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Exploring the Governance and Fairness in the Milk Value Chain: A Case Study in Vietnam

Viet Hoang [1,*], An Nguyen [1], Carmen Hubbard [2] and Khanh-Duy Nguyen [1]

[1] School of Economics, University of Economics Ho Chi Minh City, Ho Chi Minh City 700000, Vietnam; quynhan1995@gmail.com (A.N.); khanhduy@ueh.edu.vn (K.-D.N.)
[2] School of Natural and Environmental Sciences, Newcastle University, Newcastle upon Tyne NE1 7RU, UK; carmen.hubbard@ncl.ac.uk
* Correspondence: viet.hoang@ueh.edu.vn

Abstract: Governance and fairness in the food value chain have gained considerable attention from both policymakers and scholars, especially in developing countries. This study analysed the milk value chain, exploring its governance and fairness, and assessed the regulatory interventions across the milk value chain in Vietnam using a qualitative framework and the global value chain governance model. The results show that Vietnam's milk production and dairy market have developed notably since the reforms. The value chain is structured according to three governance models, i.e., relational, captive, and hierarchy models. Vietnam's milk value chain has progressed through three building phases, expanding in breadth, and undergoing in-depth development, and the governance models have adjusted accordingly. However, Vietnamese dairy farms have been exposed to a low level of fairness across the supply chain. Although dairy farmers in the relational model may benefit from more power and fairness in the short term, farmers in the captive model may gain benefits and potential fairness in the long term. Vietnam has diverse regulatory interventions to enhance farmers' fairness and welfare, and the results are notable. However, not all farmers have benefitted from these policies, and measures regarding fairness and welfare should be diverse, gradual, and inclusive.

Keywords: milk; fairness; global value chain; governance; sustainability; Vietnam

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1. Introduction

Agricultural economists and policymakers are interested, inter alia, in defining and assessing the performance of agri-food systems that directly affect the present and future welfare of actors and society, in addition to understanding how to improve this. The key dimensions to evaluate performance are fairness, resilience, product variety, technological progress, governance, sustainability, and efficiency [1]. Governance, sustainability, and fairness are central to the global food value chain. In recent years, these concepts have gained notable attention from both practitioners and scholars [2–11]. Moreover, governance, sustainability, and fairness in the global food value chain have significantly changed over time and are influenced by various factors, most notably regulatory interventions. This is particularly the case for transition and developing countries, such as Vietnam.

Gereffi and Korzeniewicz [12] defined value chain governance as the authority and power relationships determining how financial, material, human, and other resources are allocated between actors and flow within a chain. The concept of governance in the global value chain is used to show that firms in the chain enforce the parameters under which other actors operate, and describes the structure of interactions, contracting, relationships, power, and coordination mechanisms; that is, value chain governance explains who makes decisions on what is produced, why particular stakeholders interact, what type of rules exist, how these are enforced and codified, and who are the rule makers in the chain [2,10,13–15]. Value chain governances are complicated processes and may take various forms that are subject to both international and national regulations.

Value chain governance can be classified into private governance (e.g., firm codes of conduct and monitoring), social governance (civil society pressure on business), and public governance (government policies) [16]. Private governance has various forms, such as standards of environment, labour, health, and product safety; codes of conduct by corporations, associations, and non-governmental organisations; labels for green and fair trade; and self-regulation by firms with corporate social responsibility. Public governance involves formal rules and regulations set by governments at local, national, and global levels that facilitate social and economic upgrading. Social governance is driven by civil society actors and includes codes of conduct for regulating workers' rights and conditions [9,16]. Private and public governance may hold comparative strengths and weaknesses that make them complementary [17]. According to Gereffi et al. [18], three major variables determine how a global value chain is governed: (i) complexity of transactions, (ii) ability to codify transactions, and (iii) capabilities in the supply base. These scholars also suggest five types of value chain governances, i.e., market governance, modular governance, relational governance, captive governance, and hierarchy governance, which range from low to high levels of explicit coordination and power asymmetry.

Sustainability is the second central concept in the food value chain and has increasingly caught scholars' interest. Sustainability implies meeting both present and future needs. Hence, it is necessary to answer what is to be sustained: nature (earth, biodiversity, ecosystem), life support (ecosystem service, resource, environment), and community (culture, group, place) and what is to be developed: people (children, life expectancy, education, equity, equal opportunity), economy (wealth, productive sector, consumption), and society (institution, social capital, regions) [19–21]. Thus, sustainability is a multidimensional concept covering social, political, economic, and environmental aspects. Agri-food production, value chains, and markets face different pressures and are at the centre of the interconnection of global environmental, economic, political, and social issues. They are critical in dealing with different sustainability challenges, such as climate change, population growth, resource scarcity, ecosystem degradation, biodiversity loss, food security, food safety, poverty and inequalities, and hunger and malnutrition [4,22–24].

The implications of the governance of sustainable agri-food standards are ambiguous if the sustainability definition includes the dimensions of food safety, environmental well-being, and farmers' income. The implication of a retail standard may be positive in aspects of food safety and environmental protection but can be negative in terms of income and equality. The impacts are different in terms of the dimensions and criteria of sustainability (e.g., food safety, environment, politics, society, and economics) and the distribution of target groups (e.g., farmers, processors, retailers, and consumers) [25–29]. In private governance, lead enterprises may set various standards for other actors in the food value chain by utilising the information and power asymmetries which can, in turn, result in unfairness and components of market failure. The failure of benefit distribution throughout the value chain may drive farmers to exit the food value chain, hence affecting their sustainable livelihood, but also the diversity and resilience of the food value chain [5,18]. The socio-economic sustainability of producers in various developing country is addressed, to some extent, through the fair-trade certification for those growers who are lucky enough to be included in these cross-continental schemes; however, many are excluded. Therefore, fair trade may work for some farmers but not all, particularly those who supply to their local markets in developing economies, and where the concept is hardly understood and applied (as in the case of Vietnam).

There is little doubt that fairness is the prominent attribute of the sustainability in the food value chain. However, fairness is difficult to define and measure. The definition of fairness highly depends on the perception and position of participants in the value chain. Fairness is often assessed relative to expectations. It is fair if expectations are met. When expectations are violated, it is considered to be unfair [30,31]. Though fairness may be posited to be mutually exclusive of economic efficiency, some scholars argue that efficiency is not lost when the ethical restriction is applied for ensuring fair treatment of others, such as

farmers, workers, and animals [31,32]. Gudbrandsdottir et al. [2] identify seven groups of factors related to fairness perception, namely, economic outcomes, operational outcomes, power, environmental stability, information sharing, relationship quality, and controls. They also suggest five indicators of fairness, i.e., profit margin, number of buyers/suppliers, firm size, seller power, and buyer power.

Since the country's reform in 1986, Vietnam has become a socialist-oriented market economy with a notable growth in GDP per capita, social welfare, and food consumption and markets. Fairness and poverty reduction, particularly in rural areas, are the principal goals of the current political system [33]. The General Secretary of Vietnam's Communist Party stresses that "*the benefit distribution must ensure fairness, create momentum for growth, and operate a distribution mechanism based on work results and economic efficiency*" [33]. To achieve these goals, Vietnam's government has initiated and promoted various policies, projects, and programmes to develop the agricultural sector, support farmers, increase social welfare, and enhance fairness in the food value chain.

Dairy is a crucial sector and largely contributes to food security and human development in Vietnam. Vietnam's dairy production has steadily increased, to rank sixth in Asia and second in the Association of Southeast Asian Nations (ASEAN) in 2018 [34,35]. Its milk consumption has also risen due to (real) income growth, higher living standards, and changes in consumer's behaviour. High demand for milk products resulted in an increase in milk production, which grew at an average rate of 14.4% between 2010 and 2018 [36]. The increase in milk consumption is higher than that of other foods, such as fish, meat, oils, rice, and fruits [37]. Nevertheless, at present, Vietnam's dairy production cannot satisfy its domestic demand; hence, it imports milk and various dairy products [38]. Although Vietnam's dairy sector plays a key role in the economy and has gained considerable attention and support from the government, it is argued that the dairy farmers, particularly small-scale producers, face the challenges of unfair market power, disadvantageous farming conditions, ineffective production, and unequal welfare distribution [37,39–41].

Against this background, this study investigated the governance and fairness of price and contractual arrangements across the milk value chain. Additionally, it explored how the particular political and economic system of Vietnam potentially influences fairness and governance by regulatory interventions across the supply chain. The paper aims to contribute to the current state of the art by providing a better understanding of the perception and reality of fairness, and the influence of a socialist-oriented market economy on governance in a value chain. To the best of our knowledge, this is the first study that explores the governance structures and the fairness in the milk value chain in a transition and developing country, such as Vietnam. The remainder of the article is organised as follows: Section 2 provides materials and methods. Section 3 presents the key findings and the discussion. Finally, Section 4 concludes and presents some policy implications.

2. Materials and Methods

2.1. Theoretical Framework

Following Barling and Gresham eds. [5], the methodological approach to analyse Vietnam's milk value chain in this study rests on a two-fold assumption: First, the governance of a given food value chain is a key determinant of its performance. The five types of global value chain governance, the values of the three variables that determine them from an economic point of view [18], and the social and environmental perspectives [42], are listed in Table 1. Second, that public policies contribute, to different extents depending on the context, to shape the governance of agri-food value chains and, in turn, their economic, social, and environmental performances [5].

Table 1. Key determinants of global value chain governance.

Governance Type	Complexity of Transactions	Ability to Codify Transactions	Capabilities in the Supply-Base	Degree of Explicit Coordination and Power Asymmetry
Market	Low	High	High	Low
Modular	High	High	High	↕
Relational	High	Low	High	
Captive	High	High	Low	
Hierarchy	High	Low	Low	High

Source: Gereffi et al. [18].

The research objectives of this study were achieved using the approach of Barling and Gresham eds. [5], the global value chain governance model of Gereffi et al. [18], and a qualitative framework which was developed on the basis of expert in-depth interviews and a grounded-theory process. Additionally, a focus group with consumers was conducted to verify some of the findings from consumers' perspectives. The grounded-theory process was modified from the approaches of Bitsch [43], Charmaz and Belgrave [44], and Winsen et al. [45] in accordance with protocols and the evaluative criteria to obtain a methodological fit and rigor [46]. The qualitative framework consists of four main stages, and the process of data coding and analysing includes four steps: coding, classifying, structuring, and synthesising (Figure 1). First, the authors identified the research problems and proposed the research hypothesis about the perception and degree of fairness in Vietnam's milk value chain. Second, we undertook a literature review and collected data via in-depth interviews and a focus group. Third, data was analysed and coded through four steps. The milk value chain was analysed and described in this stage. Finally, the governance, fairness, and regulatory interventions in the dairy supply chain were explored and consolidated.

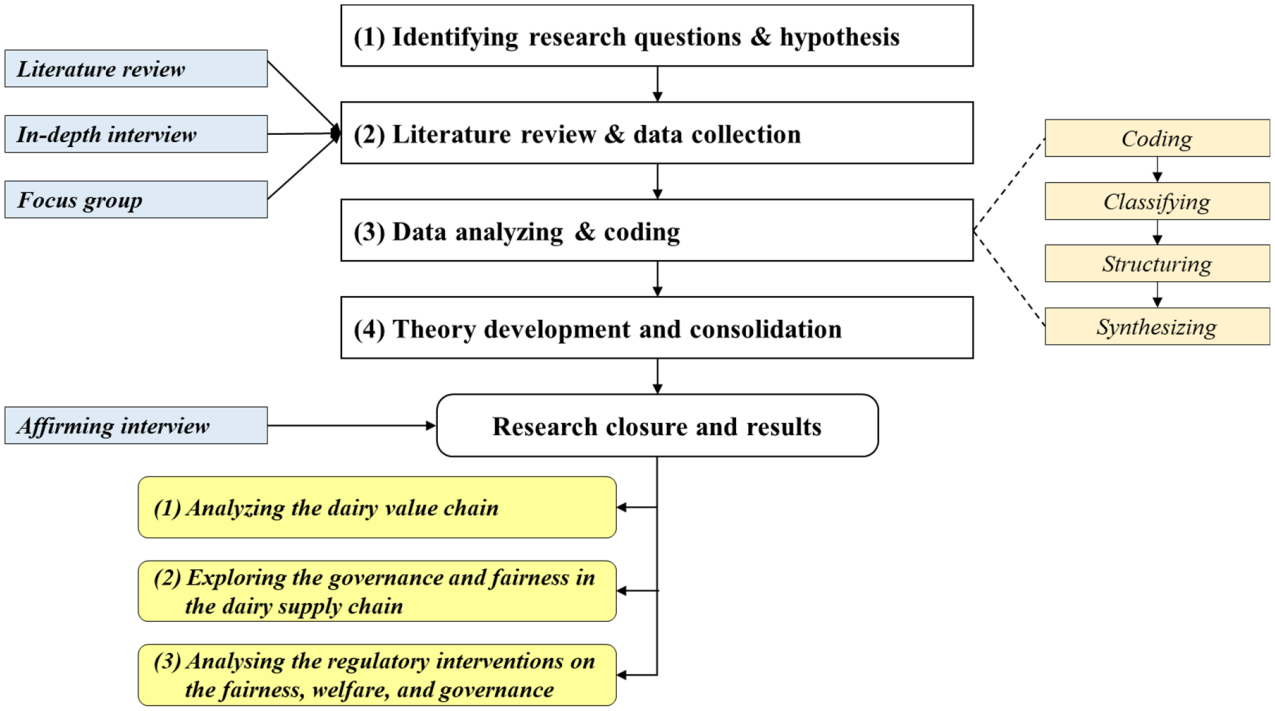

Figure 1. The qualitative research framework. Source: Bitsch [43], Charmaz and Belgrave [44], and Winsen et al. [45].

2.2. Global Value Chain Governance Model

The governance models of the dairy value chain in Vietnam are identified by using the global value chain governance model of Gereffi et al. [18]. There are five types of the global value chain governance (Figure 2) with characteristics as follows: (1) Market model: Transactions are easily codified, product specification is relatively simple, and the supplier has the capability to make the products. The costs of switching to new partners are low and power is relatively equal. (2) Modular model: Transaction and product specification become complex. Suppliers make products according to customers' specifications. The cost of switching to new partners remains low. (3) Relational model: Product specification cannot be codified, the transaction is complex, and supplier capability is high. The information must be exchanged and lead firms have to outsource from highly competent suppliers. Lead firms and suppliers are dependent and regulated through reputation, social and spatial proximity, and family and ethnicities. The cost of switching to new partners is high. (4) Captive model: Transaction and product specification are both complicated, but supplier capability is low. These require strong intervention and control of lead firms. Captive suppliers are frequently confined to a narrow range of tasks and dependent on lead firms. Suppliers have less power and face a very high cost to switch to new partners. (5) Hierarchy model. Product specification cannot be codified, the transaction is complex, and highly competent suppliers cannot be found. Lead firms have to develop and manufacture products in-house and this governance form is characterised by vertical integration.

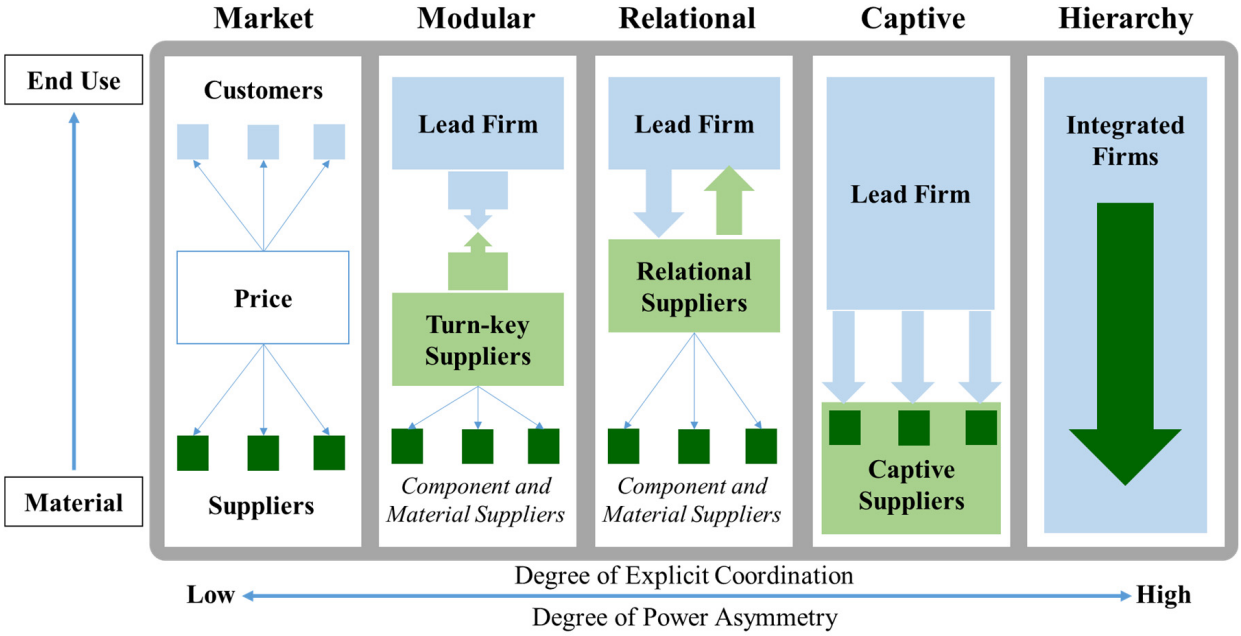

Figure 2. Five types of global value chain governance. Adapted from Gereffi et al. [18].

2.3. Data Collection

Primary data analysis was supplemented by secondary data analysis. The primary qualitative data was collected in 2019 and 2020 via in-depth and exploratory interviews with 25 stakeholders who are member and non-member farmers, cooperative directors, agency managers, leaders of large dairy firms, consultants and researchers, directors of retailers, and government officers. The interviews were based on a semi-structured and exploratory questionnaire that aimed to comprehensively investigate the governance, fairness, and dynamics of Vietnam's milk value chain, and identify the potential influence of regulatory interventions on the governance and fairness across this value chain. The interviews lasted 45–60 min on average and covered stakeholders across the major dairy production regions. In addition, a focus group with dairy product consumers was

conducted to verify some of the findings from consumers' perspectives. Finally, three additional expert interviews were conducted to confirm and consolidate the final findings. The secondary information was collected from various data sources (i.e., General Statistics Office—GSO, Food and Agriculture Organization—FAO), academic articles, statistics reports, media news, and other documents.

3. Results and Discussion

3.1. Overview of the Dairy Sector in Vietnam

Since the reform of 1986, Vietnam's economy and dairy sector, in particular, has been reconstructed from a planned system to a socialist-oriented market system with a competitive market. Subsequently, the dairy sector has developed dynamically and become one of the most important agri-food sectors, providing diverse dairy products for the domestic market, creating jobs and incomes for farmers, and gradually replacing imported dairy products [38]. The size of milk cow herds and dairy production have grown significantly. Vietnam became the sixth-biggest milk producer in Asia and the second-largest producer in ASEAN, having milk production of about one million tonnes (or approximately 1.6 billion litres) in 2018, and an average growth rate of 14.4% between 2010 and 2018 [34–36] (Figure 3). The milk value chain has been considerably upgraded and developed based on the development and expansion of some large dairy enterprises, which benefit from high technology and science, large investment, high-quality breeding cows (imported from the USA and New Zealand), and large-scale dairy farms such as Vinamilk, TH True Milk, and NutiMilk [47].

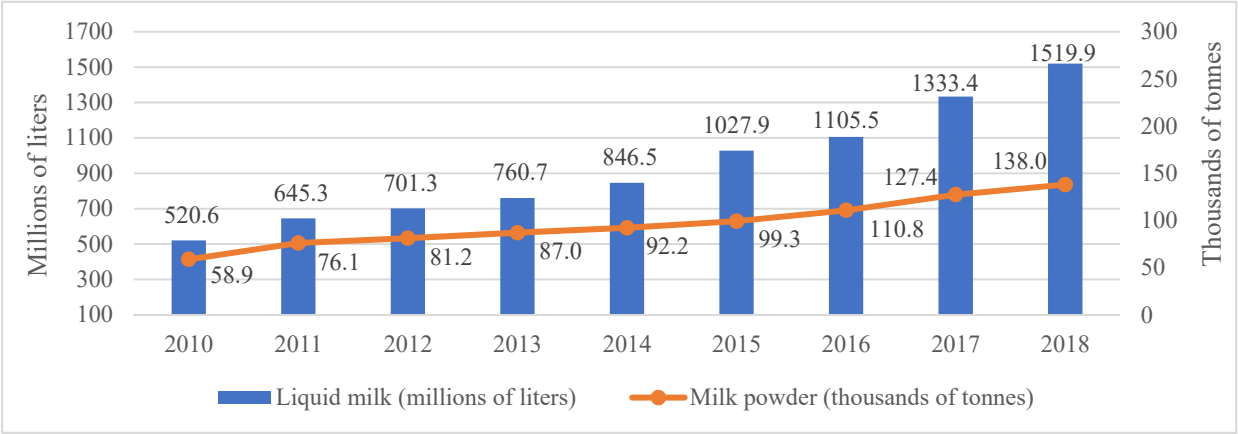

Figure 3. The quantity of fresh milk and milk powder. Source: Authors' analysis based on GSO [36].

The notable development of Vietnam's social and economic condition has led to the high demand for milk and the formation of a strong market and value chain [48]. Dairy revenue reached over EUR 4 billion in 2018, accounting for an average growth rate of 13.6% from 2013 to 2018. Liquid milk revenue was about EUR 2 billion in 2018 (Figure 4) [49,50]. Generally, the milk sector experienced the highest growth rate in the livestock food market and it is anticipated to continue growing at a rate of 10% per year in the future [51]. Liquid milk and powdered milk accounts for nearly three-quarters of the dairy market [52]. In the liquid milk segment, UHT (ultra-heat treaded) milk contributes 84%, and pasteurised milk and vegetable milk account for 4% and 12%, respectively [49].

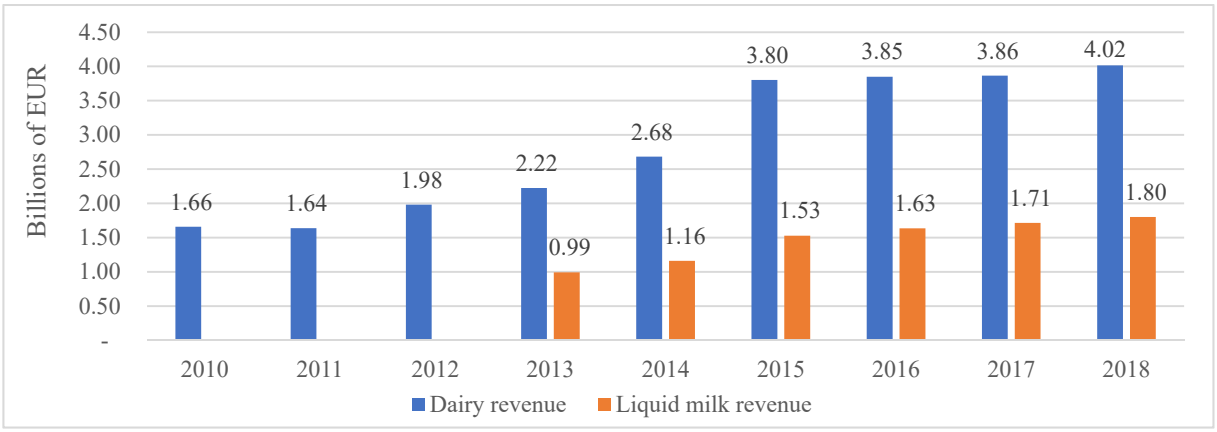

Figure 4. The revenues of the total dairy market and liquid milk market (billions of EUR). Source: Authors' analysis based on GSO [36].

Vietnam's milk consumption has increased and reached 2.6 billion litres in 2018, accounting for about 10% of the total food expenditure. Milk consumption in rural areas has also increased, in 2018 growing at a rate of 6.6% in quantity terms and 7.9% in value terms [36,53,54]. The average milk consumption has also doubled, from 14 litres per capita in 2010 to 27 litres per capita in 2018 [55]. The sharp increase in the dairy consumption in Vietnam can be explained by several factors, such as a stable growth in GDP per capita, which led to the development of middle-class income earners who account for around 80% of domestic milk use; an increase in living standards, health concerns, and a change in milk consumption habits; the development of modern and online retail distributions; and rapid urbanisation and the development of rural milk markets [49,53]. However, Vietnam's average per capita milk consumption, including milk and milk equivalents of dairy products, is still much lower than that of the world average, European average, and other Asian countries (e.g., Thailand and China) (Figure 5).

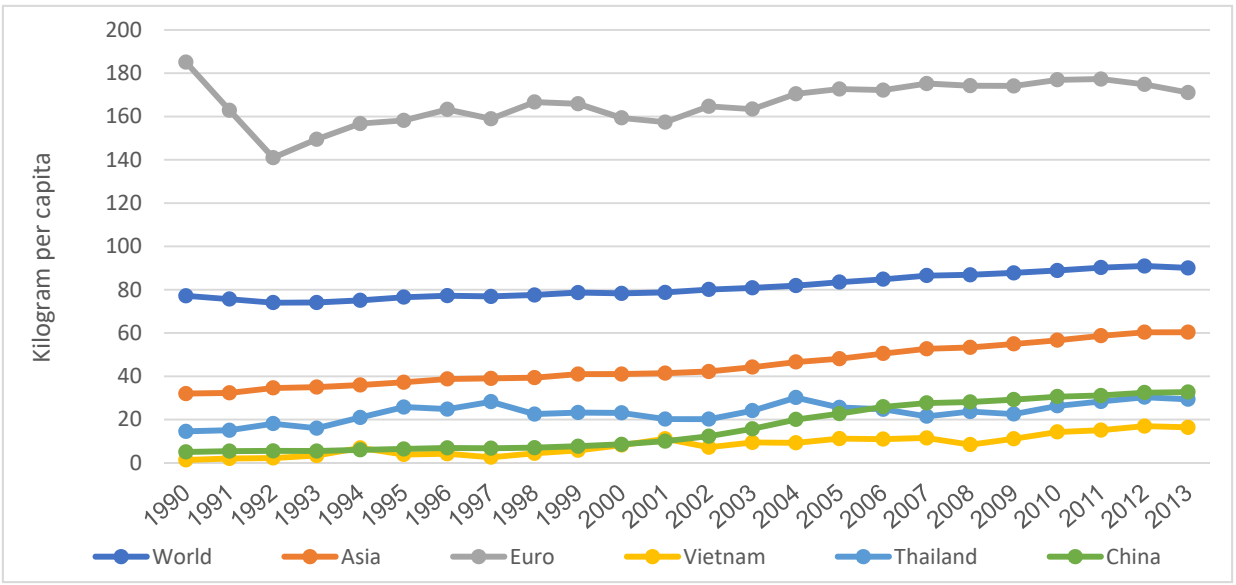

Figure 5. Per capita milk consumption (including milk equivalents of dairy products) (kg). Sources: Authors' analysis based on FAO [56].

Due to this large increase in milk consumption, Vietnam's milk production cannot meet its demand; hence, the country imports a large quantity of dairy products [35]. For example, in 2018, the national dairy production covered only 40% of its domestic demand, and the

remainder of demand was met by imports [57]. Vietnam imports milk (in the form of reconstituted milk) and milk products from 17 countries, mainly New Zealand (38% of the total value of imported dairy products), Singapore (16%), the USA (14%), Germany (7%), Thailand (6%), Australia, Japan, and Malaysia. Vietnam is in the top 20 largest dairy import countries in the world [49,58]. There are signs of import reduction since large local dairy firms, such as Vinamilk, TH True Milk, and NutiMilk, have increased their milk production [47]; however, more needs to be done to ensure self-sufficiency.

Vietnam exports dairy products to 43 countries, particularly infant milk formula. Its dairy export increased from about EUR 77 million in 2016 to over EUR 110 million in 2018. Its main export markets are Iraq, China, Hong Kong, the Philippines, Laos, Myanmar, the USA, Afghanistan, the UAE, the EU, and Japan. Vietnam has 10 exporting dairy companies, but four dominate the market, i.e., Vinamilk, TH True Milk, NutiMilk, and Moc Chau Milk. The value of dairy exports is estimated to increase in the future based on the export strategy and investment in overseas markets of these companies, and the advantages of various free trade agreements, such as the one signed with the European Union (namely EVFTA) [57,59].

Vietnam's milk farm-gate price has also continued to increase (in nominal terms) from EUR 0.24/kg in 2005 to EUR 0.53/kg in 2016, with an average growth of 7.8%. Between 2005 and 2011, Vietnam's milk prices were lower than the world prices. From 2011 to 2016, the world milk price declined while Vietnam's milk prices continued to raise (Figure 6). However, like for all commodities, milk prices are highly volatile depending on demand and supply. Farm-gate prices may also be different among farmers, depending on milk quality, farming contracts, and buyers [52]. Although reduction in the world price and the integration in the global market may have caused difficulties to domestic farmers, these also push them to enhance quality standards, increase farm size, improve productivity, and apply high technology and modern management approaches [57].

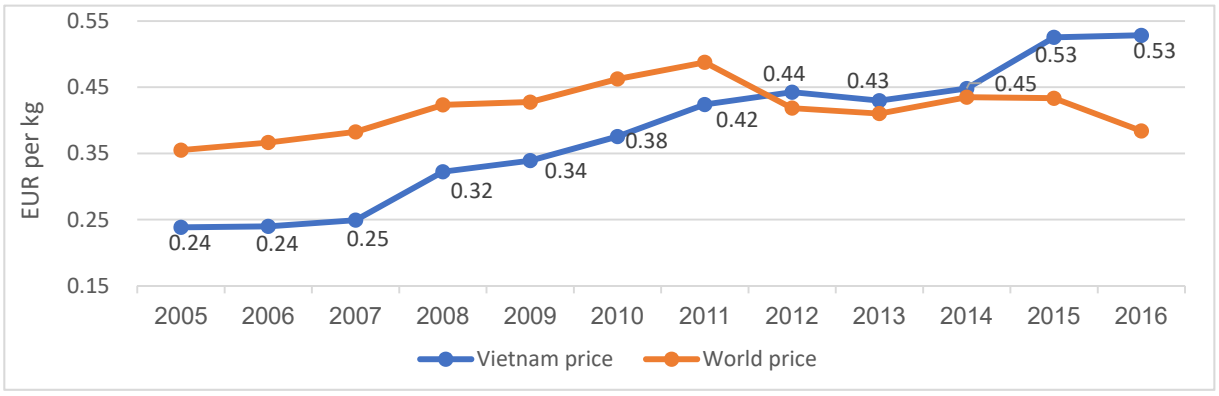

Figure 6. Vietnam's farm-gate price (nominal terms) of raw milk and world prices (EUR per kg). Source: Authors' analysis based on FAO [56].

Although Vietnam's milk sector has experienced rapid growths in milk production, demand, and trade, dairy farmers are facing various challenges, such as the dependence on imports of quality breeding cows and feed; small and scattered dairy farms; a low level of knowledge, skills, and experience; backward technology, low economic efficiency, and weak competitiveness; weak linkages in the value chain; a decrease in the number of dairy farms due to soil degradation and climate change; price volatility; and increasing competition. To overcome at least some of these challenges, Vietnam's government has implemented various policies and programmes that support the development of the dairy sector, enhance the fairness and sustainability of the milk value chain, improve farmers' income, and protect dairy consumers.

3.2. Analysis of the Milk Value Chain

The milk value chain in Vietnam is primarily created from core actors of farmers, cooperatives, processors, and distributors, and retailers (Figure 7). The additional actors include input suppliers, importers, exporters, government, and associations. Generally, most milk farmers participate in farming contracts and/or cooperatives because selling raw milk directly to customers (e.g., retailers and other end-users) is very difficult due to milk characteristics and storage requirements. Therefore, dairy cooperatives and contract farming have expanded quickly, along with the emergence of large-scale dairy farms of leading firms. The structure of the milk value chain in Vietnam is described as follows:

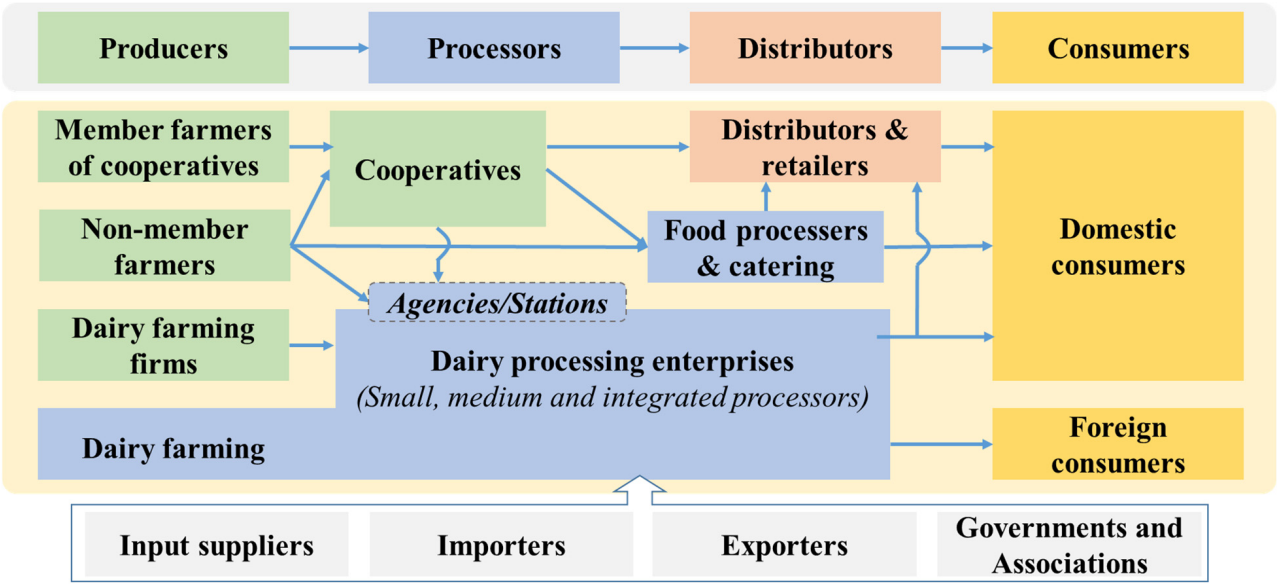

Figure 7. The milk value chain in Vietnam. Source: Authors' construction based on interviews.

3.2.1. Milk Farmer

In 2018, there were approximately 300,000 cattle in Vietnam, of which the number of cows producing milk stood at 200,000 head, experiencing an average growth rate of 9% between 2010 and 2018 [36,52]. Milk cows are mainly raised in the Southeast (33%) and the North Central and Central Coast (26%) of Vietnam. Ho Chi Minh City has the largest herd with 81,280 cows (28%), followed by Nghe An with 63,130 cows (21%). There are about 30,000 milk cow farmers having an average herd size of 10 cows, of which 1717 farms have a herd size of over 37 head, and some farms have a herd size of one thousand cows [60]. There are 20 dairy cooperatives in Vietnam, of which the largest is EverGrowth, which produces 22 tonnes of raw milk per day from 2300 members and 7000 cows [61]. Many dairy farms of large firms, such as Vinamilk and TH True Milk, meet the standards of Global GAP (Good Agricultural Practice), Viet GAHP (Good Animal Husbandry Practices), and the EU Organic certification. They have the largest and most modern farms in Vietnam [62,63].

Milk farmers are the key actors in the milk value chain. They purchase inputs such as breeding cows, feed, animal husbandry medicine, and equipment. They may directly provide raw milk to the processing firms or through a middle actor, such as a milk cooperative. The process of purchasing and quality control is undertaken on a weekly basis by the purchasing firms. The raw milk is transported by farmers and collected by dairy firms at their stations or agencies twice per day. Then, the milk is preserved and transported at a temperature of between 2 and 6 °C using dedicated refrigeration tools and equipment. This process is regulated by the National Technical Regulation for raw milk (QCVN 01-186: 2017/BNNPTNT) regarding quality criteria, food safety, and management requirements.

3.2.2. Dairy Processor

Once collected at cooperative centres and firms' agencies or stations, the milk is then transported to dairy firms' factories or storage facilities with dedicated tank trucks. The processors test the milk quality to support decisions about purchasing, grades, prices, and payment. The payment to the farmer for the purchased milk is then made (Figure 8).

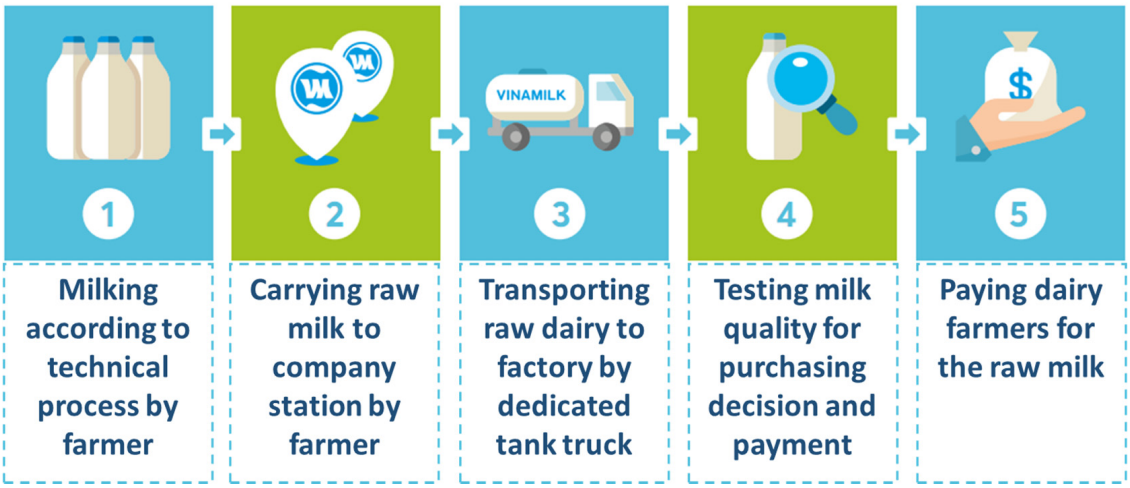

Figure 8. The process of purchasing, transporting, testing, and payment of the Vinamilk company. Reprinted from Vinamilk [64].

Raw cow milk is the primary input to produce various dairy products, such as UHT/pasteurised drinking milk, powder milk, yogurt, butter, cheese, and ice cream. The market shares of the dairy products in Vietnam are shown in Figure 9. The quality standards of Vietnam's dairy products are regulated by the Ministry of Agriculture and Rural Development, Ministry of Science and Technology via the national standard of TCVN for milk and milk products, the international CODEX standard, the Viet GAHP standard, and the Global GAP standard [65].

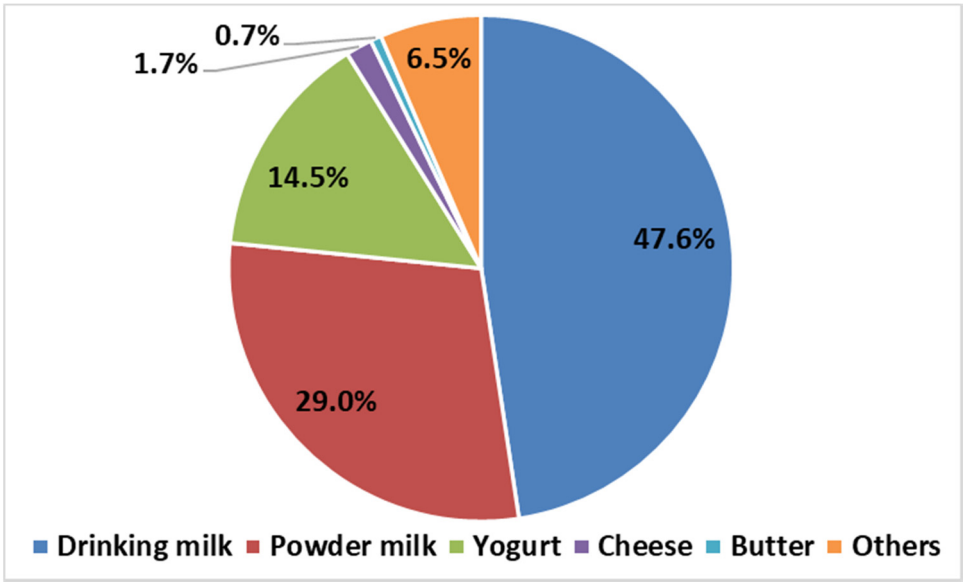

Figure 9. The turnover market shares of dairy products in 2020. Source: SSI [66].

In Vietnam, there were over 60 milk processing and trading firms in 2019 with over 300 brands. The largest local dairy companies are Vinamilk, TH True Milk, Moc Chau milk, IDP, and Nutifood, and the biggest foreign enterprises are FrieslandCampina, Nestle,

and Abbott [59,67]. The concentration level of the milk processing enterprises is relatively high, with the largest four dairy companies (7% of the industry) accounting for 79% of the drinking milk market share, including Vinamilk (55%), TH True Milk (11%), Friesland-Campina Viet Nam (7%), and Moc Chau (6%) [68]. Vinamilk is also in the top 50 biggest dairy companies in the world, ranking 36th in 2020 [69].

3.2.3. Milk Distribution System

In Vietnam, dairy products are distributed through various retail systems. Distribution and retail channels in Vietnam's milk value chain consist of (1) Traditional sale channels: grocery stores, wet shops, and firms' retail points; (2) Modern channels: supermarkets and convenience stores; (3) Online shopping channels: Social networks (Facebook, Zalo), e-commerce shops, and websites; (4) HoReCa channels: hotels, restaurants, and canteens; (5) Export markets: Exporting or investment in foreign markets. The large dairy firms can have all types of these distribution and retail channels. For example, Vinamilk's sale system spreads throughout the country with 208 distributors and 250,000 retail points. Its products are in all distribution channels. A striking point of Vinamilk's distribution is the "Vietnam Milk Dream" store chain, having 450 sale points and also connected to the online shopping system. The firm also supplies to the HoReCa channel and exports to global markets [64].

3.2.4. Global Governance of Vietnam's Milk Value Chain

Based on the global value chain governance model of Gereffi et al. [18], three types of dairy value chain governance can be identified in Vietnam, i.e., relational governance, captive governance, and hierarchy (integrated) governance (Figure 10).

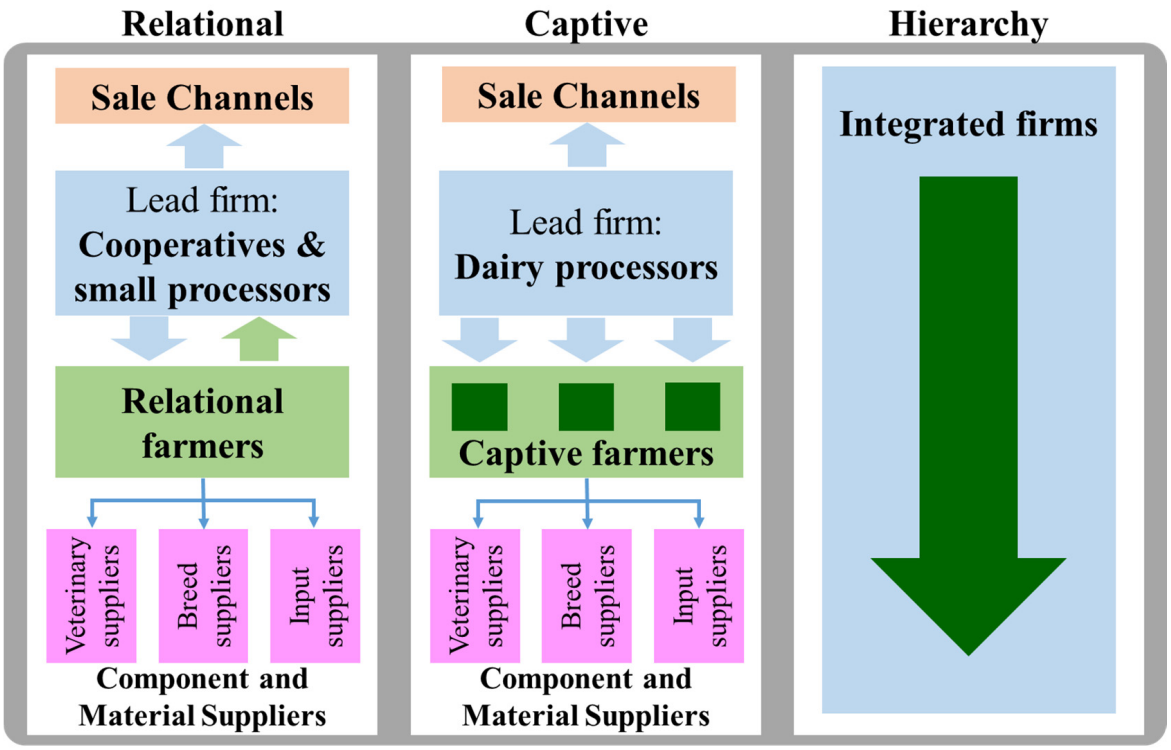

Figure 10. Three types of the milk value chain governance in Vietnam.

Relational value chain: Dairy farmers in an area with sufficient farming conditions may participate in dairy cooperatives, with the activities of both raising dairy cows and processing milk products taking place at small and medium scales. These processors require basic quality and safety standards of raw milk. The transaction is complex because it needs trust, social and spatial proximity, and family and ethnic ties to control the mutual dependence between farmers and cooperatives. Member farmers sell their raw milk to

the dairy cooperative through a simple contract. Dairy farmers are both suppliers and owners of the cooperative. The ability to codify transactions is low, whereas the capabilities of farmers (as suppliers) are high. The cost of switching to new partners is high due to farmers' contracts and ownership of the cooperative. Dong Thanh, Ever-Growth, and Tan Thong Hoi cooperatives exemplify this type. In this model, the milk cooperative is a dairy processor in the vertical linkage, but not a milk trader or collection agency for dairy firms.

Captive value chain: Big dairy processors demand more stringent quality standards of both raising cows and milk; that is, there is a high ability to codify in the form of detailed instructions for standards. This requires more knowledge, skills, technique and technology, and financial capital. Thus, dairy farmers need support, interventions, and commitment to purchase from the dairy firms. Farmers can produce higher-quality milk with the support and guide of firms. They benefit from higher prices for the higher-quality milk. As a result, dairy farmers depend on the lead processing firms and become captive suppliers. Dairy farmers and processing firms usually have a tight and official contract with clear terms relating to quality standards, price, quantity, support, penalties, etc. In this governance model, both transaction and product specifications are complicated, and milk farmers' capabilities (as suppliers) are low. Due to a high price, strict quality standards, support and intervention from firms, and tight contracts, it is difficult for farmers to change milk buyers. There are also milk cooperatives in this model that act as a horizontal linkage. They play the role of traders or collections centres for dairy firms, but not the role of processors.

Hierarchy value chain: The most advanced, modern, and high-technology milk value chain is the hierarchy governance model, in which a large firm integrates almost all of the key activities, such as cattle feed production, dairy farming, milk processing, and dairy product distribution. Dairy farming in this governance model usually has quality certifications with a higher specificity in comparison with other models. Meeting high quality standards (such as Global GAP and EU Organic) and achieving effective production require complex and expensive processes and practices that cannot be applied by small and scattered dairy farmers. Only very large firms with high technology and techniques, sufficient financial resources, and modern farming management can meet these quality conditions. Vietnam's leading dairy firms, such as Vinamilk, TH True Milk, and NutiMilk, have invested in large and modern dairy farms to guarantee stable input quality, quantity, and price, upgrade product segments, and expand market shares. They have also built their own distribution systems and retail shops. These firms are able to build an integrated dairy value chain from farming to retailing; hence, they are perfect examples of a hierarchy value chain governance model. However, this governance model is not common and the internal supply accounts for only 5–10% of the firms' total dairy input.

3.3. Governance and Fairness in Vietnam's Milk Value Chain

3.3.1. Evolution of the Milk Value Chain Governance in Vietnam

Vietnam reformed its economic system in 1986 and in 1991, and the critical elements of the reform included decentralisation, market development, land use rights, private ownership, foreign investment, and global relationship. Since these reforms, Vietnam's dairy sector has progressed through three phases of building, expanding in breadth, and undergoing in-depth development. Accordingly, the governance models of the dairy value chain have positively changed and advanced.

The first phase of building (approximately 1986–1991): The key goal of Vietnam in this period was to meet people's basic demand for food and reduce poverty. The private and commercial dairy actors appeared and developed. The major large dairy farms and firms still belonged to the government. The main value chain governance models in this phase were mainly market, modular, and relational.

The second phase of expanding in breadth (approximately 1992–2005): The dairy farms and firms were broadly built and quickly developed throughout the country, expanding from small subsistence farms to large-scale farms, with the support and promotion of

policies under Vietnam's national industrialisation and modernisation strategy. In this period, large dairy state-owned enterprises were equitised (dividing ownership into shares for private actors), foreign dairy companies were established, and private large dairy farms and firms increased in number and were modernised. Vietnam's value chain governance models in this period were mainly modular, relational, and captive.

The third phase of in-depth development (approximately 2005–present): Under the conditions of globalisation, increasing competition, climate change, and changes in food consumer behaviour, Vietnam's dairy sector developed in a sustainable and modern manner. Leading firms began to undertake mergers and acquisitions, to build large-scale farms with high technology, modern management, and sustainable quality standards (such as Global GAP and EU Organic). The governance models in this period were mainly relational, captive, and hierarchy.

3.3.2. Fairness: Price and Contractual Arrangements

In Vietnam, most dairy farmers have farming contracts or agreements to sell their milk, regardless of whether they are in any models of value chain governance, or whether they operate at small or large scales. The findings from the interviews show that the scope of the processors, the governance of the dairy value chain, and the scale of the farms significantly determine the nature of relations between farmers and buyers, in addition to the behaviour of farmers. As previously highlighted, there are three governance models that characterise the milk value chain in Vietnam. Because there is no farmer–firm relationship in the integrated model, the price and contractual arrangements were analysed only for the captive and relational models. The components of price, fairness, and relationship in these models are different.

In the captive governance model, the contract between dairy firms and farmers is annually renewed in terms of quantity, quality standard, price, payment, and processes. In general, the transaction milk quantity must reach the registered amount, and farmers must supply the quantity stipulated in the contract. If farmers change the size of cow herds and milk supply quantity, they should notify the dairy firms in advance. In practice, dairy firms still buy the additional volume from contracted farmers if the quality of milk is high.

The raw milk prices are different and depend on the milk quality. The quality standards are measured for three main criteria, namely, total solids, fat content, and somatic cells. The requirement of quality standards may be increased over time and farmers have no choice but to follow them: "*Recently, the firm has added new standards for raw milk. If the firm adds something else in the next year, then farmers must unwillingly follow that"* (Agency Manager 1). The best-quality milk receives the highest price, which is usually higher than the market price; average-quality milk receives a medium price, which is similar to the market price (about 15% lower than the highest price); and the lowest-quality milk receives the lowest price, which is lower than the market price (about 20% lower than the medium price). The price is determined weekly by the dairy firm after collecting the milk and quality testing, and then the firm pays farmers accordingly. As noted by some interviewees, this process is deemed to be unfair to farmers: "*It's unfair that dairy firm decides the milk price after one week of testing the milk quality which means that the firm is the judge in his own case. Other testing centres are not qualified and not accepted by the firm*" (Agency Manager 1).

It is supposed that the lowest price is just equal to the production cost; hence, there is no profit for farmers. Various input costs are also not taken into account. In addition, it is difficult and rare for small-scale farms to achieve the best quality and hence to receive the highest prices: "*The range of milk prices is high, a large difference between the upper and lower prices. But it is hard and rare for dairy farmers to produce high standard milk. They face many costs, risks and [in general] they are making a loss. It is likely that some farmers may exit the sector*" (Agency Manager 2). Farmers also think that they are unfairly treated given this mechanism of price setting and quality testing. They suspect that "*the firm may set up difficult standards so to purchase milk at a lower price. If farmers do not sell raw milk to the firm,*

it is hard for them to sell their milk otherwise. It is a very risky and unstable business" (Agency Manager 3). Dairy farmers are also concerned that they may lose money by investing in modern farming technology and infrastructure to improve the quality of their milk, given that firms can change the quality standard and price policies as often as they like. Hence, in this model, it is essential to enhance actors' trust, commitment, and behaviour.

The contract also has a sanction term; thus, for example, if a dairy farm supplies milk at the lowest quality and price in two consecutive weeks, or the raw milk is contaminated with antibiotics, the firm has the right to terminate the contract. The exclusivity clause of the contract prohibits farmers from selling their raw milk to other firms. In reality, however, farmers optimise profit by selling the best milk to the contracted company and occasionally selling low-quality milk to others: "*Some farmers possibly sell in parallel their raw milk to three buyers such as A, B, and C companies. They may sell their raw milk to these firms at the same time with different milk quantities, qualities, and prices. The milk with the highest quality is sold to A firm for the best price, the milk with medium quality and high fat is sold to B, while the rest is sold to C*" (Consultant and Researcher 2).

By comparison, stakeholders imply that a fair measure of strong actors (i.e., large firms) can be misunderstood and considered as unfairness by weak actors (i.e., small farmers). For example, a dairy firm can set up a stringent quality control system with a higher price for the higher quality milk. This is good and fair for dairy consumers and motivates farmers to "*increase milk quality and obtain a higher price, especially in the medium and long terms*" (Consultant and Researcher 3). If farmers "*have good farming practices, follow firms' processes and standards, and produce good-quality milk they can surely achieve more stable and higher prices*" (Local Government Leader 1). However, farmers may regard the strict quality standard as unfair to them because it is difficult to produce high-quality milk. In conclusion, the contract in the captive governance model can result in more stable and higher prices for farmers. However, they are the weakest link in this model and have no power to negotiate; hence, they are at the mercy of the leading firms. Nonetheless, milk farmers must improve their milk quality and enhance their capacity to successfully benefit from this type of model.

Cooperative contracts can be characterised by higher levels of farmers' power and fairness in the relational governance model. In this relationship, the milk price is discussed and determined by both processing cooperatives and members; hence, benefits are shared and ensure an appropriate income for farmers. The milk quality standard is at the basic level and is controlled by two criteria: no dilution and no antibiotics. The quality testing is not very strict. Although the quality testing in this model is less stringent than that in the captive model, it is guaranteed by the high level of trust and the cohesion between cooperatives and farmers: "*Generally, before signing the contract, we have known and trusted each other well. This cooperative mainly buy milk from acquaintances*" (Cooperative Director 1). Trust is verified and increased over time by both farmers and cooperatives through the quality improvement and the stability of payment, price, and purchasing: "*Before, trust level was only about 20%, but now it is up to 90% and gradually rising. Beliefs are currently trending upward*" (Cooperative Member Farmer 1) and "*If raw milk has any problem, we inform farmers to check. They are willing to adjust and improve milk quality . . . /. Sometimes, the cooperative still buy milk from farmers at the committed price and amount. Even we make a loss, the cooperative must ensure the income for member farmers*" (Cooperative Director 2). Milk farmers are also owners; thus, they trust the structure and attempt to enhance the milk quality: "*We have to trust and work together to make this cooperative exist and grow. For example, when someone reminds a farmer about the total solid and fat content in milk, he has to make positive changes such as feeding, cleaning, and milking methods*" (Cooperative Member Farmer 2).

There is only one contract price for all milk quality grades in the relational governance model. The milk price is usually fixed each year based on the purchasing price of leading dairy companies and farmers' costs. It is usually similar to the medium price of leading firms. This price mechanism is stable and good for dairy farms, especially those having a small scale and lower milk quality: "*Farmers can sell milk at a stable price, it may be neither high*

nor low, but enough to maintain their herds. In general, dairy farmers seem to prefer to sell their milk to the cooperative at that price because it is stable and clear for them" (Cooperative Member Farmer 3). The cooperative can also purchase milk from non-member dairy farmers at a lower price. This helps farmers to sell their lower-quality milk if they cannot sell to large dairy firms: "*Our cooperative aims to share the benefit with farmers. If farmers cannot sell their milk to dairy firms, at any time, they can sell to the cooperative. This helps farmers to reduce their difficulties and financial loss*" (Cooperative Director 2).

Another interesting finding is that there is no fixed term of *exclusivity* in the cooperative contract. Farmers can sell milk with a higher quality to dairy firms to obtain a higher price. In practice, farmers usually sell more than 70% of their milk production to contracted cooperatives. Thus, the role of the contract in this model is mainly to "*ensure the stable price and income for farmers, help farmers to improve milk production conditions, and increase the trust between farmers and cooperatives rather than to bind farmers by milk quantity, quality standard controls, and sanctions*" (Consultant and Researcher 2).

The additional finding from the focus group of dairy end-users indicates that the concept of fairness is not well understood. Generally, consumers feel unfairly treated because the retail prices are relatively high, while they have insufficient information on milk product quality, origins, and nutrition. The participants also showed a vague understanding of, and little trust in, the domestic quality standard certifications, and they required more obvious and detailed information about the quality standards. Thus, information appears to be a key attribute of fairness.

In summary, the contract terms in the captive model are more standardised, obligatory, and obvious than those in the relational model, whereas the fairness and power of farmers in the relational governance model appear to be higher than those in the captive governance model. The cooperative contract may be viewed as fostering fairness, power, and stability for dairy farms, particularly small-scale and less efficient milk farms. However, the controls of milk quality and other conditions in the cooperative contract are not highly stringent, which may lead to lower milk quality and decrease farmers' capacity in the long term if the ethics and commitments of some dairy farmers are not strong enough. In contrast, leading dairy firms in the captive model can strictly control milk quality and farming processes, provide dairy farmers with various supports and guides, and offer a higher price for high-quality milk. These practices can "*enhance the sustainable development of the dairy sector, increase farmers' capacity, and provide higher quality milk for consumers in the long term though they may be considered as unfair to farmers in the short term*" (President of a Leading Dairy Firm). This finding is backed by the literature, which indicates that the quality standard may be positive in terms of food safety and environmental protection, but is negative in terms of equality and income, particularly for small farmers in developing countries [25,26].

3.3.3. The Socialist-Oriented Market Economy and Regulatory Interventions

Vietnam has experienced dramatic changes in its political and economic orientation to socialism, market, and global integration since the reforms of 1986 and 1991. The country has become a socialist-oriented market economy having the core goals of enhancing social welfare, fairness, democracy, and civilisation. These changes have led to the development of the agricultural sector and the dairy value chain in particular. To achieve these targets, Vietnam's government has implemented a series of policies and programmes to develop agricultural sectors and support farmers. The regulatory interventions have significantly affected fairness, welfare, governance, and sustainability in Vietnam's dairy value chain, and they can be categorised into seven groups as follows:

Developing the Dairy Sector in General

Since 1986, Vietnam has developed the dairy sector, and particularly its private actors, with various policies to enhance the development of the milk value chain. Milk cow farms rapidly developed in Ho Chi Minh, Dong Nai, and North provinces with an average

growth in the number of cows of 11% from 1985 to 1999 [70]. The government implemented several policies and programmes affecting the development of the dairy sector, as follows: enhancing large-scale production, high-quality breeds, modernity, sustainability, cleaner production, waste treatment, and food hygiene and safety; applying advanced and modern technology and science to produce high-quality and diverse dairy products; increasing the use of local raw milk supply while reducing the consumption of imported milk powder; encouraging private investment in agricultural industries and rural areas; promoting the dairy brands and markets; and increasing added value and sustainable development.

The key regulations to develop the dairy sector are Decision 167/2001/QĐ/TTg on the master strategy to develop the dairy cow sector in 2001–2010; Decision 22/2005/QD-BCN on the development programme for the dairy processing industry in Vietnam to 2010, with a vision toward 2020; Decision 3399/QD-BCT on the development project for the dairy processing industry in Vietnam to 2020, with a vision toward 2025; Decision 10/2008/QD-TTg on the livestock development strategy to 2020; Decree 210/2013/ND-CP on incentives for firms investing in agriculture and rural areas; and Decision 984/QD-BNN-CN on re-structuring the livestock industry for increasing added value and sustainable development.

Enhancing the Capacity of Dairy Farmers and Cooperatives

The sustainable and long-term development of the dairy value chain requires weak actors to increase their capacity and performance. Dairy farmers can gain diverse supports, such as training, loan interest and credit, breeding and feed, machinery and equipment, technique and technology, insurance, and consulting. The policies basically help farmers and cooperatives enhance their capacities and increase milk quality. For example, Ho Chi Minh City has financial supports for the new investment in high-technology dairy production and processing. Dairy farmers and cooperatives receive support and achieve effective results. As Cooperative Director 1 said, "*If I had no support from the government, I could not build this modern factory and operate the cooperative so far. The support helps us upgrade farming and processing technique and technology*".

The main policies enhancing the capacity of dairy farmers and cooperatives are Decision 50/2014/QĐ-TTg on increasing effectiveness and capacity of livestock households in 2015-2020; Decision 315/2011/QD-TTg on agricultural insurance in 21 provinces in 2011–2013; Decree 02/2010/ND-CP on the agricultural extension to increase farmers' efficiency, capacity, and income by training, information, communication, and consulting; Decree 41/2010/ND-CP on credit policies for agricultural and rural development; Circular 02/2010/TT-NHNN on supporting interest rates for purchasing machinery, equipment, and materials for agricultural production; Dispatch 8013/VPCP-QHQT and Decision 1263/QĐ-UBND on the ODA project from Israel to invest in high-technology dairy farms in Ho Chi Minh city; Decision 4320/QĐ-UBND on a programme to develop dairy cow farming in Ho Chi Minh in the period 2011–2015; and Decision in 2004 on promoting dairy cow farming in Binh Dinh. In addition, Decision 4653/QĐ-BNN-CN on Vietnamese Good Animal Husbandry Practices ensures raw milk quality, food safety, environmental protection, and social welfare. The certification can enhance milk farmers' capacity, income, power, and fairness in the value chain.

However, "whether dairy farmers can take advantages of these supports to enhance their performance and dairy quality and achieve a higher price, income, and power depends on themselves" (Local Government Leader 2). Many small-scale farmers fail to make the best use of these supports and cannot sell their products at a high price, so as to make a profit. They rely on direct financial supports.

Increasing the Income, Welfare, and Poverty Reduction of Farmers

In Vietnam, increasing income and welfare, and reducing poverty, of farmers and the poor in the rural areas receive the most attention and policy support from the government. There are a large number and diverse forms of these regulatory interventions, such as direct payments, income support, price stabilisation, price support, irrigation fee exemption,

land use fee exemption, tax exemption, extension services, research, flood protection, and storage infrastructure [71,72].

The typical policies to raise income and welfare, and reduce poverty, are Decree 75/2008/ND-CP and Decree 177/2013/ND-CP on the price stabilisation for the essential commodities, including dairy products; Decision 135/1998/QD-TTg and Decision 07/2006/QD-TTg on the poverty reduction programme for ethnic minorities and remote areas; Resolution 55/2010/QH12 and Decree 20/2011/ND-CP on the exemption and reduction in agricultural land use tax; and Decree 42/2012/ND-CP on paddy land management with a direct per hectare payment to farmers.

Linking: Cooperative and Contract Farming

Vietnam has implemented policies and programmes to encourage farmers and firms to participate in dairy cooperatives and contract farming to enhance farmers' benefit, power, and relationships in the dairy value chain. Cooperatives may increase power, fairness, profit, and trust for farmers, and contract farming can encourage linking dairy production to consumption, stabilising prices, building large dairy farms, and investing in advanced technology and modern farming management.

The key policies to promote cooperative and contract farming are Decision 80/2002/QĐ-TTg and Decision 62/2013/QD-TTg on encouraging processing enterprises to purchase agricultural products from farmers by farming contracts; Decision 800/QĐ-TTg and Decision 1600/QĐ-TTg on a large programme to build new-style rural areas and developing agricultural cooperatives; Decision 461/QĐ-TTg on developing 15,000 effective agricultural cooperatives with several means of support for new and current agricultural cooperatives; Decree 98/2018/NĐ-CP on incentives for the development of linkages in the production and consumption of agricultural products; and Decision 1804/QĐ-TTg on a project to support and develop cooperatives in 2021–2025.

Improving Dairy Safety, Human Nutrition, and Milk Demand

The policies on dairy safety and hygiene, human nutrition, and milk demand can increase milk quality, improve consumers' health, and promote the dairy market. In 2010, the government implemented a master scheme to develop the physical strength and stature of Vietnamese people and to improve the quality of life. A key result of the scheme was the *school milk programme* to provide fresh milk for 45–50% of kindergartens and primary schools pupils by 2015 and for 100% of kindergartens and primary schools by 2020. This scheme enhances the demand for milk products and clients' awareness of the value of dairy. The programme is the "*key stimulus to establish and develop small and medium processors to supply milk products to the market segments*" (Cooperative Director 1). The Ministry of Health differentiated fresh milk and reconstituted milk with detailed descriptions of nutrition, ingredients, and functions. This regulation can *"enhance the competitiveness and fairness to local milk farmers since fresh milk is more preferred by milk consumers and it is made by local producers"* (Consultant and Researcher 3).

The main policies on improving dairy safety, human nutrition, and milk demand are Decision 461/QD-TTg on developing the physical strength and stature of Vietnamese people; Decision 4653/QĐ-BNN-CN on good animal husbandry practices for dairy production; Circular 29/2017/TT-BNNPTNT and QCVN 01-186:2017/BNNPTNT on the quality criteria, food safety, and management requirements for raw milk; Circular 03/2017/TT-BYT and QCVN 5-1:2017/BYT on the safety limits and management requirements for milk products; and Circular QCVN/5/1/2017-BYT on defining fresh milk and reconstituted milk with detailed descriptions of nutrition, ingredients, and functions.

Promoting the Transparency and Openness of Information

Information is a key attribute of fairness in the food value chain and a requirement in a farming contract. The symmetry, transparency, and openness of information indicates the fairness and results in benefits for farmers. Vietnam's government has issued diverse

regulations on packaging and labelling, product quality and nutrition, safety and quality standards, advertising information, and traceability to promote information symmetry, transparency, and openness. Several projects have been implemented to help farmers assess market information, record production information, obtain quality and traceability certifications, and apply information technology to promote information.

The main policies to promote transparency and openness of information are Decree 43/2017-CP on prescribing the contents, means of recording, and guide management of the goods labels; Decree 38/2012/ND-CP on ensuring food safety information on the label matches the nature of the product, and is accurate, clear, and not misleading to the users; Decree 02/2010/ND-CP on agricultural extension to increase farmers' capacity and income by information sharing and communication; Plan 02/KH-UBND to maintain and develop agri-food traceability systems in Ha Noi; QCVN/5/1/2017-BYT on defining fresh milk and reconstituted milk with detailed descriptions of nutrition, ingredients, and functions; and Decree 100/2014/NĐ-CP on information, education, communication, and advertising in trading and consumption of nutrition products, milk, and products for children.

Protecting the Environment and Animal Welfare

Protecting the environment and animal welfare are more recent concerns that have gained the attention of policymakers and researchers. Agricultural production and food quality are related to and dependent on environmental conditions. Moreover, the dairy sector is connected to animal welfare. This topic has become especially important due to the recent changes in climate and consumer behaviour. Vietnam's key regulations to protect the environment and animal welfare include Law 55/2014/QH13 on protecting the environment; Decision 4653/QĐ-BNN-CN on good animal husbandry practices for dairy production in Vietnam; Decision 543/QD-BNN-KHCN on the action plan to respond to climate change in the agricultural sector in 2011–15 and the vision to 2050; Decree 02/2010/ND-CP on agricultural extension, with one of the main targets being environmental protection; and Law 32/2018/QH14 on animal welfare, with requirements in production activities, transportation, slaughter, scientific research, and other activities.

4. Conclusions

In general, milk products play a key role in human health in Vietnam, and dairy production is an important agri-food sector with notable investment and support from both the government and private enterprises. This research provides an exploratory analysis of the milk value chain, identifies the governance and fairness in the value chain, and assesses the regulatory interventions across the milk supply chain in Vietnam. The results show that dairy production has developed significantly over the past ten years, and the sector is highly ranked in Asia and ASEAN. Domestic production can only satisfy 40% of the national milk consumption. Nevertheless, Vietnam still exports dairy products to 43 countries, mainly in the form of infant milk formula.

Vietnam's milk value chain is structured around three global value chain governance models, i.e., the hierarchy, captive, and relational value chains. Due to the specific characteristics of dairy farming and milk products, almost all of the dairy farmers participate in contracts or cooperatives. Vietnam's dairy sector has progressed through three phases of formation, expanding in breadth, and undergoing in-depth development. The governance of the milk value chain has changed and developed accordingly. Recently, leading firms have merged and acquired, built large-scale farms with advanced technology and modern management principles, employed sustainable standards, and formed an integrated milk value chain.

The study shows a relatively low level of fairness and power, particularly for small-scale dairy farms and consumers in Vietnam. The asymmetries of fairness and power relationships between actors originate from the high concentration level of the milk industry in a small number of very large dairy firms; the large number of small and scattered dairy cow farms; the weakness of dairy farmers in education, skill, knowledge, and in-

formation; and the disadvantages relating to cow breeds, financial capital, technology, and management. In the short term, dairy farmers in the relational model may obtain more power and fairness, whereas dairy farmers in the captive model can gain more benefits and fairness in the long term. However, the understanding of fairness, as a concept, across the milk value chain appears to be vague and controversial. Fairness may consist of various perspectives, such as economic, social, environmental, political, and ethical issues. The perception of fairness is also different between actors and reflects their individual positions in the value chain. Actions (perceived as fair) of actors with greater power can be misunderstood and considered to be unfair by actors with less power.

Under the high pressures of globalisation, climate change, and changes in consumer behaviour, Vietnam's milk value chain has been notably upgraded in a more sustainable and modern manner. Vietnam's regulatory interventions have had positive and significant influences on fairness, welfare, sustainability, and governance in the milk supply chain. The government's policies and programmes can be categorised into seven groups. However, not all dairy farmers are benefiting from these supporting policies and programmes. Therefore, to be successful, policies and programmes to enhance fairness and the welfare of dairy farmers should be diverse, gradual, and inclusive.

As with any exploratory study, this research has limitations. Although it explored the governance and fairness in Vietnam's milk value chain and assessed the influence of regulatory interventions, it did not identify the specific determinants at the farm level. Thus, research that focuses on identifying the farming factors and farmers' understanding of governance and fairness will add to our study. Nonetheless, despite these limitations, our study adds to the existing literature and creates opportunities for future work on governance and fairness in value chains in transition and developing countries.

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