further explanation is needed that delayed payment is often applied to long-term relationships through repeat transactions, as explained by Dau and the PCWs. In particular, PCWs have a close relationship with Dau because their kiosk is also located within the wholesale market area. This also meant that retailers who do not have a relationship with Dau cannot use this privilege.

Dau- A form of broker

From the above empirical analysis and findings, it can be regarded that Dau is a hybrid form of broker and commission agent. However, Dau should be concluded as a broker rather than a commission agent due to several key distinctions as captured in table 7 below. While both entities facilitate transactions, brokers typically do not directly represent either party, contrasting with commission agents who often represent the interests of one party exclusively. Indeed, when comparing with a commission agent, Dau lacks of some essential criteria such as "goods possession", "representation", and “price negotiation”. This lack of direct representation aligns more closely with the role of a broker, who acts as a middleman,

matching buyers with sellers without assuming fiduciary duties to either. Moreover, the compensation structure, based on a fixed commission earned from successful transactions, is a hallmark of brokerage rather than commission agency. In fact, Dau was earning a fixed compensation of approximately 4.3 USD per one hundred kilograms (at the time of the survey) charged on the revenue of CWs. This fee is not related to the price agreed in the transaction but corresponds to a fixed rate function of the volume traded.

Therefore, based on these characteristics, it is evident that Dau fits the profile of a broker rather than that of a commission agent.

Table 7. Dau characteristics against the proposed literature-based analytical differentiation between commission agent and broker

Characteristics	Commission agent	Broker
Representation	-	+
Goods possession	-	-
Services provided	+	+
Price negotiation	-	-
Market access	+	+
Insurance and credit facilitation	+	+
Compensation (Commission)	-	+

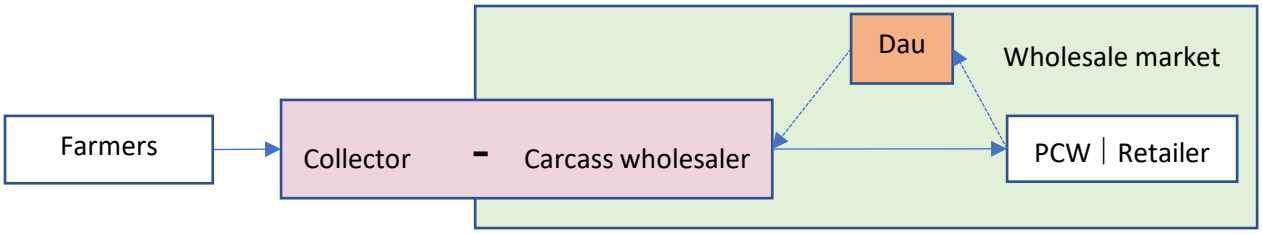
However, identifying the role of Dau is also more difficult when recently collected observations show that these actors themselves significantly change their behavior due to adverse events such as African Swine Fever and COVID-19. The adaptation of Dau will continue being analyzed in the next section.

ASF caused an event that forced many small farmers to stop operating and also caused many CWs to quit their profession. It must be reiterated that Dau's existence and operations are based on the relationship between CWs and PCWs/retailers. Therefore, CW's shutdown disrupted Dau's business activities. To deal with this, Dau received consignment goods from traders (who bought and traded pork from companies) to maintain his business. Therein, Dau took responsibility for finding outputs and negotiating the price with PCWs/retailers on behalf of traders. Thanks to taking the roles of CWs, Dau could increase their profit. This illuminates that disruptions in WS operations push Dau to take more functions on temporary possession of goods and selling. It illustrates how, in some cases, Dau can change flexibly to perform a commission agent's role.

Wholesale market resilience after crises disruption and upstream changes.

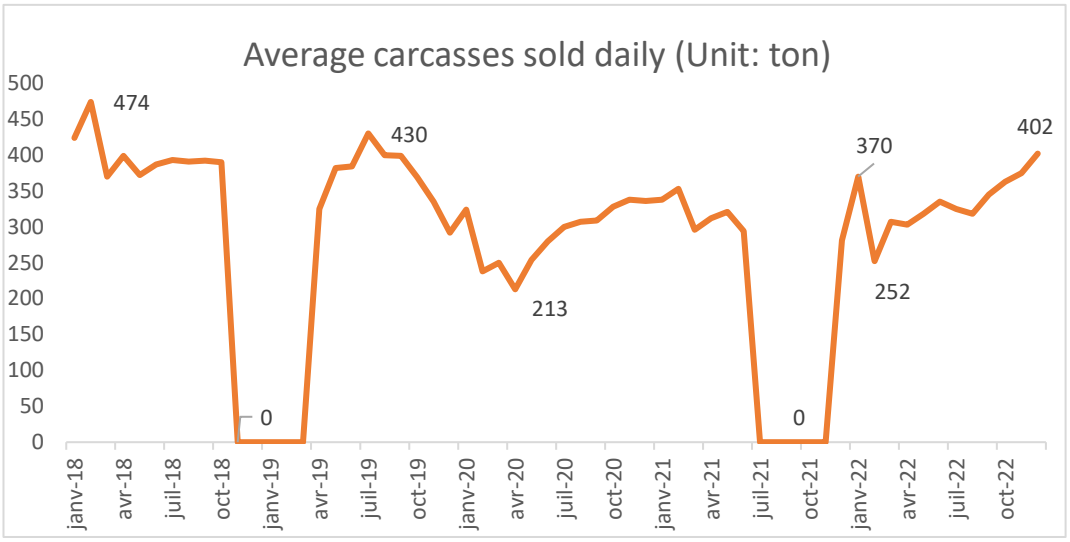
Before the outbreak of African swine fever, the pork value chain in the Southern region, particularly in the Southeast provinces where pork is predominantly consumed in HCMC, operated as shown in the figure 18 below. The primary source of pork came from small-scale farmers and was typically transported by traditional collectors to HCMC for slaughtering and selling at the wholesale market. According to insights gathered from interviews with collectors, approximately 70% of pork sold at wholesale markets originated from this process. Additionally, the Hoc Mon market served as a hub for significant collectors from Dong Nai who commonly procured pigs from local sources in Dong Nai and neighboring provinces, mainly from small-scale farmers. The rationale behind this preference lies in the diverse range of product sources available, affording collectors greater flexibility in selection and thereby enhancing their bargaining power.

Figure 18. The structure of wholesale market before the ASF



Wholesale markets were first forced to shut down from November 2018 to March 2019 due to supply shortages caused by ASF and then from July to December 2021 due to lockdown policies induced by COVID-19. ASF has caused a significant change in the wholesale market concerning input sources by suddenly eliminating the small farmers who account for about 80% of pig producers. On the contrary, industrial farms controlled by big livestock companies overcame the crisis and took advantage to dominate. This also benefited traders who had an agreement to buy pigs from those companies. Our survey results also confirm the outburst of livestock companies, which now supply more than 90% of the products in the Hoc Mon market, for instance, while this figure was estimated at 20-30% in the past few years (Source: an interview with Dau and WS). Typically, as shown in figure 19 below, while the ASF crisis period lasted until the end of 2020, the wholesale market could still operate at over 213 tons per day during 2020.

Figure 19. The structure of wholesale market before the ASF



Source: Department of Industry and Trade, HCMC

The term trader, used in this chapter, is used for a person who chooses to buy pig from companies instead of collecting it only from small farmers. The trader could be a traditional collector because the companies could sell their pigs to anyone who just needed to qualify for the condition of payment directly.

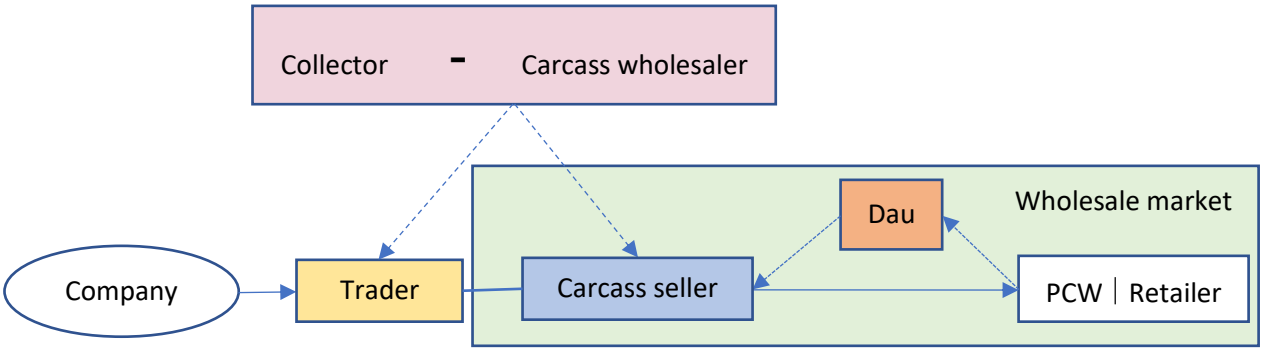
The quick response to input sources from upstream due to livestock companies and traders quickly restored the shortage in the wholesale market. This event partly reflects that although the value chain has witnessed a significant change upstream with massive restructuring in pig production and supply, the traditional market structure still remains mainly at the wholesale level.

Interestingly, although Dau still prioritizes maintaining their position at the middle and the function of providing support services rather than integrating other attributes which can make Dau become a commission agent. However, this study found a change in Dau's strategy. Firstly, our result recorded at the time of investigation (in 2023) show that 3 out of 15 Dau actors have shifted to actually change their business. One of them declared his work as follows:

"Instead of traders having to hire sellers at the market, I can play as a seller to help my business increase profits or at least to secure operations at my stall."

Upstream changes are also found in the classification/modification of the group of traders/collectors who have strong relationships with Dau (Figure 20). As mentioned above, collectors have also previously played as CWs in the value chain. ASF classified the roles of traders. This event caused some collectors to stop operating entirely or to shift partly to partner with livestock companies to act as traders. In the new linkage, traders are now only responsible for the link of goods flow between the livestock companies and the wholesale market. These traders also build on their connection with Dau actors to employ sellers who usually were the collectors but ran out of their businesses to take advantage of the sales experience and already built-in customer network of these collectors.

Figure 20. The structure of wholesale market after the ASF



This result brings to this study two insights. First, although ASF caused a chance for livestock companies to take advantage to dominate, the wholesale market is still a principal choice of distribution channel. Our results show that the livestock companies still sell the majority of pigs to traders to distribute at traditional markets (source: interview with livestock company's staff and the CWs). However, those companies are documented to distribute in modern channels such as supermarkets or chains of mini-stores. Secondly, ASF also induced a change even in part of the middle area by eliminating the participation of traditional collectors or specifying the role of the trader/collector, but Dau still plays a critical role in the connection between sellers and buyers in the wholesale market. In other words, the wholesale market, particularly the Hoc Mon market, and the actor Dau are still essential links in the case of the PVC in HCMC.

DISCUSSION

The link between the role of wholesale market and the role of Dau actor

The dynamics presented above helps enrich the literature on wholesale markets and provide concrete evidence about how these markets and actors operating on them concretely operate in ensuring fresh food supply in large urban settings in developing countries and how they have been evolving and adapting to the major recent crises. Constructing concentrated wholesale markets within metropolitan areas has been suggested as a viable strategy for enhancing food distribution by various international development agencies such as The World Bank and FAO, as underscored by Tollens (1997) and Yasmeen (2001). Numerous development economists have advocated for the establishment of these terminal wholesale markets in urban settings as a way to improve the efficiency of fresh food distribution in expanding urban centers. In practice, local authorities in HCMC have initiated projects aimed at constructing wholesale markets as a means to address perceived deficiencies in the traditional fresh produce marketing system. However, these endeavors have been formulated without consulting with key local stakeholders, including traders. Consequently, the formation of concentrated wholesale markets substantially impacts the operations of numerous stakeholders engaged in trade in different market premises (Cadilhon et al., 2003).

Acting as rules of the game, institution arrangements play as “coordinating mechanism” (Vargo & Lusch, 2016) to facilitate and limit the collaborative process of creating value by providing guidance on how resources can be combined and services can be exchanged among individuals or groups involved (Koskela-Huotari et al., 2016). In alignment with this point of view, the wholesale market is regarded as a platform that provides an infrastructural entity and a set of regulatory frames for transactions; this article sheds light on actual interactions among actors and an original contribution in characterizing the actor Dau in wholesale markets.

First, it is necessary to discuss the formation of wholesale markets, which have been created to meet, exchange, and even create new rules of the game for transactions. The pork wholesale markets were introduced in a context of small, informal transaction points growing larger under the pressure of increased consumer demand for this essential commodity in HCMC (M. L. Lapar, 2014). Originating from traditional collectors, the formation of Dau can

be explained as a way to bridge gaps in wholesale markets' capacity to aggregate and disseminate information, thereby facilitating large and centralized transactions. Chronologically, those actors formalized their role by shifting to operating as an enterprise providing support services under the recognition and permission of the government. This change has helped them build a solid position in a context of wholesale markets where CWs and PCWs/retailers have no engagement and all transactions are determined by prices.

Second, State intervention has facilitated the formation of concentrated wholesale markets. Precisely, the State recognizes Dau's activities as representing a distinct organization, creating a separate structure for the pork market and the value chain. Through this, the State is likely aiming at sharing some of its responsibilities, such as providing services to support trading activities and managing hygiene and safety issues. Importantly, State interventions have created regulatory barriers by limiting the number of Dau actors and challenging new entrants through complex licensing procedures or standards (Kovacic, 1992). Indeed, because the State controls the number of Dau, it allows Dau to gain exclusive advantages. Specifically, market premises were rented by the State to Dau over fifty years while all business activities were forced to be organized in wholesale markets under State control. This allows Dau to benefit from all transactional activities consistently. In other words, State protection has contributed significantly to creating an imperfect competitive environment regarding the services of facilitating the transactions and, at the same time, favored the Dau actors to consolidate their power.

Third, as evident from the result section, a high capital investment plays an essential role in forming and maintaining the position of Dau in the wholesale markets. Initially, Dau did not need huge capital to buy stalls. This came as an opportunity. Then, they built on it by filling specific roles that require capital investments; they maintained their position by providing a wide diversity of services, notably credit, which is particularly financially demanding. This aligns with the resource-based theory which implies that high financial resource can enable a firm to improve its market position (Hoopes et al., 2003). In fact, as a financial intermediary, it requires those actors to have a "huge treasury" to secure their partner operations and to balances the goods flow.

Dau favorings the process of brokerage

In agricultural economies, rural households often find themselves compelled to rely on their social networks and/or the sale of assets to cope with various unforeseen events (Minten et al., 2012). The absence of formal insurance mechanisms, in a context of high frequency of hazards, represent a serious burden on rural households; and those with access to informal insurance arrangements are much better equipped to effectively stabilize their livelihoods and consumption patterns, as illustrated, for instance, in the research by Rosenzweig & Wolpin (1993). Establishing personalized relationships with intermediaries that can grant these vulnerable actors access to informal credit and insurance networks and enhance their financial resilience in the face of unforeseen challenges therefore constitutes a valuable strategy when rural credit and insurance markets exhibit significant imperfections.

Furthermore, cash liquidity constitutes a particularly essential attribute in transactions in Vietnam, especially in agricultural commodities (cash-to-carry term). In this regard, the offering of credit facility by Dau is a critical feature of their role in the resilience of wholesale market operations and actors. Through bridging the gap between CW's need for liquidity to honor upstream transactions and PCW's demand for delayed payment, the credit service answers simultaneously two needs. On the one hand, the financial capacity that Dau provides helps collectors/traders sustain the connection with the upstream segment. Indeed, in both transacting with farmers or livestock companies, collectors or traders must pay cash immediately. The livestock companies even require traders to place orders in advance and request full payment even before receiving goods. Dau's participation, hence, helps CWs answering these requirements and thereby securing their relations with upstream actors. On the other hand, Dau credit service also helps maintain downstream stability. As an inherent attribute, the customers of PCW often ask for a delayed payment of about 3-5 days. Allowing downstream wholesalers or retailers to pay with a delay can help those stay afloat and smooth goods circulation. This result matches the explanation by Minten et al. (2012) that financial service is a significant reason to interpret the repeated exchange and personalized relationship. Therein, the repetition in business is also argued as a way of economizing the costs of establishing personal trust (Fafchamps, 2003). Therefore, the credit service helps the CWs/traders cycle their money continuously, supporting the resilience of upstream transactions and maintaining steady goods flow downstream. In other words, Dau's credit

service plays a significant role in the resilience of the actors of the pig value chain who operate through the wholesale markets.

Even though Dau does not actively seek out customers for CWs or introduce buyers and sellers to each other, their role in facilitating transactions by providing complementary services does not perfectly fit into any established transaction strategies like tertius gaudens or tertius iungens. However, it seems that Dau helps coordinate transactions between buyers and sellers by filling in the holes in the network, which is similar to the strategy of tertius gaudens. Accordingly, to respond to the financial gap in dynamic environments such as wholesale markets where transactions are not governed by contracts, providing financial services as a tool to balance interests can be seen as effective in coordinating the circulation of goods. In other words, Dau exploited the flaw in the credit structure to separate the continuity of cash flow to gain benefits from the transactional activities when the seller needed quick cash and the buyers requested delayed payment.

The asymmetry in the process of modernization

The results show that rapid adaptation helps the wholesale market maintain its position in the middle segment of pig value chain operations. However, this result also implies that modernizing the pork industry in Vietnam involved contradictory trends. As a shred of evidence, wholesale markets and Dau can be resilient and efficient in crossing over the serious shock caused by ASF. As shown previously, ASF caused the disappearance of small-scale farmers and their replacement by very large-scale, modern actors. As a result, some traditional actors in the PVC have to change their strategies to adapt to this new value chain environment. Therein, the case of traditional farmers and collectors is highlighted. Due to the impact of ASF, small farmers have been unable to supply pork, causing many traditional traders to cease their collecting activities. Despite this, it appears that the wholesale market and the Dau actor have not been significantly affected. This may be due to two main reasons: (1) Vietnamese consumers prefer traditional markets as their primary shopping destinations (Maruyama & Trung, 2007). Modern retail outlets in Vietnam have grown significantly and developed in a relatively short period. This is accompanied by higher investments in primary production that put lots of pressure on the tradition pig farming (Masayoshi et al., 2014). Despite that, traditional markets still outnumber them by a large margin (TRAN, 2023). (2)

Specific distribution mechanism with State participation. Ho Chi Minh City has implemented a strategy of constructing wholesale markets at key entry points near neighboring provinces, aiming to simplify the process of gathering and managing the quality of goods (Cadilhon et al., 2006). This approach has established a unique distribution channel that benefits certain players. For instance, in the pork industry, enforcing the rule that all suppliers must go through the wholesale market has enabled Dau to maintain its position and competitiveness despite significant changes in the supply chain over time.

CONCLUSION

This study explores a new actor and its activities in the Vietnamese pig value chain with a view to contribute to the limited literature on commission agents. The results of this study show that the Dau was formed as a new market operator initially in a context of sharp increase in demand for pork consumption and before centralized wholesale markets were established in the biggest Vietnamese cities like Ho Chi Minh City. To satisfy the needs of sellers and buyers, this category of Dau actors established as an intermediary specializing in providing services to facilitate marketing transactions, in which credit services play an essential role in maintaining the stability of the pig value chain.

By comparing with the essential characteristics drawn from the literature that define a broker, Dau can to a certain extent be considered under this category. However, this actor also has characteristics of commission agents; they can switch flexibly to play as commission agents. The operation of the Dau actor in the pig value chain also illustrates the diversity of agriculture and market linkages in developing countries.

This study highlights Dau's unique role in providing credit services. This role is vital to the stability of the chain, especially to actors playing in the middle area in the context that credit is figured out as being limited or loan amounts being insufficient (Duong et al., 2014). This study also found that State protection in considering wholesale markets as an official and obligated distribution channel favors Dau actors. Parallelly, a high financial capacity facilitates Dau actors in consolidating their power.

Partly due to budget and time limitation, this research was conducted mainly based on in-depth interviews. Further research using quantitative methods is recommended to further investigate the role of Dau actors as well as credit services in the pig value chain in Vietnam.

GENERAL CONCLUSION

The conclusion starts start with a summary of the main thesis results, followed by a presentation of the implications for policy and avenues for further research.

Summary of the main results

This thesis significantly advances our understanding of the intricate transition in the pig sector in Vietnam by delving into the interconnected dynamics of specific components of the food system, meticulously mapping the overarching transformation, intertwining macro-level global and national contexts with micro-level situations. Moreover, it comprehensively analyzes cross-level transition dynamics in food systems, and provides a holistic understanding of changes within the sector.

A key focal point of this thesis is examining the upgrading of coordination through contract farming and mega farms. Through this lens, the research documents the magnitude of consolidation, centralization and integration in the value chain. It clarifies the factors that influence the rapid expansion of private corporations and mega farms from the upstream side in response to the sanitary crisis and associated financial challenges.

In a noteworthy departure from conventional value chain studies, this research introduces the role of a key actor, named *Dau*, whose significance has been largely overlooked in previous analyses. *Dau* operates in the "hidden middle," a zone to which researchers have limited access, and the inclusion of this actor broadens our understanding of activities in the middle segments of the chain. Further, the study accounts for the past dynamics, power structures, and socio-cultural dimensions associated with *Dau*, thereby contributing to existing literature.

An additional contribution to the literature is bringing to the fore the pivotal role of the wholesale market, which qualifies the extent of vertical integration across the entire value chain.

The main findings of this research, described in detail in each chapter, are presented below.

Chapter 1 applied a sociotechnical transition framework to dissect the intricate evolution of Vietnam's pig sector. The findings reveal a transformative trajectory unfolding across discernible stages, each characterized by distinct socio-technical regimes and catalyzed by a confluence of global, national, and local factors. Beyond the chronological stages, a cross-

cutting theme in this trajectory is the intricate linkages between sociotechnical regimes, with each phase marked by its own set of challenges and opportunities.

The first investigation concerned the consequences of the disintegration of the collectivist regime in the late 1980s leading to the dominance of the smallholder sociotechnical regime in the 1990s. This tumultuous period not only prompted a rapid shift to a smallholder regime but also created an innovation niche for private smallholders. The ensuing economic reform, underscored by a series of policy changes that recognized family farming as the primary agricultural production model and enacted land laws, positioned Vietnam to tackle primary challenges, i.e. access to land, and overcoming poverty.

Central to the transition has been the role of institutions and policies, with the land issue emerging as a linchpin. The intertwining of economic, environmental, and urban planning policies further shaped the utilization of this critical resource. Indeed, land control was considered a privileged State tool in the socio-technical landscape. The recognition of the family farm as the primary economic unit, coupled with land reforms, not only dismantled a historical bottleneck but set the stage for growth of diversified farming systems and the incremental emergence of larger farms.

Despite problems accessing financial and technological resources, smallholders found a window of opportunity in the changing global interactions, particularly with the normalization of relations with the West. Facilitated by supportive policies, the groundwork was laid for a new era characterized by consolidation, specialization, and organizational metamorphosis. This era witnessed shifts in - and the convergence of - international cooperation, and the enactment of supportive policies like the Law on Private Enterprise and the Law on Foreign Investment, which propelled agricultural industrialization forward. Indeed, the event of normalization with the US in 1995 and Vietnam's participation in international organizations, such as ASEAN or WTO, helped integrate Vietnam into the global economy. With the participation of FDI, contract farming emerged as an innovation niche during this stage. It laid the foundation for the establishment of large-scale farms and modern livestock production.

The second stage, characterized by the emergence of mega farms as the dominant sociotechnical regime in the post-2008 period, involved not only a change in scale but the profound restructuring of the entire value chain. A trio of crucial elements instigated this

transformation: the global food crisis of 2008-09, which triggered a change in investment trends, a surge in technical innovations facilitated by digital technologies, and a new industrial context characterized by concentration and internationalization. The State played a vital role during this stage by promulgating policies to foster agricultural industrialization and modernization, thereby facilitating the integration and concentration of livestock production.

Foreign direct investment emerged as a transformative force, catalyzing shifts in production relationships and the adoption of technologies. This chapter unveiled the role of FDI, not merely as an economic stimulant but also as a conduit for spillover effects. The participation of FDI benefited domestic firms by facilitating the transfer of technology and business know-how resulting in productivity gains and competitiveness and by enhancing competition, thereby forcing local firms to imitate and innovate. On the other hand, the involvement of foreign companies, particularly in contract farming and mega-farm models, drove the consolidation process and its links with value chain integration. In the case of Vietnamese pig industry, the presence of foreign companies has profoundly impacted the production relationship. The entry of feed companies contributed significantly to the change in pig feed from the use of traditional to industrial feeds, the use of exotic breeds resulting in higher productivity, the use of veterinary products, new farming techniques, and science and technology applied in the farming system. These changes resulted in higher scale, and performance, but also the risk the exclusion of small farmers.

The third stage, the disease crisis, notably that of African swine fever, has had a significant impact on the pig industry, leading to a sharp decrease in the domestic livestock industry. In response to these challenges, the mega-farm model, supported by foreign direct investment (FDI) and local investors, has emerged as a dominant force. Leveraging high biosecurity procedures, these mega farms are expanding in both number and scale, helping consolidate the industry but also increasing the risk of eliminating smaller farms.

The major crisis induced by African swine fever in 2019 acted as a catalyst, and had substantial economic consequences that reshaped the pig sector. This crisis not only reduced the number of small farmers but also significantly boosted contract farming, which was previously confined to a niche. Indeed, Vietnam experienced a reduction of approximately one fourth in the number of pigs. The repercussions have been particularly severe for small-medium size

farms, around 80% of which were forced to cease operations. Conglomerate mergers, predominantly led by large companies, further bolstered vertical coordination in the pig sector.

While creating a diversified production landscape, the coexistence of smallholder and mega-farms also introduced new dynamics of power and resource distribution. Coupled with conglomerate mergers, the ability of mega-farms to survive animal crises, amplifies the challenges faced by small and medium-scale farmers.

In general, this chapter conducts a comprehensive examination delves into the intricate circumstances of changes in Vietnam's pig industry. The interplay of sociotechnical regimes, institutional dynamics, global events, and the strategic influence of foreign investment jointly shape a trajectory of resilience, adaptation, and restructuring. After emerging as private family farms after the disintegration of the "collectivist" regime during stage 1, smallholders were empowered and dominant during stage 2 despite facing huge competition and changes in market dynamics, some small-scale farmers have been able to maintain their position in the business by leveraging their intimate knowledge of local conditions and resources. What is more, they have generations of experience in the area backing them up, and enabling them to adapt traditional farming techniques to face modern challenges. Indeed, through contract farming, farmers have shown their adaptability by collaborating with FDI companies, which also diversifies the production system, while allowing small farmers to access new markets, technologies, and capital. By partnering with FDI entities, small farmers can benefit from economies of scale, access advanced agricultural inputs, and guarantee markets for their produce. Such collaboration allows them to remain competitive but independent and to retain ownership of their land and production processes. Although today (stage 3) there is a decrease in the number and relative importance of small-scale farmers, this group still manages to remain in business, particularly by focusing on specialty products and local breeds.

In the face of intensive production requirements, resource optimization, and environmental issues, strategies for upgrading integration to higher levels have encouraged cooperation between FDI and Vietnamese companies. Mega farms are established under the flexible

transfer of ownership. This helps integration without requiring mergers, thereby enabling corporations to maximize their business while diversifying the integration structure.

With a variety of stakeholders simultaneously present in the sector, one could contend that the transition gives rise to parallel and occasionally interconnected trajectories—or, in other words, the overlapping of multiple regimes, as argued by Duteurtre et al. (2021).

Chapter 2 explored the profound changes in the integration strategy between large FDI and domestic corporations in terms of enhancing the level of consolidation and upscaling, including biosecurity measures challenged by financial issues. The chapter aimed to test the research hypothesis that disease outbreaks in pig value chains create a high degree of uncertainty around the business, require specific investment in biosecurity measures and new technical expertise. These increase the degree of vertical integration in pig chains, in the form of contracts or salaried labor that reduce small farmers' autonomy and may exclude them from value chains.

The hypothesis was confirmed including the constraints faced by small and medium-scale farmers, and emphasizing the transformative era of intensified production in the livestock industry. African swine fever was identified as the most influential risk affecting farmers' performance at any scale, as the disease partially alters the structure of the pig value chain However, despite its detrimental effects, African swine fever is also seen as a catalyst for investment, disease prevention, and accelerating modernization of the value chain.

Termed "game-changing shift," this disease outbreak has led to the displacement of small-scale farmers in favor of more significant and modern actors. In fact, African swine fever meant around fourth-fifth of producers (mostly small- and medium-scale producers) had to stop operating due to epidemiological problems and the scarcity of breeders.

By examining the response to ASF in the form of significant investments in infrastructure, personnel, and biosecurity measures, this chapter also demonstrates how both contract farming (CF) and mega-farm models take advantage of disease prevention to maintain and even expand their position. The results showed that while the number of non-contract farms declined by about 50% in 2019 and by up to 74% in 2022 compared to 2018, contract farming between feeding companies and large-scale farmers (>300 heads) actually expanded during the ASF crisis. Even more impressively, mega farms also expanded during the African swine

fever pandemic. The number of mega farms in Binh Phuoc province increased by 51% between 2018 and 2021.

Although the contract farming model has proved its efficacy in disease prevention and in maintaining stable production systems, inherent limitations and risks persist. Contract farming models, acting as a coordination mechanism between feed companies and small-scale farmers, showcase a hybrid approach that allows companies to achieve control akin to vertical integration while retaining flexibility. However, it comes together with farmers' weak bargaining positions.

To sum up, the mega farm model reflects an upgrade to a higher level of vertical coordination, supporting a broader trend of modernization in the livestock industry. Companies, especially the FDI, pursue the highest form of vertical integration by expanding mega farms, which remove farmers from the model and eliminate potential opportunistic behaviors while potentially reducing contract farming models.

Chapter 3 focused on a unique actor (termed *Dau*) who functions as an intermediary in the pig value chain. An institutional and historical approach was combined with in-depth interviews. The *Dau* appeared in response to the market circumstance in the 1990s, highlighted by the absence of centralized wholesale markets in Ho Chi Minh City, when operations were primarily based on spontaneous bilateral transactions. The genesis of this unique actor named "*Dau*" is rooted in the need for a bridge to cross the transactional gap faced by participants in the wholesale market. Since *Dau* emerged from among those who collected live pigs from Dong Nai province and transported them to Ho Chi Minh City for sale, he recognized that transactions and associated services lacked efficient payment opportunities and faced processing service issues. *Dau* stepped in as an intermediary to bridge the gap between buyers and sellers, specializing in providing complementary services, including transportation and processing. *Dau* introduced a unique dimension by taking responsibility for providing financial support for wholesalers. This distinctive attribute distinguishes *Dau* from conventional commission agents described in the literature on agricultural markets.

While *Dau* does not actively seek out customers or introduce buyers and sellers, his role in facilitating transactions resembles a strategic orientation known as tertius gaudens brokerage

in the literature on management. By coordinating transactions and providing financial services, *Dau* fills gaps in the network, ensuring the continuity of cash flow. In essence, *Dau's* credit service not only facilitates the continuous circulation of money for collectors/traders in the upstream segments of the chain but also ensures a steady flow of goods downstream, hence, highlighting the pivotal role of *Dau's* credit services in stabilizing the overall operation of the pig value chain. On the one hand, one of *Dau's* primary functions is to act as a financial middleman, providing credit facilities that allow the postponement of payments for wholesalers and retailers of pork cuts, thereby ensuring the seamless flow of goods. This financial support is instrumental in overcoming the cash liquidity challenges inherent in Vietnamese agricultural transactions. On the other hand, *Dau's* financial guarantee is instrumental for collectors/traders, connecting the upstream (production areas) with the middle segment (wholesale markets) and thereby keeping the stabilization for the upstream side.

By comparing the essential attributes reviewed in the literature, *Dau* can be considered as a commission agent. However, the lack of temporary possession of the commodity as an attribute makes this actor a particular case.

As a major challenge to the production sector, African swine fever helped reshape the structure of pig production by eliminating the dominance of small farmers, but did not alter the structure of the middle segments. While small-scale farmers faced the challenge of supplying pork thus creating disruptions for traditional collectors, *Dau*, with his unique financial model, was still resilient.

Chapter 3 also helped document the role of traditional wholesale markets, which continue to play an essential role in the agricultural market in general and in the pork market in particular. Although many recent studies have shown that vertical integration is taking place with the involvement of FDI companies through conglomeration or mergers and acquisitions, the market still primarily depends on traditional distribution channels. The results showed that African swine fever contributed to the major changes in inputs to the market that changed the proportion of meat supplied by livestock companies that increased from about 30% to 90% (estimated from interviews with market actors). While traditional collectors had to

rapidly adapt their business in response to the pandemic, *Dau* had no reason to alter his activities.

This chapter also elucidated the role of government intervention in shaping value chains. The State's recognition of *Dau's* activities as a distinct organization contributed to the concentration of the *Dau's* power in the wholesale market. By creating a distinct structure for the pork market and value chain, the State aimed to share responsibilities, such as managing hygiene and safety issues and supporting trading activities, with private actors. State interventions limited the number of *Dau* entities, created regulatory barriers that challenge new entrants but consolidate the power of existing *Dau*.

Policy implications

The findings and implications discussed above allow me to formulate some policy recommendations to inform the design of national tools for promoting stable value chains in the agriculture and forestry sectors in Vietnam in general.

Analysis of the cross-level transition dynamics in food systems, revealed different strategies and struggles and identified coordination mechanisms for co-building safe, nutritious, and sustainable food systems. Economically, policymakers should reinforce initiatives that support smallholder farmers, recognizing their pivotal role in ensuring rural livelihoods and addressing poverty. Tailored financial and technological support programs for small and medium-scale pig farmers to help them better adapt to sanitary crises are essential to foster their resilience and competitiveness. Additionally, policies that promote the diversification of production models are crucial to prevent overreliance on mega farms, and to enable a balanced and sustainable industry. In fact, decision No. 50/2014/QD-TTg, which subsidizes small farmers to enable them to improve animal husbandry in terms of artificial insemination, breeds, and the treatment of livestock waste to improve livestock farming efficiency and environmental protection, should be extended. This regulation would also help small-scale farmers recover efficiently after a sanitary crisis, such as that caused by African swine fever. Encouraging the coexistence of smallholders and mega farms and acknowledging the strengths and vulnerabilities of each is vital to ensure a diverse and adaptable agricultural landscape. Further, to enhance productivity and efficiency, policies should prioritize technological innovation across all scales of production.

Social policy measures should be geared towards protecting the livelihoods of small-scale farmers during industrial transitions. This includes the development of robust social safety nets during crises exemplified by the outbreak of African swine fever. Addressing restrictions that hinder smallholder access to financial and technological resources is imperative to foster inclusivity and equitable growth in the pig industry.

The industrialization of pig chains indeed poses a number of social and environmental issues like those in China, according to Schneider (2017), who termed rural areas as sinks for offloading capitalist crises. Industrial livestock operations contaminate rural waterways with manure and are part of a system that "wastes" rural areas in the service of capital. Environmental considerations necessitate policies that encourage the adoption of sustainable and environmentally friendly practices in pig farming. Incentives for implementing eco-friendly techniques and waste management systems are crucial for promoting long-term ecological sustainability.

Regarding conflict management, regulatory frameworks are urgently required to ensure fair practices in contract farming. Mitigating the risks associated with opportunism and market imperfections through clearly defined and transparent contracts is essential to foster stakeholder trust. Community engagement in decision-making processes related to pig farming is crucial to address conflicts and concerns effectively.

In response to the African swine fever crisis, policies should focus on disease prevention measures and establish financial support mechanisms for affected farmers. Investments in biosecurity infrastructure and the provision of support to enable smallholders to adopt disease prevention measures are paramount to mitigate the impact of such outbreaks.

The concentration of the wholesale market allows the government to control how stakeholders operate, but existing markets lack organizational experience (J. J. Cadilhon et al., 2003). Hence, policies should ensure that stakeholder consultation is considered carefully for the following wholesale markets and effective regulatory oversight to reduce market imperfections. Moreover, as a rental contract can last as long as 50 years, it can cause the obsolescence of old commitment conditions or make it difficult for new policies to emerge; in particular, it creates favorable conditions for some actors, such as *Dau*, to gain more power than others.

Credit services and stability in the pig value chain require policies that promote financial inclusion for all actors, from smallholders to intermediaries.

Research limitations

The research presented in the three chapters provides valuable insights into the changes in and/or permanence of the Vietnamese pig value chain. However, several limitations need to be mentioned, along with the avenues for further investigation that emerged from the discussions and conclusions. Firstly, the geographical scope of the study was limited to southern regions of Vietnam. While the findings are instructive for this specific context, extrapolating them to other regions of Vietnam or similar agricultural settings calls for caution. Comparative analyses are required across diverse regions to confirm the trends identified can be generalized. Additionally, socio-technical transitions with a multi-level perspective framework have been subject to criticism. Schmitt et al. (2023) argue that the MLP framework oversimplifies complex socio-technical systems by presenting transitions as linear processes with distinct phases (niches, regimes, and landscapes) because transitions are often messy, non-linear, and involve multiple feedback loops and interactions between different levels. Ulli-Beer et al. (2011) argue that the MLP framework tends to portray socio-technical systems as static entities with clearly delineated boundaries between niches, regimes, and landscapes. In practice, socio-technical systems are dynamic and constantly evolving, with actors at different levels adapting and responding to changes over time. Hence, in future studies, it may be necessary to use other frameworks, such as the socio-technical systems framework or the social change model, which provides a structured approach to understanding how social issues evolve over time and how they impact individuals, communities, and societies (Riera, 2009; Wagner, 1996), to enable comparisons that render the context of transformation more transparent. Future research could explore the practices and perceptions of sustainability transitions at specific levels to examine the motivations for and the consequences of this transition. Moreover, this study mainly focused on the upstream and midstream segments of the pig value chain, neglecting downstream actors such as retailers and consumers. Cultural and social dimensions, including consumer preferences, are only briefly mentioned in this thesis. The study started from the assumption that traditional retailers dominate Vietnam's food retail landscape, accounting for 94% of sales (USDA 2017), and that the shopping habits of Vietnamese are still mainly found in this channel, while the

growing demand for food safety, the development of supermarkets, and how it influences the chain remain unexplored. A more comprehensive exploration of how cultural practices and societal norms shape consumer behavior and affect the functioning of the value chain is now needed for a more holistic understanding.

The methodological approach used relied heavily on qualitative data obtained through in-depth interviews. While qualitative insights offer rich contextual information, the study would now benefit from quantitative methods to validate and quantify the observed patterns and impacts. This methodological diversification would enhance the robustness and replicability of the research. However, it should also be borne in mind that information concerning companies and *Dau*, is hard to acquire, which limits the feasibility of a quantitative survey of these particular stakeholders.

Temporal considerations also merit attention. The study covers a substantial period, yet the dynamic nature of the pig sector suggests that further changes are likely. The choice of the periods used in this study was based on significant events that have been extensively analyzed in the literature. Choosing different periods could lead to different perspectives and analyses.

A longitudinal approach could provide a more nuanced understanding of transformations over time. Global events and external factors, such as the global food crisis in 2008-09 and the African swine fever pandemic in 2019, are acknowledged in the study. However, a more in-depth exploration of the global context and its impact on the pig sector in Vietnam is warranted. This should include an examination of international events, trade policies, and global market trends. Furthermore, while government policies are recognized as being influential, further research could investigate the specific details and impacts of different policies on the pig value chain in Vietnam. An in-depth analysis of policy implementation and enforcement at various administrative levels would provide a more detailed understanding of the government's role.

Lastly, the study introduces a unique actor, *Dau*, as a broker in the pig value chain, offering critical insights into the formation and operational role of this particular actor. However, the exploration of *Dau's* attributes identified specific limitations that underscore the need for more in-depth investigation of the distinctive middle area of the value chain. Firstly, the study characterizes *Dau* as a broker yet highlights at least one deviation from the typical attributes

associated with commission agents. Unlike conventional agents who temporarily possess and sell commodities, *Dau* appears to function differently in prioritizing financial support for wholesalers over direct involvement in the possession and sale of goods. This departure from the traditional role of a commission agent warrants more nuanced elucidation of the intricacies of *Dau's* functions and its impact on the overall dynamics of the pig value chain. Furthermore, the study acknowledges the importance of *Dau's* capital investment in facilities, equipment, and workers. The high capital requirements for participation in the market are emphasized, suggesting that *Dau's* role extends beyond mere facilitation. A more comprehensive investigation of *Dau's* financial structures, investment strategies, and risk management mechanisms is essential for a holistic understanding of the contribution of this role to the stability and functioning of the pig value chain.

REFERENCES

Abenoja, Z. R. R., & Lapid, D. A. (1991). Barriers to entry, market concentration, and wages in the Philippine manufacturing sector, 1987. *Philippine Review of Economics*, *28*(2).

Akram-Lodhi, A. H. (2004). Are 'Landlords Taking Back the Land'? An Essay on the Agrarian Transition in Vietnam. *The European Journal of Development Research*, *16*(4), 757–789. https://doi.org/10.1080/09578810412331332622

Akter, S., Jabbar, M., & Ehui, S. (2003). *Competitiveness and efficiency in poultry and pig production in Vietnam.*

Aldaba R. M., A. F. T. (2012). Does FDI Have Positive Spillover Effects?: The Case of the Philippine Manufacturing Industry. *ARTNeT Conference on Empirical and Policy Issues of Integration in Asia and the Pacific*.

Alvarez, I., & Marin, R. (2013). FDI and Technology as Levering Factors of Competitiveness in Developing Countries. *Journal of International Management*, *19*(3), 232–246. https://doi.org/10.1016/j.intman.2013.02.005

Anseeuw, W., & Ducastel, A. (2013). *Production grabbing: New investors and investment models in agriculture*. https://doi.org/http://dx.doi.org/10.3280/QU2013-002002

Antwi, M., & Seahlodi, P. (2011). Marketing Constraints Facing Emerging Small-Scale Pig Farmers in Gauteng Province, South Africa. *Journal of Human Ecology*, *36*(1), 37–42. https://doi.org/10.1080/09709274.2011.11906415

Argyres, N. (1996). Evidence on the role of firm capabilities in vertical integration decisions. *Strategic Management Journal*, *17*(2), 129–150. https://doi.org/10.1002/(SICI)1097-0266(199602)17:2<129::AID-SMJ798>3.0.CO;2-H

Arya, A., Löffler, C., Mittendorf, B., & Pfeiffer, T. (2015). The middleman as a panacea for supply chain coordination problems. *European Journal of Operational Research*, *240*(2), 393–400. https://doi.org/10.1016/j.ejor.2014.07.007

Athukorala, P., & Yamashita, N. (2006). Production fragmentation and trade integration: East Asia in a global context. *The North American Journal of Economics and Finance*, *17*(3), 233–256. https://doi.org/10.1016/j.najef.2006.07.002

Bardhan, P. (1991). On The Concept of Power in Economics. *Economics & Politics*, *3*(3), 265–277. https://doi.org/10.1111/j.1468-0343.1991.tb00050.x

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, *17*(1), 99–120. https://doi.org/10.1177/014920639101700108

Baumann, J. U. (2022). *Vertical differentiation in two-sided markets: an analysis along German personal transport intermediation*.

Baum, M. A. (2020). *Vietnam's development success story and the unfinished SDG agenda*. International Monetary Fund.

Biglaiser, G. (1993). Middlemen as experts. *The RAND Journal of Economics*, 212–223.

Bijman, J. (2008). *Contract farming in developing countries: an overview*. Wageningen University, Department of Business Administration.

Bloom, N. (2014). Fluctuations in Uncertainty. *Journal of Economic Perspectives*, *28*(2), 153–176. https://doi.org/10.1257/jep.28.2.153

Bui, N., & Gilleski, S. (2020). *Vietnam African Swine Fever Update*. https://www.fas.usda.gov/data/vietnam-vietnam-african-swine-fever-update-1

Byrne, M. M. (2001). Understanding life experiences through a phenomenological approach to research. *AORN Journal*, *73*(4), 830.

Cadilhon, J. J., Fearne, A. P., Moustier, P., & Poole, N. D. (2003). Modelling vegetable marketing systems in South East Asia: Phenomenological insights from Vietnam. In *Supply Chain Management* (Vol. 8, Issue 5, pp. 427–441). https://doi.org/10.1108/13598540310500268

Cadilhon, J.-J., Moustier, P., Poole, N. D., Tam, P. T. G., & Fearne, A. P. (2006). Traditional vs. Modern Food Systems? Insights from Vegetable Supply Chains to Ho Chi Minh City (Vietnam). *Development Policy Review*, *24*(1), 31–49. https://doi.org/10.1111/j.1467-7679.2006.00312.x

Caron, P., Ferrero y de Loma-Osorio, G., Nabarro, D., Hainzelin, E., Guillou, M., Andersen, I., Arnold, T., Astralaga, M., Beukeboom, M., Bickersteth, S., Bwalya, M., Caballero, P., Campbell, B. M., Divine, N., Fan, S., Frick, M., Friis, A., Gallagher, M., Halkin, J.-P., … Verburg, G. (2018). Food systems for sustainable development: proposals for a profound four-part transformation. *Agronomy for Sustainable Development*, *38*(4), 41. https://doi.org/10.1007/s13593-018-0519-1

Celine, B., Dubois, P., & Villas-Boas, S. B. (2009). *Empirical Evidence on the Role of Non Linear Wholesale Pricing and Vertical Restraints on Cost Pass-Through*.

Cesaro, J.-D., Duteurtre, G., & Nguyen, M. H. (2019). Atlas of Livestock Transitions in Vietnam: 1986-2016. *Hanoï : IPSARD-CIRAD*.

Chamberlain, W. O., & Anseeuw, W. (2017). Contract Farming as Part of a Multi-Instrument Inclusive Business Structure: A Theoretical Analysis. *Agrekon*, *56*(2), 158–172. https://doi.org/10.1080/03031853.2017.1297725

Charlebois, S. (2009). Wholesaling, the role of the middleman and marketing costs: some forgotten concepts in marketing thought. *Journal of Management Research*, *1*(2). https://doi.org/10.5296/jmr.v1i2.114

Choi, T. Y., & Krause, D. R. (2006). The supply base and its complexity: Implications for transaction costs, risks, responsiveness, and innovation. *Journal of Operations Management*, *24*(5), 637–652. https://doi.org/10.1016/j.jom.2005.07.002

Cook, M. L., & Chaddad, F. R. (2000). Agroindustrialization of the global agrifood economy: bridging development economics and agribusiness research. *Agricultural Economics*, *23*(3), 207–218.

Costales, A., Son, N. T., Lapar, M. L., & Tioncgo, M. (2008). *Determinants of Participation in Contract Farming in Pig Production in Northern Viet Nam*.

Crane, L., Gantz, G., & Isaacs, S. I. (2013). *Introduction to risk management*. Extension Risk management education and risk management agency.

Crawford, G. S., Pavanini, N., & Schivardi, F. (2018). Asymmetric Information and Imperfect Competition in Lending Markets. *American Economic Review*, *108*(7), 1659–1701. https://doi.org/10.1257/aer.20150487

Dabholkar, P. A., Johnston, W. J., & Cathey, A. S. (1994). The dynamics of long-term business-to-business exchange relationships. *Journal of the Academy of Marketing Science*, *22*, 130–145.

da Silva, C. A., & Ranking, M. (2013). *Contract farming for inclusive market access.* Food and Agriculture Organization of the United Nations (FAO).

Decision N. 2449/QĐ-UB. (2003). *On The Issuance Of Policy Applicable To Enterprises And Individual Business Households That Have To Remove From 10 Inner City Agricultural Products Markets To Do Business At Three Agricultural Products And Food Wholesale Markets In Hoc Mon District, Thu Duc District, And District 8.*

Department of Animal Health, H. (2008). *Business performance at two wholesale markets: Binh Dien and Tan Xuan*. http://chicuccntyhcm.gov.vn/new/2008/05/23/Tinh-hinh-hoat-dong-kinh-doanh-tai-2-cho-dau-moi-Binh-Dien-va-Tan-Xuan.aspx

De Silva, H., & Ratnadiwakara, D. (2008). Using ICT to reduce transaction costs in agriculture through better communication: A case-study from Sri Lanka. *LIRNEasia, Colombo, Sri Lanka, Nov*.

Doan, X. T. (2021). Changes and adaptations of Vietnam's swine industry after African Swine Fever & in the context of the COVID-19 pandemic. *Vietnam Livestock Magazine*.

Do, H. (2006). "White night in the pork wholesale market." *Https://Cand.Com.vn/Phong-Su-Tu-Lieu/Dem-Trang-o-Cho-Thit-Heo-I30458/*.

Dong, D. D., Moritaka, M., Liu, R., & Fukuda, S. (2020). Restructuring toward a modernized agro-food value chain through vertical integration and contract farming: the swine-to-pork industry in Vietnam. *Journal of Agribusiness in Developing and Emerging Economies*, *10*(5), 493–510. https://doi.org/10.1108/JADEE-07-2019-0097

Dong, D., Moritaka, M., Liu, R., & Fukuda, S. (2019). A Study on Risk–Sharing Scheme of Formal Contract Agreements in Swine Industry in Vietnam. *Journal of the Faculty of Agriculture, Kyushu University*, *64*(2), 395–405. https://doi.org/10.5109/2339034

Dries, L., & Swinnen, J. (2004). Foreign Direct Investment, Vertical Integration, and Local Suppliers: Evidence from the Polish Dairy Sector. *World Development*, *32*, 1525–1544. https://doi.org/10.1016/j.worlddev.2004.05.004

Dunning, J. H. (2002). *Global capitalism, FDI and competitiveness* (Vol. 2). Edward Elgar Publishing.

Duong, N. N. T., Huyen, N. T. T., Van Hung, P., Ha, D. N., Van Long, T., Be, D. T., Unger, F., & Lapar, M. L. (2015). *Household pork consumption behaviour in Vietnam: Implications for pro-smallholder pig value chain upgrading*.

Duong, N. N. T., Ninh, H. N., Hung, P. Van, & Lapar, Ma. L. (2014). *Smallholder pig value chain development in Vietnam: Situation analysis and trends*. https://hdl.handle.net/10568/53935

Duteurtre, G., Pannier, E., Hostiou, N., Nguyen, M. H., Cesaro, J.-D., Pham, D. K., & Bonnet, P. (2021). Economic Reforms and the Rise of Milk Mega Farms in Vietnam: Governing the Post-socialist Transition. *The European Journal of Development Research*. https://doi.org/10.1057/s41287-021-00456-3

Dzung, N. M., & TuLiem, T. P. (2015). Pig production and marketing in Vietnam. *National Institute of Animal Science: Hanoi, Viet Nam*.

Eaton, C., & Shepherd, A. (2001). *Contract farming: partnerships for growth* (Issue 145). Food & Agriculture Org.

Ebata, A. (2022). Social embeddedness of pig value chains in Myanmar and its implications for food and nutrition security. *Food Security*, *14*(4), 965–976. https://doi.org/10.1007/s12571-022-01278-9

Fafchamps, M. (2003). *Market institutions in sub-Saharan Africa: Theory and evidence*. MIT press.

FAO. (2022). *The State of Agricultural Commodity Markets 2022*. https://www.fao.org/3/cc0471en/online/state-of-agricultural-commodity-markets/2022/food-agricultural-trade-globalization.html

FAOSTAT. (2022). Statistics of the Food and Agriculture Organization of the United Nations. In *In Food and Agriculture Organization of the United Nations.* https://www.fao.org/faostat/en/#data

Fazzari, S., Hubbard, R. G., & Petersen, B. (1988). Investment, financing decisions, and tax policy. *The American Economic Review*, *78*(2), 200–205.

Fuentes, G. A. (1998). Middlemen and agents in the procurement of paddy: Institutional arrangements from the rural Philippines. *Journal of Asian Economics*, *9*(2), 307–331. https://doi.org/10.1016/S1049-0078(99)80086-4

Gable, M., Topol, M. T., Mathis, S., & Fisher, M. E. (1995). Entry barriers in retailing. *Journal of Retailing and Consumer Services*, *2*(4), 211–221.

Gabre-Madhin, E. (2001). The role of intermediaries in enhancing market efficiency in the Ethiopian grain market. *Agricultural Economics*, *25*(2–3), 311–320. https://doi.org/10.1016/S0169-5150(01)00088-3

Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research Policy*, *31*(8–9), 1257–1274. https://doi.org/10.1016/S0048-7333(02)00062-8

Geels, F. W. (2004). From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory. *Research Policy*, *33*(6–7), 897–920. https://doi.org/10.1016/J.RESPOL.2004.01.015

Geels, F. W. (2011). The multi-level perspective on sustainability transitions: Responses to seven criticisms. *Environmental Innovation and Societal Transitions*, *1*(1), 24–40. https://doi.org/10.1016/J.EIST.2011.02.002

Geels, F. W. (2019). Socio-technical transitions to sustainability: a review of criticisms and elaborations of the Multi-Level Perspective. *Current Opinion in Environmental Sustainability*, *39*, 187–201. https://doi.org/10.1016/J.COSUST.2019.06.009

Geels, F. W., & Schot, J. (2007). Typology of sociotechnical transition pathways. *Research Policy*, *36*(3), 399–417. https://doi.org/10.1016/J.RESPOL.2007.01.003

Gerber, J., Turner, S., & Milgram, B. L. (2014). Food Provisioning and Wholesale Agricultural Commodity Chains in Northern Vietnam. *Human Organization*, *73*(1), 50–61. http://www.jstor.org/stable/44148738

Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of global value chains. *Review of International Political Economy*, *12*(1), 78–104. https://doi.org/10.1080/09692290500049805

Ghadami, M., & Jebelli, A. R. (2017). Comparison of Brokerage and Commission in Iranian Commercial Law. *Journal of History Culture and Art Research*, *6*(1), 257. https://doi.org/10.7596/taksad.v6i1.740

Gill, A. (1996). Interlinked agrarian credit markets in Punjab: exploitative, yet growing. *Economic and Political Weekly*, 586–588.

Glover, D. J. (1987). Increasing the benefits to smallholders from contract farming: Problems for farmers' organizations and policy makers. *World Development*, *15*(4), 441–448. https://doi.org/10.1016/0305-750X(87)90112-4

Gu, B., & Hitt, L. (2001). Transaction costs and market efficiency. *ICIS 2001 Proceedings*, 11.

Häberli, C. (2014). Foreign direct investment in agriculture: Land grab or food security improvement. *Economic Analysis of International Law*, 283–303.

Hagen, J. M. (2002). *Causes and consequences of food retailing innovation in developing countries: supermarkets in Vietnam*.

Hailu, A. (2016). *Value chain analysis of vegetables: The case of Ejere District, West Shoa Zone, Oromia National Regional State of Ethiopia*. MSc thesis in Agricultural Economics. Haramaya, Ethiopia: Haramaya University.

Hill, C. W. L. (1990). Cooperation, Opportunism, and the Invisible Hand: Implications for Transaction Cost Theory. *The Academy of Management Review*, *15*(3), 500. https://doi.org/10.2307/258020

Hoopes, D. G., Madsen, T. L., & Walker, G. (2003). Guest editors' introduction to the special issue: why is there a resource-based view? Toward a theory of competitive heterogeneity. *Strategic Management Journal*, *24*(10), 889–902.

Humphrey, J., & Schmitz, H. (2002). *Developing Country Firms in the World Economy: Governance and Upgrading in Global Value Chains Changing Knowledge Divide in the Global Economy View project Technology platforms, innovation and industry structure in China View project*. https://www.researchgate.net/publication/320427730

Humphreys, P. K., Li, W. L., & Chan, L. Y. (2004). The impact of supplier development on buyer–supplier performance. *Omega*, *32*(2), 131–143. https://doi.org/10.1016/j.omega.2003.09.016

Huyen, L. T. T., Duteurtre, G., Cournut, S., Messad, S., & Hostiou, N. (2019). Diversity and sustainability of pig farm types in the northern mountains of Vietnam. *Tropical Animal Health and Production*, *51*(8), 2583–2593. https://doi.org/10.1007/s11250-019-01973-4

Huynh, T. T. T., Aarnink, A. J. A., Drucker, A., & Verstegen, M. W. A. (2006). Pig production in Cambodia, Laos, Philippines, and Vietnam: a review. *Asian Journal of Agriculture and Development*, *3*(1362-2016–107621), 69–90.

Janssen, M., & Sol, H. G. (2000). Evaluating the role of intermediaries in the electronic value chain. *Internet Research*, *10*(5), 406–417. https://doi.org/10.1108/10662240010349417

Jayne, T. S., Muyanga, M., Wineman, A., Ghebru, H., Stevens, C., Stickler, M., Chapoto, A., Anseeuw, W., van der Westhuizen, D., & Nyange, D. (2019). Are medium-scale farms driving agricultural transformation in sub-Saharan Africa? *Agricultural Economics*, *50*, 75–95. https://doi.org/10.1111/agec.12535

Jorgenson, A. K., & Kuykendall, K. A. (2008). Globalization, Foreign Investment Dependence and Agriculture Production: Pesticide and Fertilizer Use in Less-developed Countries, 1990-2000. *Social Forces*, *87*(1), 529–560. https://doi.org/10.1353/sof.0.0064

Kaplinsky, R. (2004). Spreading the gains from globalization: What can be learned from value-chain analysis? *Problems of Economic Transition*, *47*(2), 74–115.

Karakaya, F., & Stahl, M. J. (1989). Barriers to entry and market entry decisions in consumer and industrial goods markets. *Journal of Marketing*, *53*(2), 80–91.

Karimuribo, E. D., Chenyambuga, S. W., Makene, V. W., & Mathias, S. (2011). Characteristics and production constraints of rural-based small-scale pig farming in Iringa region, Tanzania. *Livestock Research for Rural Development*, *23*(8).

Kessler, F., & Stern, R. H. (1959). Competition, Contract, and Vertical Integration. *The Yale Law Journal*, *69*(1), 1. https://doi.org/10.2307/794286

King, R. P., & Venturini, L. (2005). Demand for quality drives changes in food supply chains. *New Directions in Global Food Markets*, *794*.

Kinh, L. V., & Hai, L. T. (2008). *Improving pig performance through breeding and feeding in Vietnam*. http://www.ilri.org/InfoServ/Webpub/fulldocs/Pig%20Systems_proceeding/CH_08_Kinh_Hai.pdf

Knickel, K., Ashkenazy, A., Chebach, T. C., & Parrot, N. (2017). Agricultural modernization and sustainable agriculture: Contradictions and complementarities. *International Journal of Agricultural Sustainability*, *15*(5), 575–592.

Knight Frank, H. (1921). *Risk, uncertainty and profit* (First Editon). Houghton Mifflin, The Riverside Press, Cambridge.

Koskela-Huotari, K., Edvardsson, B., Jonas, J. M., Sörhammar, D., & Witell, L. (2016). Innovation in service ecosystems—Breaking, making, and maintaining institutionalized rules of resource integration. *Journal of Business Research*, *69*(8), 2964–2971. https://doi.org/10.1016/j.jbusres.2016.02.029

Kovacic, W. E. (1992). Regulatory controls as barriers to entry in government procurement. *Policy Sciences*, 29–42.

Krieger, T., & Leroch, M. (2016). The political economy of land grabbing. In *Homo Oeconomicus* (Vol. 33, pp. 197–204). Springer.

Krieger, T., & Meierrieks, D. (2016). Land grabbing and ethnic conflict. *Homo Oeconomicus*, *33*, 243–260.

Kumar, A., Verma, S. C., Chaurasia, S., & Saxena, S. B. (2013). Production and Marketing of Marigold Flower in Uttar Pradesh with Special Reference to Kannauj District. *HortFlora Res. Specturm*, *2*, 220–224.

Kuzmin, E. A., & Suvorova, A. V. (2023). Efficiency of Institutions and Economic Agents from Transaction Costs Perspective. In V. Kumar, E. Kuzmin, W.-B. Zhang, & Y. Lavrikova (Eds.), *Consequences of Social Transformation for Economic Theory* (pp. 117–132). Springer International Publishing.

Laborde, D., Lallemant, T., McDougal, K., Smaller, C., & Traore, F. (2019). *What are the policy priorities?* International Institute for Sustainable Development (IISD). http://www.jstor.org/stable/resrep22022

Lapar, L. M., Vu, T. B., & Simeon, E. (2003). *Identifying barriers to entry to livestock input and output markets in Southeast Asia*.

Lapar, Ma. L. A., Toan, N. N., Que, N. N., Jabbar, M. A., Tisdell, C. A., & Staal, S. J. (2009). *Market outlet choices in the context of changing demand for fresh meat: implications for smallholder inclusion in pork supply chain in Vietnam*.

Lapar, M. L. (2014). *Review of the pig sector in Vietnam*.

Lawhon, M., & Murphy, J. T. (2012). Socio-technical regimes and sustainability transitions. *Progress in Human Geography*, *36*(3), 354–378. https://doi.org/10.1177/0309132511427960

Law on Animal Husbandry, Pub. L. No. No.32/2018/QH14 (2018).

Lee, J. (2017). *Global Commodity Chains and Global Value Chains* (Vol. 1). Oxford University Press. https://doi.org/10.1093/acrefore/9780190846626.013.201

Le Goulven, K. (1999). How institutions matter in the organization and regulation of agricultural markets after liberalization? An institutional analysis of hog market integration in Vietnam. *International Conference ‘‘Institutions in Transition*.

Le Hang. (2021). *The temporary close of the Hoc Mon wholesale market and the difficulty in producing pigs in Dong Nai*. VOV. https://vov.vn/kinh-te/cho-dau-moi-hoc-mon-tam-dung-hoat-dong-dong-nai-kho-tieu-thu-heo-869680.vov

Lemeilleur, S., & Codron, J.-M. (2011). Marketing cooperative vs. commission agent: The Turkish dilemma on the modern fresh fruit and vegetable market. *Food Policy*, *36*(2), 272–279. https://doi.org/10.1016/j.foodpol.2010.11.024

Lemke, U., Mergenthaler, M., Roessler, R., Le Thi Thanh, H., Herold, P., Kaufmann, B., & Zárate, A. (2008). Pig production in Vietnam - A review. *CAB Reviews Perspectives in Agriculture Veterinary Science Nutrition and Natural Resources*, *23*. https://doi.org/10.1079/PAVSNNR20083023

Le Thi Minh, C., Lebailly, P., & Tran Quang, T. (2017). Enhancing farmers’ market power and income in the pig value chain; a case study in Bac Giang province, Vietnam. *Livestock Research for Rural Development*, *29*(12).

Levin, R. C. (1978). Technical change, barriers to entry, and market structure. *Economica*, *45*(180), 347–361.

Levi, R., Rajan, M., Singhvi, S., & Zheng, Y. (2020). The impact of unifying agricultural wholesale markets on prices and farmers’ profitability. *Proceedings of the National Academy of Sciences*, *117*(5), 2366–2371. https://doi.org/10.1073/pnas.1906854117

Loc, N. T. T. (2002). Le developpement des magasins et des supermarches dans la filiere des legumes frais a Ha Noi et a Ho Chi Minh ville Viet Nam. *Développement Agricole Tropical. Montpellier, Centre National d'Etudes Agronomiques Des Régions Chaudes*, *105*.

Lund-Thomsen, P., Riisgaard, L., Singh, S., Ghori, S., & Coe, N. M. (2021). Global Value Chains and Intermediaries in Multi-stakeholder Initiatives in Pakistan and India. *Development and Change*, *52*(3), 504–532. https://doi.org/10.1111/dech.12647

MacDonald, J. M., Perry, J., Ahearn, M. C., Banker, D., Chambers, W., Dimitri, C., Key, N., Nelson, K. E., & Southard, L. W. (2004). Contracts, Markets, and Prices: Organizing the Production and Use of Agricultural Commodities. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.754986

Maguire, S., Hardy, C., & Lawrence, T. B. (2004). Institutional Entrepreneurship in Emerging Fields: HIV/AIDS Treatment Advocacy in Canada. *Academy of Management Journal*, *47*(5), 657–679. https://doi.org/10.5465/20159610

Markard, J., Raven, R., & Truffer, B. (2012). Sustainability transitions: An emerging field of research and its prospects. *Research Policy*, *41*(6), 955–967. https://doi.org/10.1016/J.RESPOL.2012.02.013

Martinez, S. (2002). *Vertical Coordination of Marketing Systems: Lessons From the Poultry, Egg, and Pork Industries*. https://doi.org/http://dx.doi.org/10.22004/ag.econ.34051

Maruyama, M., & Trung, L. V. (2007). Supermarkets in Vietnam: Opportunities and obstacles. *Asian Economic Journal*, *21*(1), 19–46. https://doi.org/10.1111/j.1467-8381.2007.00245.x

Maruyama, M., & Trung, L. V. (2011). Modern Retailers in Transition Economies: The Case of Vietnam. *Journal of Macromarketing*, *32*(1), 31–51. https://doi.org/10.1177/0276146711421932

Masayoshi, M., Le, V. T., & Nguyen, T. T. T. (2014). Retail policy and strategy in Vietnam. *Retailing in Emerging Markets: A Policy and Strategy Perspective*, 94.

Mendez, M. A., & Popkin, B. M. (2004). Globalization, urbanization and nutritional change in the developing world. *EJADE: Electronic Journal of Agricultural and Development Economics*, *1*(853-2016–56106), 220–241.

M. H. (2008). *"150 small business households selling pork have come to the new market."* https://doanhnhansaigon.vn/150-ho-tieu-thuong-ban-thit-heo-da-den-cho-moi-301597.html

Michel, S., Saucède, F., Pardo, C., & Fenneteau, H. (2019). Business interaction and institutional work: When intermediaries make efforts to change their position. *Industrial Marketing Management*, *80*, 266–279. https://doi.org/10.1016/j.indmarman.2018.06.005

Mighell, R. L., & Jones, L. A. (1963). *Vertical coordination in agriculture* (Issue 19). Farm Economics Division, Economic Research Service, US Department of Agriculture.

Minot, N., & Sawyer, B. (2016). Contract farming in developing countries: Theory, practice, and policy implications. *Innovation for Inclusive Value Chain Development: Successes and Challenges. Washington DC (USA): IFPRI*, 127–158.

Minten, B., Vandeplas, A., & Swinnen, J. (2012). Regulations, Brokers, and Interlinkages: The Institutional Organization of Wholesale Markets in India. *The Journal of Development Studies*, *48*(7), 864–886. https://doi.org/10.1080/00220388.2011.615919

Möller, K. K., & Wilson, D. T. (1995). *Business marketing: An interaction and network perspective*. Springer Science & Business Media.

Moschini, G., & Hennessy, D. A. (2001). Chapter 2 Uncertainty, risk aversion, and risk management for agricultural producers. *Handbook of Agricultural Economics*, *1*(PART A), 87–153. https://doi.org/10.1016/S1574-0072(01)10005-8

Moustier, P. (1996). *Organization in the Brazzavillian vegetable market*. University of London.

Munneke, H. J., & Yavas, A. (2001). Incentives and Performance in Real Estate Brokerage. *Journal of Real Estate Finance and Economics*, *22*(1).

Nampanya, S., Richards, J., Khounsy, S., Inthavong, P., Yang, M., Rast, L., & Windsor, P. A. (2013). Investigation of Foot and Mouth Disease hotspots in northern Lao PDR. *Transboundary and Emerging Diseases*, *60*(4), 315–329. https://doi.org/10.1111/J.1865-1682.2012.01350.X

Neumann, E. J., Kliebenstein, J. B., Johnson, C. D., Mabry, J. W., Bush, E. J., Seitzinger, A. H., Green, A. L., & Zimmerman, J. J. (2005). Assessment of the economic impact of porcine reproductive and respiratory syndrome on swine production in the United States. *Journal of the American Veterinary Medical Association*, *227*(3), 385–392. https://doi.org/10.2460/javma.2005.227.385

Ngoc Que, N., Thi Ngoc Linh, P., Cong Thang, T., Thi Thuy, N., Thi Thinh, N., Rich, K. M., & Nguyen-Viet, H. (2020). *Economic impacts of African swine fever in Vietnam*.

Ngo, H. H. T., Nguyen-Thanh, L., Pham-Duc, P., Dang-Xuan, S., Le-Thi, H., Denis-Robichaud, J., Nguyen-Viet, H., Le, T. T. H., Grace, D., & Unger, F. (2021). Microbial contamination and associated risk factors in retailed pork from key value chains in Northern Vietnam. *International Journal of Food Microbiology*, *346*, 109163. https://doi.org/https://doi.org/10.1016/j.ijfoodmicro.2021.109163

Nguyen, A. N., Nguyen, T., Le, D. T., Pham, Q. N., NGuyen, D. C., & Nguyen, D. N. (2008). Foreign direct investment in Vietnam: Is there any evidence of technological spillover effects. *Available at SSRN 1117202*.

Nguyen, A. T. (2016). *Value chain governance in agriculture: A case study of pig production in Thong Nhat district Dong Nai province*.

Nguyen Manh Cuong. (2014). *Analysis of the Pig Value Chain in Thong Nhat district, Dong Nai province*. Report presented at the Scientific Committee Meeting of the REVALTER Project Tam Dao, Vietnam, October, 13 and 14, 2014

Nguyen-Minh, Q., Prins, H., Oosterveer, P., Brouwer, I. D., & Vignola, R. (2021). Food system transitions in Vietnam: the case of pork and vegetable networks. *Environmental Innovation and Societal Transitions*.

Nguyen-Minh, Q., Prins, H., Oosterveer, P., Brouwer, I. D., & Vignola, R. (2023). Food system transitions in Vietnam: The case of pork and vegetable networks. *Environmental Innovation and Societal Transitions*, *47*, 100716. https://doi.org/10.1016/j.eist.2023.100716

Nguyen Thi Thuy, M., Dorny, P., Lebailly, P., Le Thi Minh, C., Nguyen Thi Thu, H., & Dermauw, V. (2020). Mapping the pork value chain in Vietnam: a systematic review. *Tropical Animal Health and Production*, *52*(6), 2799–2808. https://doi.org/10.1007/S11250-020-02338-Y/TABLES/2

Nguyen-Thi, T., Pham-Thi-Ngoc, L., Nguyen-Ngoc, Q., Dang-Xuan, S., Lee, H. S., Nguyen-Viet, H., Padungtod, P., Nguyen-Thu, T., Nguyen-Thi, T., & Tran-Cong, T. (2021). An assessment of the economic impacts of the 2019 African swine fever outbreaks in Vietnam. *Frontiers in Veterinary Science*, *8*.

Nguyen-Viet, H., Dang-Xuan, S., Pham-Duc, P., Roesel, K., Huong, N. M., Luu-Quoc, T., Van Hung, P., Thi Duong Nga, N., Lapar, L., Unger, F., Häsler, B., & Grace, D. (2019). Rapid integrated assessment of food safety and nutrition related to pork consumption of regular consumers and mothers with young children in Vietnam. *Global Food Security*, *20*, 37–44. https://doi.org/10.1016/J.GFS.2018.12.003

Nierenberg, D., & Mastny, L. (2005). *Happier meals: rethinking the global meat industry* (Vol. 171). Worldwatch Institute.

Nieuwenhuis, N., Duinhof, T. F., & van Nes, A. (2012). Economic analysis of outbreaks of porcine reproductive and respiratory syndrome virus in nine sow herds. *Veterinary Record*, *170*(9), 225–225. https://doi.org/10.1136/vr.100101

Obstfeld, D. (2005). Social Networks, the *Tertius Iungens* Orientation, and Involvement in Innovation. *Administrative Science Quarterly*, *50*(1), 100–130. https://doi.org/10.2189/asqu.2005.50.1.100

Obstfeld, D., Borgatti, S. P., & Davis, J. (2014). *Brokerage as a Process: Decoupling Third Party Action from Social Network Structure* (pp. 135–159). https://doi.org/10.1108/S0733-558X(2014)0000040007

OEDC (Organisation for Economic Co-operation and Development). (2018). *Meat consumption*. https://data.oecd.org/agroutput/meat-consumption.htm

Patr, M. K., Begum, S., & Deka, B. C. (2014). Problems and prospects of traditional pig farming for tribal livelihood in Nagaland. *Indian Research Journal of Extension Education*, *14*(4), 6–11.

Peng, M. W., & York, A. S. (2001). Behind Intermediary Performance in Export Trade: Transactions, Agents, and Resources. *Journal of International Business Studies*, *32*(2), 327–346. https://doi.org/10.1057/palgrave.jibs.8490955

Perry, M. K. (1989). *Chapter 4 Vertical integration: Determinants and effects* (pp. 183–255). https://doi.org/10.1016/S1573-448X(89)01007-1

Pham, H. T. T., Antoine-Moussiaux, N., Grosbois, V., Moula, N., Truong, B. D., Phan, T. D., Vu, T. D., Trinh, T. Q., Vu, C. C., Rukkwamsuk, T., & Peyre, M. (2017). Financial Impacts of Priority Swine Diseases to Pig Farmers in Red River and Mekong River Delta, Vietnam. *Transboundary and Emerging Diseases*, *64*(4), 1168–1177. https://doi.org/10.1111/TBED.12482

Pingali, P., & Vo-Tong, X. (1992). Vietnam: Decollectivization and Rice Productivity Growth. *Economic Development and Cultural Change*, *40*, 697–718. https://doi.org/10.1086/451973

Porter, M. E. (1997). Competitive Strategy. *Measuring Business Excellence*, *1*(2), 12–17. https://doi.org/10.1108/eb025476

PPLPI. (2007). *Contract farming for equitable market-oriented swine production in northern Vietnam*.

Prowse, M. (2012). *Contract farming in developing countries – a review*.

Raj, N. (2022). Information asymmetry and market failure. *International Journal of Food and Nutritional Sciences (IJFANS)*, *11*(1), 1020–1037.

Rana, M., & Maharjan, K. L. (2022). Participation of Brinjal Farmers in Large and Small Wholesale Markets: Factors Influencing Farmers' Decisions and Impact on Producers' Prices. *Sustainability*, *14*(4), 2357. https://doi.org/10.3390/su14042357

Raynolds, L. T., Myhre, D., McMichael, P., Carro-Figueroa, V., & Buttel, F. H. (1993). The "new" internationalization of agriculture: A reformulation. *World Development*, *21*(7), 1101–1121. https://doi.org/10.1016/0305-750X(93)90002-Q

Reardon, T., & Barrett, C. B. (2000). Agroindustrialization, globalization, and international development: An overview of issues, patterns, and determinants. *Agricultural Economics*, *23*(3), 195–205.

Reardon, T., Chen, K. Z., Minten, B., Adriano, L., Dao, T. A., Wang, J., & Gupta, S. Das. (2014). The quiet revolution in Asia's rice value chains. *Annals of the New York Academy of Sciences*, *1331*(1), 106–118. https://doi.org/10.1111/nyas.12391

Reardon, T., & Swinnen, J. F. M. (2004). Agrifood Sector Liberalisation and the Rise of Supermarkets in Former State-controlled Economies: A Comparative Overview. *Development Policy Review*, *22*(5), 515–523. https://doi.org/10.1111/j.1467-7679.2004.00263.x

Reardon, T., & Timmer, C. P. (2007). Chapter 55 Transformation of Markets for Agricultural Output in Developing Countries Since 1950: How Has Thinking Changed? *Handbook of Agricultural Economics*, *3*, 2807–2855. https://doi.org/10.1016/S1574-0072(06)03055-6

Reardon, T., & Timmer, C. P. (2014). Five inter-linked transformations in the Asian agrifood economy: Food security implications. *Global Food Security*, *3*(2), 108–117. https://doi.org/10.1016/J.GFS.2014.02.001

Reddy, A. (2013). Training manual on value chain analysis of dryland agricultural commodities. *Patancheru*, *502*, 324.

Rehber, E. (2000). *Vertical coordination in the agro-food industry and contract farming: A comparative study of Turkey and the USA*.

Rich, M. K. (2003). Business-to-business marketing: strategies and implementation. *Journal of Business & Industrial Marketing*, *18*(3), 289–291.

Riera, J.-L. (2009). *Applying the social change model*. Jossey Bass, USA pp.

Rogelberg, S. G. (2016). Governance structures. In G. P. Hodgkinson (Ed.), *The SAGE encyclopedia of industrial and organizational psychology* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Rojas, F. (2010). Power Through Institutional Work: Acquiring Academic Authority in the 1968 Third World Strike. *Academy of Management Journal*, *53*(6), 1263–1280. https://doi.org/10.5465/amj.2010.57317832

Rosenzweig, M. R., & Wolpin, K. I. (1993). Credit market constraints, consumption smoothing, and the accumulation of durable production assets in low-income countries: Investments in bullocks in India. *Journal of Political Economy*, *101*(2), 223–244.

Rotmans, J., & Loorbach, D. (2010). Towards a better understanding of transitions and their governance. A systemic and reflexive approach. In *Transitions to sustainable development: New directions in the study of long term transformative change* (Vol. 1, pp. 105–122). Routledge: New York, NY, USA.

Ruben, R., Cavatassi, R., Lipper, L., Smaling, E., & Winters, P. (2021). Towards food systems transformation—five paradigm shifts for healthy, inclusive and sustainable food systems. *Food Security*, *13*(6), 1423–1430. https://doi.org/10.1007/s12571-021-01221-4

Ruzzier, C. A. (2009). Asset Specificity and Vertical Integration: Williamson's Hypothesis Reconsidered. *IO: Firm Structure*.

Santangelo, G. D. (2018). The impact of FDI in land in agriculture in developing countries on host country food security. *Journal of World Business*, *53*(1), 75–84.

Schmalensee, R. (1981). Economies of Scale and Barriers to Entry. *Journal of Political Economy*, *89*(6), 1228–1238. https://doi.org/10.1086/261031

Schmitt, M., Häußling, R., & Kaip, E. (2023). From analytical levels to range of relations – Applying a multi-relational approach to the multi-level perspective. *Urban Climate*, *49*, 101507. https://doi.org/10.1016/j.uclim.2023.101507

Schmitz, P. W. (2021). Optimal ownership of public goods under asymmetric information. *Journal of Public Economics*, *198*, 104424. https://doi.org/10.1016/j.jpubeco.2021.104424

Schneider, M. (2017). Wasting the rural: Meat, manure, and the politics of agro-industrialization in contemporary China. *Geoforum*, *78*, 89–97. https://doi.org/10.1016/j.geoforum.2015.12.001

Selvaraj, M., & Ibrahim, M. S. (2012). Indian agricultural marketing-A review. *Asian Journal of Agriculture and Rural Development*, *2*(1), 69–75.

Shankar, B., Morzaria, S., Fiorucci, A., & Hak, M. (2012). Animal disease and livestock-keeper livelihoods in Southern Cambodia. *International Development Planning Review*, *34*(1), 39–63. https://doi.org/10.3828/idpr.2012.3

Sharma, P., Leung, T. Y., Kingshott, R. P. J., Davcik, N. S., & Cardinali, S. (2020). Managing uncertainty during a global pandemic: An international business perspective. *Journal of Business Research*, *116*, 188–192. https://doi.org/10.1016/j.jbusres.2020.05.026

Shudon, Z. (2008). China: an example of an agricultural brokers' association: the Tongzhou Agricultural Broker Association. *Nanjing Agricultural University, China*.

Siegfried, J. J., & Evans, L. B. (1994). Empirical studies of entry and exit: A survey of the evidence. *Review of Industrial Organization*, *9*, 121–155.

Simchi-Levi, D., Kaminsky, P., & Simchi-Levi, E. (2001). *Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies*. MA: McGraw-Hill.

Smith, A. (2007). Translating sustainabilities between green niches and socio-technical regimes. *Technology Analysis & Strategic Management*, *19*(4), 427–450.

Sobel, R. S., Clark, J. R., & Lee, D. R. (2007). Freedom, barriers to entry, entrepreneurship, and economic progress. *The Review of Austrian Economics*, *20*, 221–236.

Spooner, B. (2015). Globalization via World Urbanization. *Globalization: The Crucial Phase, University of Pennsylvania Press, Philadelphia*, 1–21.

Spulber, D. F. (1996). Market Microstructure and Intermediation. *Journal of Economic Perspectives*, *10*(3), 135–152. https://doi.org/10.1257/jep.10.3.135

Sterns, J. A., Schweikhardt, D. B., & Peterson, H. C. (1998). Using case studies as an approach for conducting agribusiness research. *The International Food and Agribusiness Management Review*, *1*(3), 311–327.

Suryaningrat, I. B., Amilia, W., & Choiron, M. (2015). Current Condition of Agroindustrial Supply Chain of Cassava Products: A Case Survey of East Java, Indonesia. *Agriculture and Agricultural Science Procedia*, *3*, 137–142. https://doi.org/10.1016/j.aaspro.2015.01.027

Swinnen, J. F. M., & Maertens, M. (2006). *Globalization, privatization, and vertical coordination in food value chains in developing and transition countries*.

Täuscher, K., & Laudien, S. M. (2018). Understanding platform business models: A mixed methods study of marketplaces. *European Management Journal*, *36*(3), 319–329. https://doi.org/10.1016/j.emj.2017.06.005

Thai Hang et Ngoc Minh. (2014). *Stories of the pork auction markets...worth billions*. Dan Tri. https://dantri.com.vn/kinh-doanh/chuyen-ve-nhung-phien-dau-gia-thit-heo-gia-bac-ty-1392079072.htm

Thi Nguyen, H., Nguyen, Q. C., Kabango, A. N., & Pham, T. D. (2019). Vietnamese Consumers' Willingness to Pay for Safe Pork in Hanoi. *Journal of International Food & Agribusiness Marketing*, *31*(4), 378–399. https://doi.org/10.1080/08974438.2018.1533506

Thoburn, J. (2013). Vietnam as a Role Model for Development. In *Achieving Development Success* (pp. 99–118). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199671557.003.0005

Thorpe, J., & Maestre, M. (2015). *Brokering development: enabling factors for public-private-producer partnerships in agricultural value chains*.

Tiongco, M., Catelo, M. A., & Lapar, Ma. L. (2008). *Contract farming of swine in Southeast Asia as a response to changing market demand for quality and safety in pork:*

Tisdell, C. A., & Clement, A. T. (2009). Trends in Vietnam's Pork Supply and Structural Features of its Pig Sector. *Economic Theory, Applications and Issues Working Papers 90623, University of Queensland, School of Economics.*

Tran, D. T., & Nguyen, T. M. T. (2012). Risks analysis of pig sector in Vietnam. *Economics Studies*, *(Original in Vietnamese)*.

Tran, T. D. (2020). Effects of African Swine Fever on Livestock Activities of Householders in Long My District, Hau Giang Province. *Vietnam Journal of Agricultural Sciences*, *18*(10), 828–838.

Tran, T. Q. (1998). Economic Reforms and Their Impact on Agricultural Development in Vietnam. *ASEAN Economic Bulletin*, *15*(1), 30–46. http://www.jstor.org/stable/25773511

Tran, T. T., Pham, T. S. H., & Barnes, B. R. (2016). Spatial Spillover Effects from Foreign Direct Investment in Vietnam. *The Journal of Development Studies*, *52*(10), 1431–1445. https://doi.org/10.1080/00220388.2016.1166205

Tran, van T. (2006). FDI and economic development: The case of Vietnam. In *Multinationals and Economic Growth in East Asia* (pp. 409–438). Routledge.

Tran Van Tho. (2006). FDI and economic development: The case of Vietnam. In *Multinationals and Economic Growth in East Asia* (pp. 409–438). Routledge.

Trochim, W. M. K. (1989). Outcome pattern matching and program theory. *Evaluation and Program Planning*, *12*(4), 355–366. https://doi.org/10.1016/0149-7189(89)90052-9

Ulli-Beer, S., Grösser, S., & Wokaun, A. (2011). How does the multi-level perspective help to enhance a system dynamics analysis of a specific transition challenge. *Proceedings of the System Dynamics Conference*.

UNTCAD. (2007). *World investment report: Transnational Corporations, Extractive Industries and Development*. https://unctad.org/system/files/official-document/wir2007_en.pdf

UNTCAD (United Nations Conference on Trade and Development). (2009). *World Investment Report 2009*. https://unctad.org/system/files/official-document/wir2009_en.pdf

Utomo, M., Pieter, L., & Siagian, C. M. (2021). Value chain structure analysis as a starting point for bamboo enterprise development: Lessons from Gunungkidul, Indonesia. *Forest and Society*, *5*(2), 405–420.

Vargo, S. L., & Lusch, R. F. (2016). Institutions and axioms: an extension and update of service-dominant logic. *Journal of the Academy of Marketing Science*, *44*, 5–23.

Venard, B. (1996). Vietnamese distribution channels. *International Journal of Retail & Distribution Management*, *24*(4), 29–40. https://doi.org/10.1108/09590559610119893

Wagner, W. (1996). The social change model of leadership: A brief overview. *Leadership*, *11*(1), 8–10.

Wang, Y., Xie, L., Zhang, Y., Wang, C., & Yu, K. (2019). Does FDI Promote or Inhibit the High-Quality Development of Agriculture in China? An Agricultural GTFP Perspective. *Sustainability*, *11*(17), 4620. https://doi.org/10.3390/su11174620

Ward, C. E. (1997). *Vertical integration comparison: beef, pork, and poultry*.

Watts, C. A., & Hahn, C. K. (1993). Supplier Development Programs: An Empirical Analysis. *International Journal of Purchasing and Materials Management*, *29*(1), 10–17. https://doi.org/10.1111/j.1745-493X.1993.tb00002.x

Whyte, G. (1994). The role of asset specificity in the vertical integration decision. *Journal of Economic Behavior & Organization*, *23*(3), 287–302. https://doi.org/10.1016/0167-2681(94)90003-5

Wilkinson, J. (2009). The globalization of agribusiness and developing world food systems. *Monthly Review*, *61*(4), 38–49.

Williamson, O. E. (1979). Transaction-Cost Economics: The Governance of Contractual Relations. In *Source: Journal of Law and Economics* (Vol. 22, Issue 2).

http://www.jstor.orgURL:http://www.jstor.org/stable/725118Accessed:24/08/200812:04http://www.jstor.org/page/info/about/policies/

Williamson, O. E. (1981). The Economics of Organization: The Transaction Cost Approach. *American Journal of Sociology*, *87*(3), 548–577. http://www.jstor.org/stable/2778934

Williamson, O. E. (1991). Comparative Economic Organization: The Analysis of Discrete Structural Alternatives. *Administrative Science Quarterly*, *36*(2), 269. https://doi.org/10.2307/2393356

World Bank. (2016). *Transforming Vietnamese agriculture: Gaining more for less*. World Bank.

Wu, K., Liu, J., Wang, L., Fan, S., Li, Z., Li, Y., Yi, L., Ding, H., Zhao, M., & Chen, J. (2020). Current State of Global African Swine Fever Vaccine Development under the Prevalence and Transmission of ASF in China. *Vaccines*, *8*(3), 531. https://doi.org/10.3390/vaccines8030531

Xu, G., Sarkar, A., Qian, L., Shuxia, Z., Rahman, Md. A., & Yongfeng, T. (2022). The impact of the epidemic experience on the recovery of production of pig farmers after the outbreak-Evidence from the impact of African swine fever (ASF) in Chinese pig farming. *Preventive Veterinary Medicine*, *199*, 105568. https://doi.org/10.1016/j.prevetmed.2022.105568

Yang, B., & He, J. (2021). Global Land Grabbing: A Critical Review of Case Studies across the World. *Land*, *10*(3), 324. https://doi.org/10.3390/land10030324

Yin, R. K. (2003). Designing case studies. *Qualitative Research Methods*, *5*(14), 359–386.

Zhang, H., Kono, H., & Kubota, S. (2014). An integrated epidemiological and economic analysis of vaccination against highly pathogenic porcine reproductive and respiratory syndrome (PRRS) in Thua Thien Hue Province, Vietnam. *Asian-Australasian Journal of Animal Sciences*, *27*(10), 1499.

Zhang, M., & Li, P. (2012). RFID Application Strategy in Agri-Food Supply Chain Based on Safety and Benefit Analysis. *Physics Procedia*, *25*, 636–642. https://doi.org/10.1016/j.phpro.2012.03.137

Ziegler, M., Garg, L., Tiwary, S., Vashistha, A., & Heimerl, K. (2019). Fresh insights: user research towards a market information service for bihari vegetable farmers. *Proceedings of the Tenth International Conference on Information and Communication Technologies and Development*, 1–11. https://doi.org/10.1145/3287098.3287115

APPENDIX

Hello, my name is Nguyen Anh Tuan, and I am researching changes and permanence within the pig value chain in Vietnam. I am particularly interested in the activities of actors within the pig value chain. Today, I would like to understand more about the operations of collectors/traders and intermediaries in the wholesale market. Below are some questions designed to help me better understand the working context of wholesale markets. Please note that the information collected will be used solely for research purposes. Any personal or confidential information will be encrypted and will not impact your business activities.

QUESTIONNAIRE FOR FEEDING COMPANY MANAGERS

I. General Information

Full Name:

Position:

Number of years working:

Responsibilities and tasks in charge:

Can you tell me when you started this job?

When you first started, did you know about the company's pig farming system?

Can you share your current main tasks in managing pig farms?

II. Policies Related to Contract Farming

What are the company's policies related to contract farming?

Do you know the exact time when contract farms appeared in Vietnam?

Did your company enter the contract farming market earlier or later than the initial timeline?

Who are the current targets of the company's contract farming system? For example: farmers or private enterprises?

What is the annual growth rate? Has it increased or decreased in recent years?

Can you provide reports on changes in the number of farms?

What policies has the company implemented to seek, maintain, and develop the number of suppliers in the company's contract farming network?

Does your company fully control the animal feed production segment, or do you collaborate with other feed companies?

Does your company have its own breeding system?

How are the company's farms distributed? Nationwide or concentrated in Dong Nai only?

III. Partnership Policies

For Suppliers

What conditions does the company require to accept a contract when starting a partnership with a supplier to build a farm?

What benefits (superior) do suppliers get compared to other companies when linking with your company?

How are cooperation contracts signed? How does the negotiation and signing process proceed?

How is the contract duration regulated?

How is the supervision of farming activities carried out?

How to ensure farmers follow the farming procedures?

What common fraudulent behaviors are encountered? How are they resolved when detected?

Does the government participate in contract management?

For Traders

Does the company currently sell its products to traders?

What percentage of pigs are sold through traders?

What conditions must traders meet to link with the company?

Is it necessary to establish purchase contracts between traders and the company?

Do traders force prices? If so, how does the company handle it?

Are traders allowed to select pigs like when they buy from small farming households?

Does the company have preferential policies such as pricing? If so, how specific?

What policies does the company have to expand the number of traders?

After the amount of pork is sold, do traders pick up pigs at the farm or the company's storage?

After the pigs are sold, does the company continue to ensure responsibility for its products?

IV. Expansion Policies

How many farms does your company currently have in Dong Nai province?

Dong Nai province currently wants to relocate farms out of residential areas, how will the current farms of the company be handled according to these policies?

Which province is currently prioritized for farm development policies?

Between the contract farming model and the megafarm model, which system is the company tending to develop more in the future? Why?

What are the strengths and weaknesses of each livestock linkage model?

Do partners receive financial support from the company?

How has the number of livestock linkage models changed in recent years? Especially after the ASF event?

Why does the company not build its own megafarms but links with domestic enterprises?

V. Production and Pricing Policies

Is the number of pigs produced according to a specific farming plan or completely free according to the existing farm capacity?

Does the company have a pork production plan? If so, is this plan daily, weekly, monthly, or yearly?

Which model between CF and mega requires a more stringent production plan?

Who is primarily responsible for ensuring the company's production policies?

VI. Disease Management

How has ASF affected the company's business situation?

Which model has ASF affected more, contract farming or megafarm?

What measures has the company taken to prevent disease?

What has the company done to mitigate the consequences for farms affected by ASF?

Does the company share the consequences of the disease with farmers?

SURVEY QUESTIONNAIRE ON MANAGEMENT AND VETERINARY AGENCIES AT HO CHI MINH CITY AGRICULTURAL WHOLESALE MARKET

General Information

Your name:

Position: Management agency staff, Veterinary staff, Other (specify)……

How long have you worked at the agricultural wholesale market ?:… ……

Roles and Responsibilities

Where was the original wholesale market located?

Can you tell me when the wholesale markets as Pham Van Hai and An Lac were established?

At that time, were the traders/collectors gathering spontaneously, or was there a plan by the state agencies?

What did the state agencies do to manage the activities of the traders and the overall activities of the wholesale markets?

What is the responsibility of veterinary services in the activities at Pham Van Hai and An Lac wholesale markets?

What requirements do the veterinary authorities impose on the actors participating in transactions at the wholesale markets, especially the actor Dau?

When were the Binh Dien and Hoc Mon markets established?

What did the state agencies do to encourage the relocation?

Which policies were relied upon for the relocation of the wholesale markets?

How did the role of veterinary services change after relocating to the new sites?

In your opinion, how has Dau changed over time, especially from the old market to the new market and currently?

How has the pork production volume changed at the markets?

Did the production levels at the wholesale markets change significantly during disease outbreaks or fluctuations in pig prices?

Recently, African swine fever and COVID-19 have been considered major shocks to the domestic livestock industry, affecting pork production. What are your thoughts on this statement?

What changes have these diseases caused in the activities of the wholesale markets?

Do the regulatory agencies allow diseased pigs to be mixed with healthy pigs?

If such a case occurs, how will it be handled?

Veterinary services are typically responsible for food safety. What are the specific responsibilities of Dau and other actors regarding food safety?

Do the regulatory agencies organize training courses related to food management?

Do veterinary services participate in the transaction process between buyers and sellers?

Is Dau's activity registered with veterinary services or with another agency?

Can you help me provide reports on pork quantities over time?

Dau recognition

Do you know/recognize the actor named “Dau” in wholesale markets?

Can you tell me more in detail concerning these actors?

Who are they?

When they have been introduced?

What are they doing? Their role in the operations of wholesale markets.

Does Dau get supports from the authority either from veterinary agencies? If yes, please detail it

Does Dau have connection to the Slaughterhouse? Are they the same actor?

What are the responsibilities that Dau has to follow in food safety implementation?

Linking with Other Actors

What actors are often associated with regulatory and veterinary agencies at agricultural wholesale markets?

In your opinion, is the linkage between regulatory and veterinary agencies with other actors effective?

Other actors as collectors or traders, what are their responsibilities in food safety implementation?

Evaluation and Suggestions

Do you have any suggestions to improve the operations of regulatory and veterinary agencies at agricultural wholesale markets?

What are your opinions on improving the working environment and hygiene at agricultural wholesale markets?

QUESTIONAIRE FOR ACTOR “DAU”

I. Trajectory

Can you describe the process of starting your job, including:

When did you begin this job?

What was your initial role?

Where is your hometown?

What motivated you to start this job, and why did you choose it?

When you first started, what was your job like?

At the beginning, what were the notable characteristics of your work? Please share specific details about your activities, including advantages and disadvantages (personal work and market-related).

Initially, when traders focused on buying and selling in Ho Chi Minh City, how many collectors/traders operated there? How many have become "Dau"?

When did you start transitioning into a Dau?

Why is the term "Dau" used?

Initially, what preparations were required to become a Dau? How have state agencies impacted your activities? Are there any specific requirements regarding the capacity of collectors who wish to do business in the markets?

Can you describe Dau's services, including labor, meat processing, and financial services for other actors in the wholesale market?

Has relocating wholesale markets from Pham Van Hai and An Lac to planned locations brought any advantages or disadvantages to Dau's operations?

In your opinion, have long-term contracts (50 years) with the government or market owners provided a significant advantage for Dau's business?

What is the process for contract extensions?

Where does Dau's capital come from? Is it from equity or other credit institutions?

Does Dau have connections with other actors, such as slaughterhouses, to provide slaughtering services to traders?

Apart from official activities at the wholesale market, does Dau engage in any other activities outside the market?

How have adverse events affecting farmers impacted your operations?

What factors most adversely affect Dau's business activities?

How did Dau overcome challenges posed by price fluctuations and epidemics affecting small-scale livestock farming?

How have ASF (African Swine Fever) and COVID-19 recently affected Dau's business, and what measures has Dau taken to address these situations?

Currently, the source of pigs imported into the market is mainly from companies. How has this affected Dau's operations?

What plans does Dau have for handling similar adverse events on a larger scale in the future?

II. Chain linkages

How do you find partners, specifically traders?

Have Dau and the traders signed contracts for renting stalls and using Dau's services at the wholesale market?

Does Dau provide any other financial support activities for partners?

When traders or retailers have difficulty finding capital, does Dau provide loans to these actors?

How is the rental payment for stalls in wholesale markets handled by the market management board?

How do Dau and the market management board fulfill their responsibilities?

To become a partner of Dau, what requirements must traders meet?

Under what circumstances does the cooperation between Dau and traders end? For example, are there cases where Dau and traders are forced to stop cooperating?

Is it difficult to find new collectors?

When conflicts arise, how are they resolved?

Regarding customers (buyers), are they mostly regular or new/changing customers?

III. Dau's characteristics

Should traders be present to sell pork at the market? Does Dau temporarily possess pork carcasses from collectors for sale? If so, how often does this occur? Is there an additional fee for this service?

Does Dau represent traders during transactions? How does pork trading typically occur?

Does Dau participate in the price negotiation process between buyers and sellers?

Does Dau broker deal between buyers and sellers by introducing new buyers to collectors renting Dau's hanging stalls?

What fees must traders pay to Dau for activities at the wholesale market?

Can you clarify the services that Dau provides to partners, especially financial services?

Does Dau allow other agents to incur debt when making purchases?

How do shoppers pay for purchases?