

Case Analysis and Problems Summary of Current Supply Chain Models of Agricultural Products in Jilin Province

YU Chunrong^{[a],*}; XU Huan^[b]; ZHENG Haoran^[c]

^[a]Professor, School of Economics, Changchun University, Changchun, China.

^[b]School of Management, Changchun University, Changchun, China.

^[c]Faculty of Education, Monash University, Melbourne, Australia.

*Corresponding author.

Supported by Project of Education Department of Jilin Province ([2014] No.284).

Received 16 October 2016; accepted 11 December 2016
Published online 26 December 2016

Abstract

By illustrating three cases including Changchun Vegetable Center Wholesale Market, Ouya Supermarket Chain-Operation Limited Company, Fubang Agricultural and Livestock Development and Cooperation Association, the paper elaborates respectively three current supply chain models of agricultural products in Jilin Province by means of case analysis, with wholesale market of agricultural products as the core, retail chain supermarket and agricultural cooperative playing a dominant role. It then makes an analysis of advantages of each model from cohesion of core enterprises, quality of products, cost control and marketing coverage, and summarizes the problems of current supply chain models of agricultural products in Jilin Province in profit distribution, logistical level, organizational degree and electronic commerce, etc..

Key words: Jilin Province; Agricultural products; Supply chain model; Case analysis; Problems

Yu, C. R., Xu, H., & Zheng, H. R. (2016). Case Analysis and Problems Summary of Current Supply Chain Models of Agricultural Products in Jilin Province. *Management Science and Engineering*, 10(4), 20-25. Available from: URL: <http://www.cscanada.net/index.php/mse/article/view/8817>
DOI: <http://dx.doi.org/10.3968/8817>

INTRODUCTION

Jilin Province is the national base of commercial grain and the center of northeast China as a large agricultural

province and amount of commercial grain, availability per capita and output amount has long ranked in the first place in China. Moreover, agricultural products have played crucial roles in national economy and social life. As one of the pillar industries, the development of agriculture has gained close attention and substantial support from the government. However, the relative backwardness of the operation and management of the supply chain of agricultural products in Jilin Province in recent years has severely constrained the market competitiveness of agricultural products in Jilin Province. With the rapid development of information technology and logistical technology, esp. the change of production organization model of agricultural products, the current supply chain models of agricultural products in Jilin Province need to be improved urgently in efficiency of operation, quality of products and control of cost, etc..

The paper will make an analysis of the three main current supply chain models of agricultural products in Jilin Province, trying to seek generality from individuality, discuss the advantage of each supply chain model, generalize the problems in the current supply chain models of agricultural products in Jilin Province and then lay a foundation for optimization of supply chain model of agricultural products and solution of problems.

1. THE CURRENT SUPPLY CHAIN MODEL OF AGRICULTURAL PRODUCTS IN JILIN PROVINCE

1.1 The Supply Chain Model of Agricultural Products With Wholesale Market as the Core

The current primary supply chain models of agricultural products in Jilin Province is the model with wholesale markets as the core, and the wholesale markets of agricultural products are the primary supply channels for

agricultural products in Jilin Province, mainly providing spot transaction in bulk and service for circulation of agricultural products (Yi, 2014). According to the *Jilin Provincial Yearbook*, there had been 169 wholesale markets of agricultural products in Jilin Province by the end of 2013, with the annual turnover of over 30,000,000,000 RMB, and the year-on-year growth of 19.5% (Table 1). Changchun Vegetable Center Wholesale Market, Haijixing Wholesale Market, Northeast Asia Wholesale Market of Subsidiary Agricultural Products, and Wanyuan Wholesale Market of Subsidiary Agricultural Products are mainly the current wholesale markets of agricultural products in Jilin Province. Changchun Vegetable Center Wholesale Market will be introduced in the following part as one example, in order to analyze the advantages and problems of supply chain model of agricultural products with wholesale market as the core.

Table 1
Wholesale Markets of Agricultural Products in Jilin Province

Year	Number of wholesale markets of agricultural products	Annual turnover (10,000 RMB)	Year-on-year growth of turnover(%)
2008	119	1,349,282	27.4
2009	119	1,614,349	19.6
2010	135	1,782,793	10.4
2011	169	2,129,331	19.4
2012	179	2,653,303	24.6
2013	169	3,170,367	19.5

1.1.1 Taking Changchun Vegetable Center Wholesale Market for Example

Changchun Vegetable Center Wholesale Market was established in No. 63 Qinggang Road Lvyuan District Changchun City in October 2013, mainly dealing in

wholesale and delivery of subsidiary agricultural products, such as vegetables, fruit, fresh and dry condiments and aquatic products. The market covers an area of 165,613 m², with the construction area of 159,822 m², including storehouse of 12,000 m² for vegetables, fresh and dry condiments, dealing floor of 10,000 m² and parking lot (cement) and road of 65,000 m², amounting to total investment of 300,000,000 RMB, annual sales volume of 2,000,000,000 kilos and annual turnover of 3,000,000,000 RMB. As the largest distributing center of subsidiary agricultural products in three provinces in the northeast of China and one of the largest wholesale markets of vegetables and subsidiary agricultural products in China, the marketing of Changchun Vegetable Center Wholesale Market has covered over 180 cities and counties around, with some of the products exporting to Russia, South Korea and markets to be expanded in Japan, East European countries.

The flow chart of supply chain of Changchun Vegetable Center Wholesale Market is shown as follows:

1.1.2 The Main Advantages of Agricultural Products Supply Chain With Wholesale Market as the Core

(a) Wholesale market plays the role of core enterprise in the supply chain

First of all, since wholesale market is placed at the center of the agricultural products supply chain with the feature of inherent information sharing platform, it determines the operation tempo and efficiency of supply chain; secondly, as wholesale market provides place and service for gathering and distributing of large amount of agricultural products, it enjoys powerful influence in the whole supply chain, and enables to organize and coordinate distribution of logistics, information and fund. However, since wholesale market plays the role of core enterprise in the supply chain, only the large wholesale market with certain scale will function better (Jin, 2011).

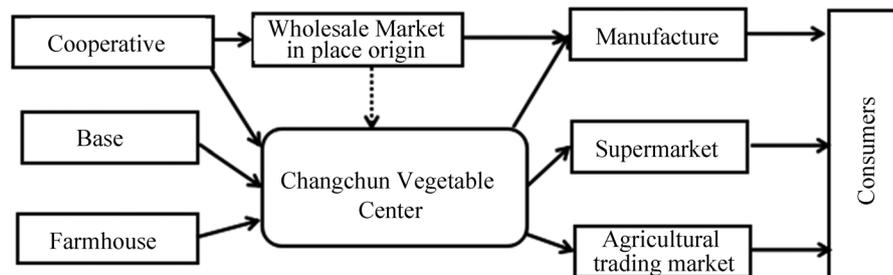


Figure 1
The Flow Chart of Agricultural Products Supply Chain of Changchun Vegetable Center Wholesale Market

(b) Diversified subjects involved in the supply chain
 Relying on agricultural products wholesale market in the supply chain, more and more producers and manufacturers of agricultural products, logistics enterprises, agricultural cooperatives, and agricultural

agents have entered the circulation area with greater and greater scale. Wholesale market of agricultural products not only connects the upper and lower part of the supply chain, but also attracts diversified subjects to get involved in the supply chain of agricultural products. With the

deepening reform of circulation system of agricultural products in Jilin Province, the status of state-owned enterprises and collective enterprises have been declining, while status of the public and private wholesale markets of agricultural products is rising. Moreover, with developing and expanding of economic cooperatives in various forms, the major driving force of agricultural products circulation has gradually come into being with the wholesale market playing a primary role.

(c) The supply chain of agricultural products with the wholesale market as the core has impacted to a greater extent

In order to realize maximization of profit, the wholesale market of agricultural products will seek new appropriate place unceasingly so as to expand the transaction scope and expand markets. Meanwhile, with the development of the new market, the diversified types of agricultural products and various demands of consumers drive the circulation of agricultural products between different regions and then again promote the impact of agricultural products. For instance, it is easier for the consumers to have access to over tens of thousands of agricultural products ranging from rice made in the three provinces of northeast of China, precious fruit from Taiwan, to fresh grain and cooking oil, livestock, eggs and tea from all over China.

1.2 The Supply Chain Model of Agricultural Products With Retail Chain Supermarket Playing a Dominant Role

With social and economic development in Jilin Province, the consumers paid more and more attention to the quality and safety of agricultural products, especially for the urban consumers, who prefer to purchase agricultural products from the supermarket. The consuming requirement has an immediate impact on the creation of supply chain of agricultural products with retail chain supermarket playing a dominant role. It was in 2009 that the pilot project of linking “farmers and supermarket” began to be launched in Jilin Province. By the end of 2013, there had been sales volume of 200,000,000 RMB and 11,000 new employees for the undertaking enterprises, 8,000 farmhouses involved and 10,000,000 RMB saved from circulation cost. The model of linking “farmers and supermarket” helps save the cost of logistics, keep the market price stable, and increase the quality of products, thus creating the “win-win” situation among businessmen, farmers and consumers.

At present, the project of linking “farmers and supermarket” develops fast, involving the long-term cooperation between Ouya Supermarket Chain-Operation Limited Company, Ouya Xinfu Shopping Mall, Walmart, Yuanfang Supermarket and breeding bases or professional cooperatives (Xu & Tao, 2015). The following part will make an analysis of advantages and problems of supply chain of agricultural products with the retail chain supermarket playing a dominant role, by taking Ouya

Supermarket Chain-Operation Limited Company for example.

1.2.1 Taking Ouya Supermarket Chain-Operation Limited Company for Example

Ouya Supermarket Chain-Operation Limited Company is affiliated to Changchun Ouya Group Limited Cooperation. The company was founded in 1984 and listed in Shanghai Stock Exchange in 1993. After development of 30 years, the economic benefit of Ouya group has been increased persistently with sales revenue reaching 36,178,000,000 RMB in 2015. The management pattern involving three parties: Modern Fashion Department Store, Commercial City and Comprehensive Supermarket Chain has been created, in which Changchun Ouya Supermarket Chain-Operation Limited Company has established long-term cooperative relationship with 21 livestock breeding bases and professional cooperatives, driving over 1,000 farmhouses, developing vegetable growing of 866.67 hm², grain and industrial crops of high quality 10,000 hm² and 11 large-scale livestock farms.

The approach of linking “farmers and supermarket” is realized by two models, “supermarket + base” and “supermarket + association”. The model of “supermarket + base” means to purchase base is established according to the market demand and order-based farming developed. The supermarket will directly sign orders with farmers on agricultural and subsidiary products which are in great demand and suitable for scale operation, such as vegetables, grains, etc., and provide breeds, quality standard and technical guidance. The farmers will then carry out standardized production by stringently following the quality standard and technical guidance and the products will be directly taken into the supermarket for sale after stringent detection. While the model of “supermarket + association” requires full play of various rural cooperatives. The supermarket will sign “purchases and sales contract” with rural professional cooperative for subsidiary and agricultural products which are in relatively less demand and decentralized planted and bred. The cooperative will direct the farmers to produce according to the unified standards and bring the products into supermarket after concentric acquisition.

The flow chart of Supply Chain of Agricultural Products of Linking “Farmers and Supermarket” by Ouya Supermarket is shown as follows:

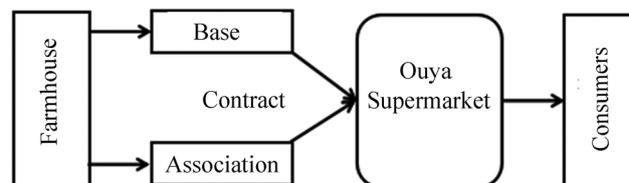


Figure 2
The Flow Chart of Supply Chain of Agricultural Products of Linking “Farmers and Supermarket” by Ouya Supermarket

1.2.2 The Main Advantages of Supply Chain of Agricultural Products With Retail Chain Supermarket Playing a Dominant Role

(a) Fewer transactions in supply chain

There is merely one intermediate link in the supply chain of agricultural products with retail chain supermarket playing a dominant role. Compared with the supply chain model of agricultural products with wholesale market as the core, many intermediate transactions are omitted, the transaction cost, transportation cost is cut, the loss of agricultural products during circulation is reduced with higher circulation efficiency and shorter supply chain.

(b) Realization of standardization of agricultural products

To ensure the quality of agricultural products, the retail chain supermarket will then sign the contract with the agricultural cooperatives or production bases and ask them to produce according to the purchasing standard of the supermarket. Under the binding force of the contract, the standardization of agricultural production will then be realized. Moreover, the retail chain supermarket is equipped with its own distribution center, which ensures standardization of products quality, process flow and management. All the retail stores enforce the unified purchase and acceptance standards, which ensure the standardization of the products all the way from “farm land” to “dining table”.

(c) Faster reaction to the change of market

The retail supermarkets can get contact to the direct consumers and have access to substantial, effective and latest information on consumers' demand. They will then make timely adjustment to the variety and amount of the agricultural products on sale according to the information mentioned above, so as to react to the change of market (Sun & Song, 2013). Since the dominant role of retail chain supermarket shortens the supply chain of agricultural products from the whole, the information flow of the supply chain will be more smooth with instant feedback under this model, avoiding or alleviate “bullwhip effect”. Therefore, the model is powerful to respond to the change of the market, especially the change of consumers' demand.

1.3 Agricultural Products Supply Chain Model With Agricultural Cooperative Playing a Dominant Role

In recent years, the supply chain of agricultural products with agricultural cooperative as the dominant role is expanding persistently with the rapid development of agricultural cooperatives in Jilin Province. In the model, the production and sale of agricultural products mainly rely on the bond of agricultural cooperatives such as professional cooperative, rural marketing association or technological association. With the furthering degree of marketization, the commercialization of agricultural

products has been increased with the increasing expansion of market. The agricultural cooperatives have been rapidly developed and become key link in the supply chain. By the end of 2014, there have been 52,065 agricultural cooperatives, 9,030 more than that of 2013, with 661,100 members of cooperative, revenues of 9,580,000,000 RMB and earning distribution of 1,800,000,000 RMB (Figure 3).

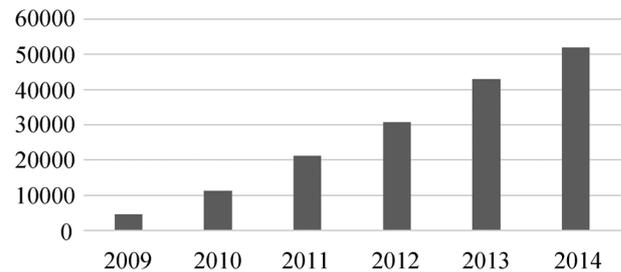


Figure 3
Number of Agricultural Cooperative in Jilin Province From 2009-2014

The agricultural cooperatives in Jilin Province have extensive scope of business, covering not only grains, vegetables, fruit, but also Chinese herbal medicine, animal husbandry, etc. such as Shiweitian Professional Cooperative and Association in Hunjiang District Baishan City mainly deals in industrial crops; Fubang Agricultural and Livestock Development and Cooperation Association in Lishu County Siping City mainly deals in poultry and animal husbandry; Shuangyan Rural Professional Cooperative in Pingxi Village Tiexi District Siping City mainly focuses on agricultural products, livestock, vegetables and fruit. The following part will make an analysis of the advantages and problems of supply chain model with agricultural cooperative playing a dominant role, by citing Fubang Agricultural and Livestock Development and Cooperation Association as an example.

1.3.1 Taking Fubang Agricultural and Livestock Development and Cooperation Association for Example

Fubang Agricultural and Livestock Development and Cooperation Association in Lishu County Siping City were originally Fubang Cooperative established by Fubang Feed Processing Plant in 2002, based on which, Fubang Agricultural and Livestock Development and Cooperation Association were founded. Through years' development, the association is expanding continuously. 25 branch offices had been established in Lishu County by 2008, including 7 branch offices in Shuangliao City and the members developing from 36 to 1,680. Since its foundation, the cooperative has provided 56,000 piglets and 5,800 tons of feed on credit, producing 210,000 pigs for slaughter accumulatively, in which 80,000 pigs have been sold with the aid of cooperative, resulting in profit

of over 4,000,000 RMB and the annual increment of 16,000 RMB for each farmer household. The cooperative has played its significant role in increasing the peasants' income and promoting prosperity of the rural economy (Wang, 2009).

The Flow Chart of Supply Chain of Agricultural Products of Fubang Agricultural and Livestock Development and Cooperation Association are shown as follows:

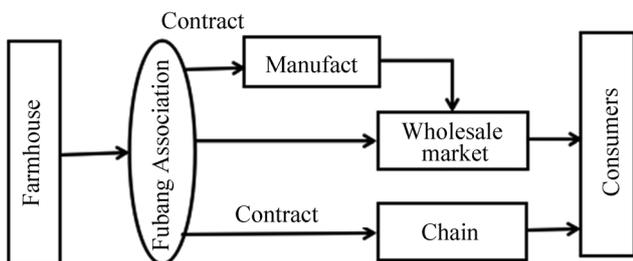


Figure 4
Flow Chart of Supply Chain of Agricultural Products of Fubang Agricultural and Livestock Development and Cooperation Association

1.3.2 The Main Advantages of Supply Chain of Agricultural Products With Agricultural Cooperative Playing a Dominant Role

(a) The farmers' benefits better guaranteed

The farmers can join the agricultural cooperative by signing the contract or investing in capital. They are no longer decentralized and independent production in each household, they have created a supplying group of agricultural products on a relatively large scale. In this way, the purchasing cost of production means will be lowered and marketing channel ensured; technical or financial support can also be gained during production. Moreover, the decentralized farmers are united to alleviate their disadvantageous position in negotiation and asymmetric information, and they are no longer placed in the absolute inferior position during the competition with markets or enterprises.

(b) The cost of supply chain reduced

The development of supply chain of agricultural products with cooperative playing a dominant role will reduce the intermediate steps of transaction in the supply chain, shorten the length and reduce the cost of supply chain, which is the same case for retail chain supermarket. The agricultural cooperative connects farmers with consumers, which will greatly increase the logistics efficiency, shorten the circulation time of agricultural products, reduce the cost of loss from storage and transportation; the fewer intermediate steps will directly reduce the operation cost of supply chain; in addition, the smooth and transparent information circulation will avoid the transaction cost from asymmetric information to a greater extent.

2. PROBLEMS OF CURRENT SUPPLY CHAIN MODEL OF AGRICULTURAL PRODUCTS IN JILIN PROVINCE

2.1 Unreasonable Benefit Distribution Mechanism Among Subjects Involved in the Supply Chain of Agricultural Products

At present, there often occurs inequality of interest distribution among subjects in the supply chain, mainly the core enterprise in the supply chain infringing farmers' interest. Such as problems including the core enterprise holds most of earnings, low revenue from production, high revenue from circulation, etc. The inequality of interest makes it difficult to establish confidence and cooperative relationship among subjects and the long-term existence of supply chain basis.

It is investigated that the wholesalers have a monthly cost-earning-rate of 156.4%, the retailer 138.2%, while the farmer merely 25%. The wholesalers enjoy the cost-earning-rate 6 to 10 times of the farmers while the retailers 5 to 7 times of the farmers. Moreover, the farmers have to undergo more uncertain factors, such as seasons, climate, supply-demand relation and production technology, etc..

2.2 Lower Degree of Highly and Elaborately Processed Agricultural Products

The lower degree of highly and elaborately processed agricultural products influences the realization of added value of agricultural products. According to the data, the rate of output and production of agricultural products in Jilin Province is merely 1:0.55, the average level in China is 1:0.6, while the average level of developed country is 1:3, especially the level in Netherlands as high as 1:4. In Jilin Province, the production value of agricultural products through product processing and food manufacturer accounts for 12.0% of the total value of agricultural products, 65.4% in Shandong Province, 40.1% in Henan Province, while the average level of China is 28.4%. Jilin Province is far below the average level of China. The data mentioned above shows that the agricultural products in Jilin Province are mainly preliminary processing, with lower degree of further and elaborate processing; therefore, it is difficult to heighten the added value of agricultural products.

2.3 Inefficiency of Agricultural Cooperative

According to statistics from Bureau of Statistics of Jilin Province, there had been altogether 43,035 agricultural cooperatives in Jilin Province by the end of 2013, 12,275 more than that of 2012, with year-on-year growth of 40%; there are altogether 500,000 members, accounting for 3.3% of all the people in agriculture. In comparison, there had been 93,552 by the end of 2013, with 394,8146 members, and accounting for 6.1% of all the people in agriculture in Shandong Province. It is shown that there are relatively less agricultural cooperatives in Jilin Province with

relatively smaller scale and less influence, compared with Shandong Province in which agricultural cooperatives are relatively standardized.

Compared with the agricultural cooperatives in developed countries, such as America and Japan, etc., Jilin Province is placed in an inferior position. There are over 2,000 grain cooperatives in America, dominating 60% of the domestic grain sales; the numbers of basic agricultural cooperatives are greatly reduced through large-scale merging in Japan. The comprehensive agricultural cooperatives expand in large scale, giving full play of the role of core enterprise and enhancing market competitiveness.

2.4 Lower Organizational Degree of Wholesale Market of Agricultural Products

At present, the agricultural products in Jilin Province have fewer barriers to enter the wholesale market, lacking in relative restricted conditions. Most individual farmers, intermediate traders and retailers can have free access to the market, consequently, many entities are involved in the wholesale market, but they are small in scale, lacking in competitiveness and professional management and the quality of agricultural products is not up to the standard and difficult to control. According to the relative data, there had been 364 various markets of subsidiary and agricultural products at the end of 2010, 110 of which were wholesale markets of agricultural products. They were generally small in trading area, with incomplete auxiliary facilities and low organizational degree, thus failed to play its role in the supply chain of agricultural products.

2.5 Relatively High Cost of Supply Chain of Agricultural Products With Wholesale Market as the Core

There are many steps in the transaction of supply chain with wholesale market as the core. The agricultural products go from producers' "farmland" through intermediate steps including wholesalers, retailers and manufacturers to consumers' "dining table" and certain profit will be retained by the participants involved in each step. On the one hand, the price of the agricultural product has been increased for many times, which is relatively higher; on the other hand, since there are many and decentralized entities involved in the supply chain, many transactions and long distance of transportation makes it difficult to lower the transaction fee, transportation cost and loss of agricultural products.

2.6 Relatively Low Degree of Development of Agricultural Products Through E-Commerce

First of all, E-commerce of agricultural products started late in Jilin Province. The pilot project of E-commerce started in Jilin Province in 2010, from pilot project in 16 cities and counties, including Shuangyang, Yitong, etc.. The trading volume of E-commerce only reached 200,000 RMB in Jilin Province.

Secondly, the rural infrastructure of network in Jilin Province is outdated. Due to constraints of farmers' literacy level and traditional view, they fail to understand E-commerce very well and don't have faith in internet transaction and virtual products. Moreover, due to underdevelopment of rural economy, the government doesn't provide enough support for E-commerce, the rural network infrastructure in Jilin Province lags behind other cities and provinces (Lu, 2015).

Finally, it is immature to develop brand construction. The quality of most agricultural products is not up to the standard and fail to create standardized production, let alone brand construction, which constrains development of E-commerce. Therefore, the E-commerce of agricultural products should start from the grass-root farmers, organize decentralized farmers in various forms, make production standardized in large scale, carry out marketing and popularity by platform of Internet, build up brand and enhance reputation.

CONCLUSION

The paper states explicitly the main advantages of each model in core enterprise, quality of products, cost control and market coverage, etc., summarizes the problems of these models in benefit distribution, logistic level and organizational degree etc. by illustrating four current supply chain models of agricultural products in Jilin Province. They still have a long way to go on the road of development. The paper lays a foundation for optimization and integration of each model, i.e. the advantages of each model should be retained to the greatest extent and the disadvantages prevented or minimized.

REFERENCES

- Jin, Y. F. (2011). Analysis of vegetable logistics development model with the wholesale market as core. *Reform and Opening*, (6), 85-86.
- Liu, W., Zhang, H., & An, Y. F. (2010). Discussion on function and position of wholesale market in supply chain of agricultural products. *China Market*, (32), 110-113.
- Lu, X. Q. (2015). Study on e-commerce model of agricultural products in Jilin province. *Human Resources*, (4), 247.
- Sun, H., & Song, K. B. (2013). Research on status quo of linking "farmers and supermarket" project in chain supermarket. *Agricultural Economy*, (311), 51-54.
- Wang, J. (2009). Empirical Study on Fubang agricultural and Livestock development and cooperation association. *China Farmers' Cooperatives*, (2), 49-51.
- Xu, E. G., & Tao, Z. (2015). Discussion and analysis of linking "farmers and supermarket" project in Changchun. *Modern Economic Information*, (3), 463-464.
- Yi, S. H. (2014). Development survey and countermeasures of wholesale market of agricultural products in China. *Journal of Beijing Technology and Business University*, (29), 16-20.