



# JOURNAL OF FORESTRY SCIENCE AND TECHNOLOGY

ISSN 2615 - 9368

\*\*\* JOURNAL OF FORESTRY SCIENCE AND TECHNOLOGY \*\*\* No.9 (2020)



**No.9  
(2020)**

VIET NAM NATIONAL UNIVERSITY OF FORESTRY



**JOURNAL OF FORESTRY  
SCIENCE AND TECHNOLOGY**

**ISSN: 2615 - 9368**

**THE NINTH YEAR  
NO. 9 (2020)**

**Editor-in-Chief:**

**(To be in charge)**

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Journal of Forestry Science and

Technology Department

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Chuong My – Ha Noi – Viet Nam

Tel: 024.8588.3318

Email: Tapchikhenln@vnuf.edu.vn

**License number:**

1948/GP - BTTTT

Ministry of Information and

Communications issued

on 23 October 2012

Printing in Hoang Quoc Viet  
Technology and Science  
Joint Stock Company

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**Tạp chí:**

**KHOA HỌC & CÔNG NGHỆ**

**LÂM NGHIỆP**

**ISSN: 2615 - 9368**

**NĂM THỨ CHÍN  
SỐ 9 (2020)**

**PHỤ TRÁCH  
TỔNG BIÊN TẬP  
TRẦN VĂN CHỨ**

**PHÓ TỔNG BIÊN TẬP  
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Xuân Mai – Chương Mỹ – Hà Nội  
ĐT: 024. 8588. 3318  
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**Giấy phép số:**

1948/GP – BTTTT  
Bộ Thông tin – Truyền thông  
cấp ngày 23 tháng 10  
năm 2012

In tại Công ty Cổ phần Khoa học và  
Công nghệ Hoàng Quốc Việt  
Địa chỉ: Số 18 Hoàng Quốc Việt,  
Nghĩa Đô, Cầu Giấy, Hà Nội

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## AN OVEVIEW OF FRUIT AND VEGETABLE SUPPLY CHAIN MODEL IN HANOI

**Nguyen Thi Thanh Huyen<sup>1</sup>, Nguyen Thi Anh Van<sup>1</sup>**

<sup>1</sup>*Vietnam National University of Forestry*

### SUMMARY

There are models of fruit and vegetable supply chains in Hanoi: Chain of participants, chain of wholesaler Mega Market, chain of retailers; Vineco closed chain and Sharefarm share chain. The model of the supply chain of vegetables and fruits by members (i.e. chains without leadering members) has many advantages: meeting up to 90% consumption of the market, a rich variety of fruits and vegetables, a wide distribution channels, throughout and affordable prices... but the quality and food safety are still inadequate. The other chain models have advantages: product quality and food safety are initially paid attention, but high prices; limited types, and the distribution channels are mainly in urban areas... During the operation, the models of fruit and vegetable supply chains have also faced many certain difficulties: (1) Compliance with commitments on quality and food safety is not serious; (2) Traditional market system has many weaknesses in management; (3) Chains lack monitoring mechanisms; (4) The dissemination and application of traceability code system (QR) is too slow... In order to increase the added value and increase the sustainability of the chains of chain leaders and industry managers, there must be a change in orientation, reorganization, and strengthening of monitoring mechanisms. string to suit living conditions and new requirements for quality standards.

**Keywords:** Fruits and vegetables, operating organization, structure, supply chain model.

### 1. INTRODUCTION

Up to now, world-famous experts in the field of chain economics have studied and published many basic theories on supply chains and value chains (Alam M. C. and Supriana T., 2015) (Chopra S. and Meindl P., 2009) (Hugos Michael H., 2010). However, the theory of supply chain model is still fragmented in Vietnam, because the theory of chains is mainly inherited from the world's ones. Vietnamese managers have been taking them as a basis to apply and develop chains in the real conditions.

In practical terms, in Vietnam in general and at Hanoi in particular, the research is just limited to describe or solve each individual problem in the fruit and vegetable supply chain, such as production, technology, and consumption according to participants, which means that the chain model has no leadering members. The studies have not generalized the existing models in Hanoi yet. At the same time, new modern supply chain models (with leading members) such as retail chains, VinEco closed

chains, Sharefarm chains being extremely promoted by market conditions and social situations are left open, which makes the solutions for chain development are asynchronous and ineffective. In Hanoi, the practical chain development is one step ahead of the theory. Therefore, to generalize the current models of the fruit and vegetable supply chain is necessary.

### 2. RESEARCH METHODOLOGY

#### 2.1. Research content

The article includes:

- Theoretical bases of supply chain model;
- Practical bases of fruit and vegetable supply chain models in Hanoi, including:
  - + Structure and operating mechanism of chain models;
  - + The result of added value of chain models;
  - + Assessments of the market share, results and limitations of the supply chain models.

#### 2.2. Research methods

The article is a part of the author's doctoral research results series. The author have used the

following research methods:

#### *Data collection method*

The secondary data is collected and analyzed as an overview of the F&V industry in Hanoi. These documents include: reports of state management agencies (Department of Agriculture and Rural Development in Hanoi, Hanoi Statistics Office), research papers, master theses.

The primary data: to conduct a random and direct interview producers, traders and consumers in the field of vegetables and fruits in Hanoi. After that, the collected information is verified by some staffs working in the local farmers associations, management boards of markets and supermarkets... in Hanoi.

#### *Data analyzation method*

Chain analysis methodology has been applied to identify the agents participated in the chain (from input supply to production, productive process, collection, preliminary treatment and marketing) and analysis of products' flow from manufacturing to

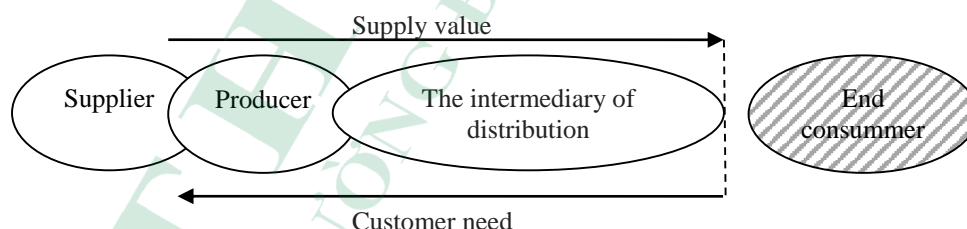
consumption across different channels. Besides the study applies descriptive statistical methods, cost-revenue analysis, economic analysis of the chain, value-added analysis for each stage and for the whole value chain of several main product channels.

### **3. RESULTS AND DISCUSSIONS**

#### **3.1. Theoretical basis of supply chain model**

##### ***3.1.1. Concepts of supply chain and supply chain model***

The concept of supply chain: According to Chopra S. and Meindl P. (2009): "*Supply chain is a collection of three or more businesses, directly or indirectly connected by one or more flows of products, information and finance in the process of meeting customer requirements*" (Alam M C and Supriana T., 2015). The term "supply chain" evokes the image of products/ services moving from supplier to manufacturer, through distributor to consumers along a supply chain. In which, physical flows, information flows, financial flows and trade flows run along both directions in the chain.



**Figure 1. General agricultural supply chain model**

(Source: Alam M. C. and Supriana T., 2015)

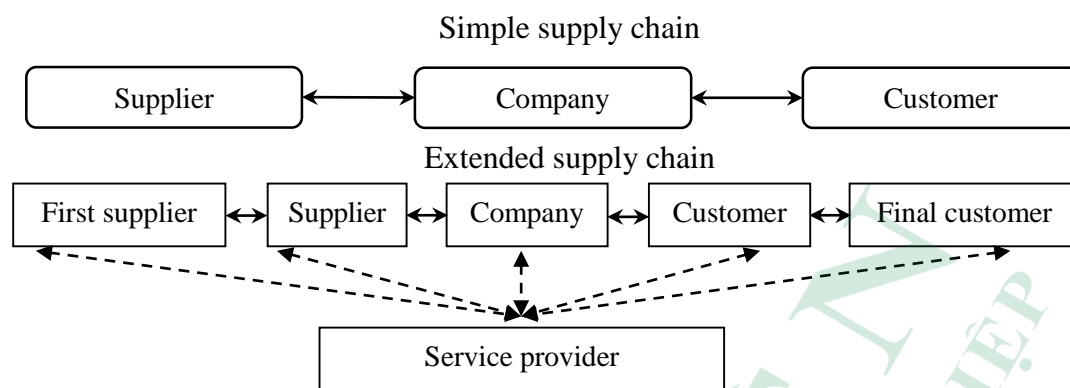
The concept of supply chain model: Based on the concept of "model" by Hoang Phe (Hoang Phe et al., 2015), the author suggests a concept of supply chain model as follows: "*Supply chain model is a structure, internal form of an organization, an arrangement and connection between members. Expression of the supply chain model is diagrams, images indicating the connection and activities of the*

*members in the chain. Structure of supply chain reflects the length and width of the chain; members' participation and connection between the members in the chain*".

##### ***3.1.2. Classification of supply chain models***

Supply chain model by the participants in the chain: According to Hugos Michael H. (Hugos Michael H., 2010), a supply chain is organized in two basic configurations:





**Figure 2. Supply chain model by participant**

(Source: Hugos Michael H., 2010)

Supply chain model led by participants: According to Dinh Van Thanh (Dinh Van Thanh, 2010), based on the member who plays the leading and coordinating role, supply chains has three types:

(1) Supply chains led by suppliers: In order to play a leading and coordinating role of the supply chain, supplier is required to be a major supplier, a raw material supply market has few participants or the supplied material has unique characteristics that other suppliers have not. There is no supplier who has capacity for this role in Hanoi.

(2) Supply chains led by Manufacturers: In these supply chains, producers will play a central role in connecting, operating and coordinating all activities from supply, production, and distribution. They will take the initiative in the connecting process by decision to conclude and how to coordinate. Currently, there is no chain of this type, because the manufacturers are not capable enough to lead

the chain.

(3) Supply chains led by wholesale/retailer: In order to implement their fulfill leading and coordinating role, these intermediaries must actively study the market carefully and offer decision about product design, price, proactively conduct agreements with different manufacturers and traders. In Hanoi, representing this sub-group is a supply chain model led and coordinated by retailer.

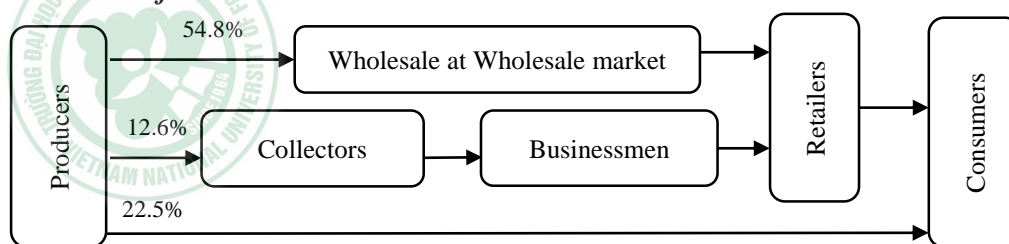
Integrating all of the above classifications, recently, there are VinEco closed chain and Sharefarm chain representing for this group in Hanoi. However, the output and market share of these two chains are still quite small.

### 3.2. Situation of fruit and vegetable supply chain models in Hanoi

#### 3.2.1. Structure and operating mechanism of the fruit and vegetable supply chain models in Hanoi

##### Model 1: Fruit and vegetable traditional supply chain model in Hanoi

#### The structure of chain



**Figure 3. Fruit and vegetable traditional supply chain structure in Hanoi**

(Source: Hanoi Department of Agriculture and Rural Development, Hanoi Department of Industry and Trade, Hanoi Statistical Office and survey data, 2018)

Currently, this chain is responsible for distributing 89.9% of Hanoi's fruit and vegetable production, equivalent to nearly 5.000 tons of vegetables and fruits per day.

### **Operating organisation of fruit and vegetable traditional supply chain in Hanoi in general and at wholesale markets in particular**

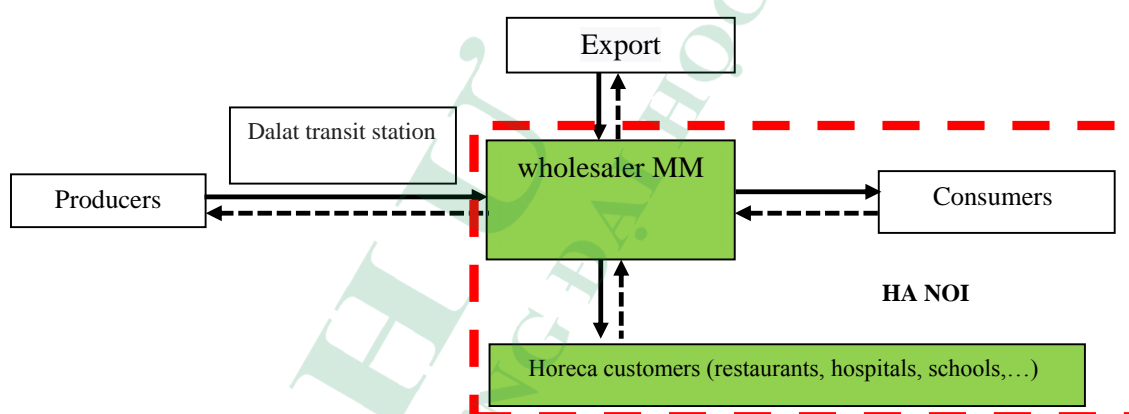
The members in the fruit and vegetable supply chain according to the participated members in Hanoi are not strong enough both in size and influence to be able to lead chain, the role of each member is quite independence, production and business activities are separated. The members have set up the business relations on the base of purchase and sale agreement, verbal agreements, and short-term contracts.

Currently, the wholesale markets take the

supply function over 50% output of vegetables and fruits to Hanoi's market, but remain many problems, such as: (1) Organisation is bulky and difficult to manage; (2) Market facilities are weak and backward; (3) There is a phenomenon of small businesses emptying kiosks, having no business, affecting to arrangement of good industry; (4) The area is too narrow to fully implement the technological solutions in arranging, preserving and storing goods and do not ensure the environmental sanitation. (5) There is no specific set of criteria for agricultural wholesale markets... The operation of chain is messy, there is a lack of sustainable and unstable links. Therefore the value-added of chain is low.

### **Model 2: Fruit and vegetable supply chain led by wholesalers (Mega Market – MM)**

#### *The structure of chain*



**Figure 4. Fruit and vegetables supply chain structure led by Mega Market wholesaler in Hanoi**

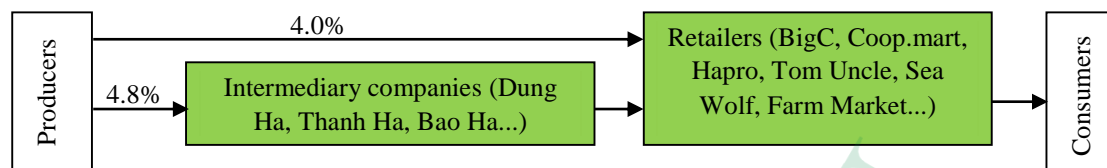
(Source: Mega Market Vietnam and survey data, 2018)

### **Operational organisation of fruit and vegetable supply chain led by MM wholesaler**

All vegetables and fruits after harvest are gathered and packed at the system of modern purchasing and transshipment stations in Da Lat, Can Tho and Binh Duong before distributing to MM centers nationwide. Being evaluated as one of the transit stations meeting FHS conditions for the leading fruit and vegetable products in Vietnam, MM's vegetable and fruit processing centers are sourced according to VietGAP standards and operated

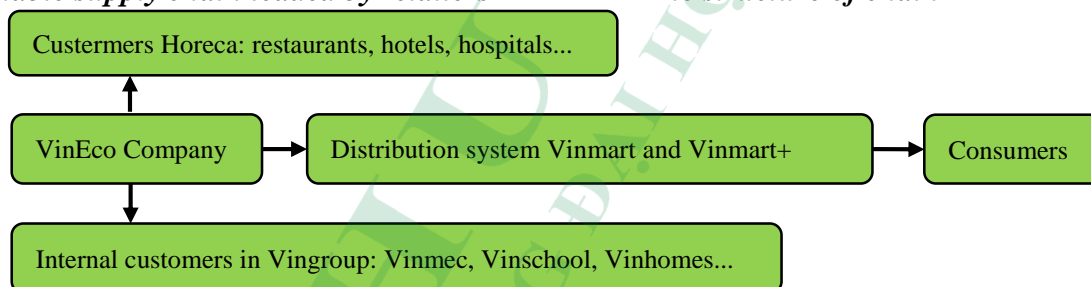
according to HACCP standards currently provided. 40 tons of fruits and vegetables per day at 19 MM centers. Here, vegetables are checked, screened, preliminary processed, preserved, packed in accordance with committed standards. Transport system by specialized cold car. The temperature is always controlled during transportation. Products displayed are labeled QR Code so that customers can traceability, improve peace of mind when using.

### **Model 3: Fruit and vegetable supply chain led by retailers**

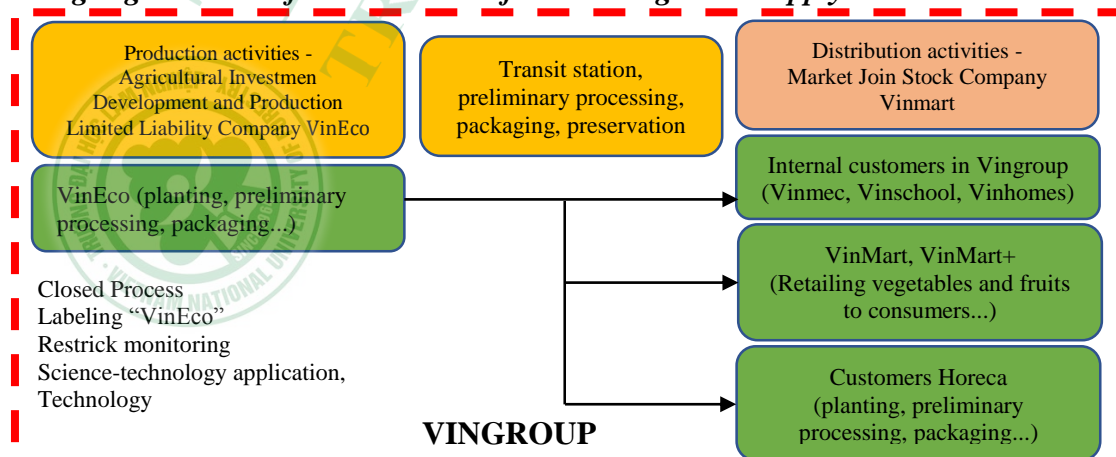
*The structure of chain***Figure 5. Fruit and vegetables supply chain structure led by retailers in Hanoi**

(Source: Hanoi Department of Agriculture and Rural Development, Hanoi Department of Industry and Trade, Hanoi Statistical Office and survey data, 2018)

In this model, chain is organized to supply vegetables and fruits to consumers through one or two distribution intermediaries: retailers or intermediary companies/retailers. The most important point in this chain is the retailers' role in leading and coordinating. Presently, this chain supply about 8.8% total quantity of vegetables and fruits in Hanoi - equivalent to about 500 tons of all kinds of vegetables and fruits per day. This chain has a strong growth orientation due to the convenience, reasonable price, and not too complicated in chain management.

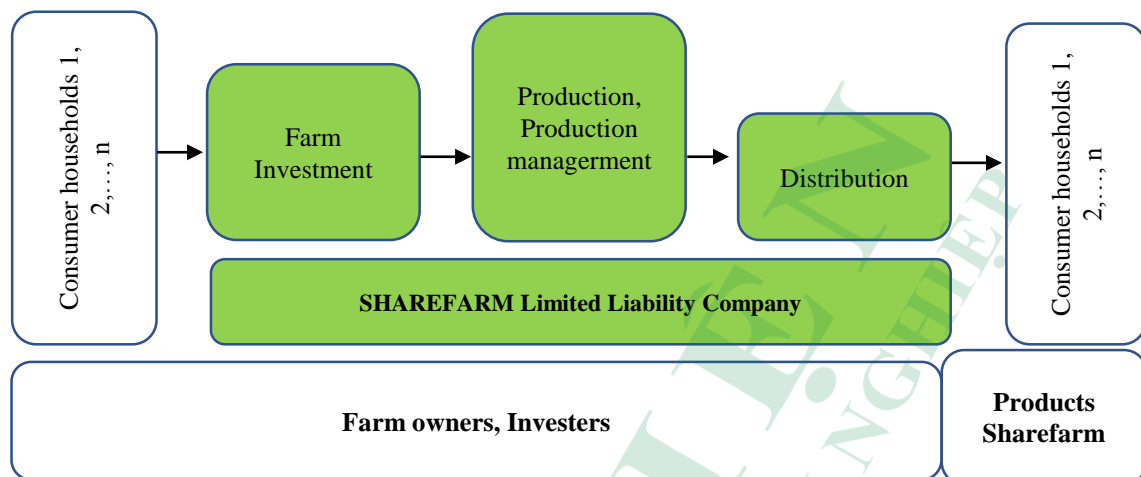
*Operating organisation of fruit and vegetable supply chain led by retailers***Figure 6. Structure of VinEco closed fruit and vegetable supply chain**

(Source: VinEco Agricultural Production Development Investment Limited Company, Hanoi Department of Agriculture and Rural Development, Hanoi Department of Industry and Trade, Hanoi Statistical Office and survey data, 2018)

*Operating organisation of VinEco closed fruit and vegetable supply chain***Figure 7. Operational diagram of VinEco closed fruit and vegetable supply chain**

(Source: VinEco Agricultural Production Development Investment Limited Company, and survey data, 2018)



**Model 5: ShareFarm supply chain model in Hat Mon – Phuc Tho***The structure of chain***Figure 8. ShareFarm supply chain model in Hat Mon – Phuc Tho***(Source: Sharefarm shared farm joint stock company, 2018)*

The objectives of Hat Mon Sharefarm: (1) To full continuously weekly provide and home delivery of food packages for 360 households (4-person households); (2) High-tech technology and production techniques adopt the natural way with the motto "synthesis ecology - closed circulation balance - natural agreement in a controlled environment"; (3) All agricultural products of Sharefarm are products of healthy organic ecosystems; (4) Closed chain model directly bring products from farm to household.

***Operating organization of the Sharefarm supply chain model***

Firstly, 360 households participated the model will share to involve all stages of the investment-production-consumption process. They are producers; through Sharfarm Company and tools with the support of high-tech, they monitor and clear every issues related to production and production quality. When there are products, 360 households are also consumers using these products.

Members become beneficiaries in the true sense: (1) To be enjoy the safe and fresh products; (2) To meet the needs of the families' weekend recreation/entertainment; (3) To practice agricultural production for families' members, to experience direct services at the farm such as: relaxing fishing, enjoying the fresh air, rural pleasure...

***3.2.2. Situation of value-added of fruit and vegetable supply chain models in Hanoi***

- The members' value-added in the fruit and vegetable supply chain model according to the participants are completely lower than the members' in the other ones.

- The total of value-added, producers' and retailers' value-added in the VinEco closed fruit and vegetable supply chain are highest.

- The fruit and vegetable supply chain led and coordinated by retailers ensure the harmonization in value-added allocation for members in the chain (the value-added proportion for the producers in this chain is highest – 37.51%).

Table 1. Summary of value-added results of fruit and vegetable supply chain models in Hanoi

Unit: dong/kg

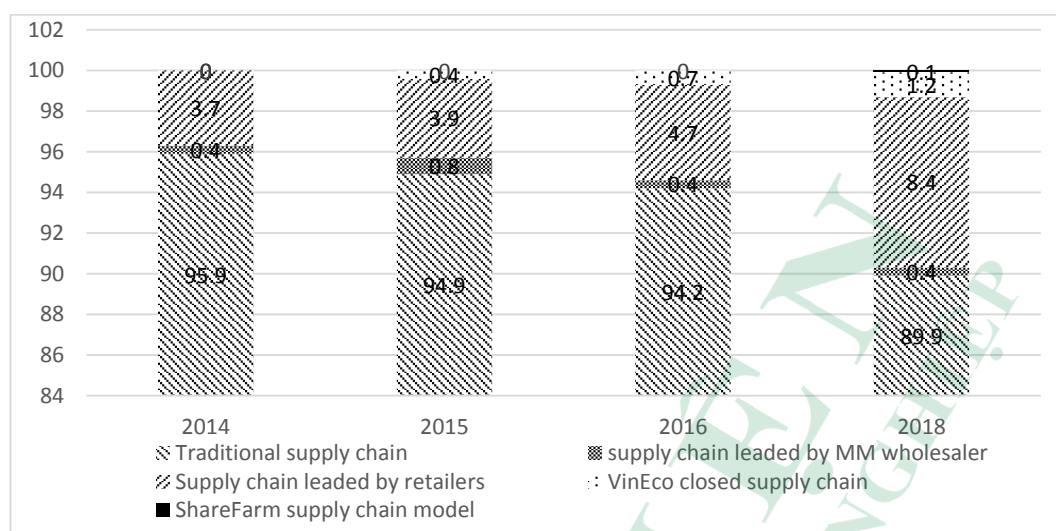
Target	Producer		intermediary company	Collector	Wholesalers		Retailer	
	Vegetable	Fruit			Vegetable	Vegetable	Fruit	Vegetable
Model 1: Fruit and vegetable traditional supply chain model								
Average value-added of members	2,777	6,142		2,010	2,336	5,500	3,380	5,000
Proportion of average value-added of members	25.95	37.39		20.65	21.83	33.50	31.58	29.11
Total average value-added of vegetable chain		10,703		Total average value-added of the fruit chain				16,420
Model 2: Fruit and vegetable supply chain led and coordinated by wholesalers								
Average value-added of members	3,965	8,020			5,430	6,450	3,769	5,000
Proportion of average value-added of members	30.12	41.19			41.25	33.13	28.63	25.68
Total average value-added of vegetable chain		13,164		Total average value-added of the fruit chain				19,470
Model 3: Fruit and vegetable supply chain led and coordinated by retailers								
Average value-added of members	3,811	11,070	2,915				4,645	8,000
Proportion of average value-added of members	37.51	58.91	22.22				42.73	41.09
Total average value-added of vegetable chain		12,405		Total average value-added of the fruit chain				19,470
Model 4: VinEco closed fruit and vegetable supply chain								
Average value-added of members	4,904	11,248					12,065	12,200
Proportion of average value-added of members	28.90	47.97					71.10	52.03
Total average value-added of vegetable chain		16,969		Total average value-added of the fruit chain				23,448
Model 5: Sharefarm chain (This model has only operated since 2018, so there is no data to assess the value-added)								

Source: Author compiled from actual survey data

### 3.2.3. General evaluation about the current situation of fruit and vegetable supply chain models in Hanoi

Evaluation about the market share of fruit and vegetable supply chain models in Hanoi

The market shares of fruit and vegetable supply chain models in Hanoi in 2014-2018 period are shown below. The information in 2017 was lack, because the author could not collect data.



**Figure 9. The market shares of fruit and vegetable supply chain models in Hanoi in 2014-2018 period**  
*(Source: Author synthesized and processed from data of Hanoi Department of Agriculture and Rural Development and survey data, 2014-2018)*

Figure 9 shows the market shares of the fruit and vegetable traditional model and leading retailers have advantage with the proportion of nearly 90% and 9% respectively. This reflects properly the consumption habits and development trends of the society in Hanoi. The wholesalers supply chain model, closed-loop model Vineco and Sharefarm have negligible market shares because they are modern chains, the market supply is low, the prices are quite high and only available in urban areas, that lead few people can reach them.

Evaluation about the achievements, limitations of fruit and vegetable supply chain models in Hanoi

In Hanoi, each model of fruit and vegetable supply chain has its own several strengths and weaknesses. Through the evaluation of current situations of the exist models shows some results, such as: (1) Fruit and vegetable traditional supply chain/ wholesale markets still meet the majority of markets; (2) New modern chains are established, such as Sharfarm and Vineco; (3) The fruit and vegetable supply chain led and coordinated by retailers has a leap in the last few years.

Limitations and problems as follow: (1) Ensuring the food safety is always the most obstacle of the existing chain models; (2) Limitation on farmers' financial capacity and

psychological concerns prevent them from committing to VietGap or higher standards compliance; (3) There are many lacks in managing the wholesale and local markets system, which make consumers confused and scared; (4) Supporting for establishment of four-home or five-home links in developing the fruit and vegetable chain is still limitation including quantity, quality and productive yield; (5) Supporting of functional organization to confirm food safety ensuring chain, banding, trade-mark, promotional introduction to the consumers is still slow; (6) Diffusing and applying the electronic information system using QR code to trace product's origin is too slow.

## CONCLUSIONS

Each of five supply chain models presenting in Hanoi has its own strengths, weaknesses, opportunities and challenges. Considering the social circumstances and conditions of the Hanoi market, the development of both traditional and modern chain models is necessary during this period. Last time, fruit and vegetables traditional supply chains/wholesale markets still met demands of the majority of Hanoi market; Fruit and vegetable supply chain led by retailers has made great strides in terms of scale as well as ways to supply products and quality; Sharefarm and VinEco closed chain



gradually come into urban life with many advantages in quality and delivery. However, these models still exist many problems related to quality, food safety, traceability by QR code, or lack of strict monitoring mechanisms...

Up to now, Hanoi still has more than 80% of consumers using vegetables and fruits via the traditional supply chain model with the system of markets, street vendors or toad markets where have many worries about quality, food hygiene and safety, prices, beliefs, etc. This requires a change about orientation, reorganization, strengthening of stringent monitoring mechanisms to suit new living conditions and requirements of quality standards.

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## TỔNG QUAN VỀ CÁC MÔ HÌNH CHUỖI CUNG ỨNG RAU QUẢ HÀ NỘI

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### TÓM TẮT

Tại Hà Nội hiện có các mô hình chuỗi cung ứng rau quả: Chuỗi truyền thống, chuỗi của nhà bán buôn Mega Market, chuỗi của nhà bán lẻ, chuỗi khép kín Vineco và chuỗi nông trại chia sẻ Sharefarm. Mô hình chuỗi cung ứng rau quả truyền thống (chuỗi không có thành viên lãnh đạo) có nhiều ưu thế: đáp ứng tới 90% sản lượng tiêu thụ toàn thị trường, chủng loại rau quả phong phú, kênh phân phối rộng khắp, giá cả phải chăng... nhưng chất lượng, ATTP còn nhiều bất cập. Các mô hình chuỗi còn lại ưu có ưu điểm: chất lượng sản phẩm và ATTP bước đầu được quan tâm nhưng giá cao, chủng loại ít, kênh phân phối chủ yếu ở khu vực đô thị... Trong quá trình vận hành, các mô hình chuỗi cung ứng rau quả Hà Nội cũng gặp nhiều khó khăn nhất định: (1) Việc tuân thủ các cam kết về chất lượng và ATTP chưa nghiêm túc; (2) Hệ thống chợ truyền thống nhiều yếu kém trong quản lý; (3) Các chuỗi thiếu các cơ chế giám sát; (4) Việc phổ biến và ứng dụng hệ thống mã truy xuất nguồn gốc (QR) còn quá chậm...

**Từ khóa:** Cấu trúc, mô hình chuỗi cung ứng, rau quả, tổ chức vận hành.

Received : 12/4/2020  
Revised : 07/8/2020  
Accepted : 11/8/2020