

SWOT Analysis of Agricultural Information Development Strategy in Jilin Province in the era of “Internet+”

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Abstract. “Internet+”, a new format of Internet industry, is a new form of economic society generated by the evolution of Internet format driven by innovation of knowledge society 2.0. Wide use of mobile Internet, cloud computing, big data, Internet of things and so on have brought opportunities and challenge to the development of agriculture in Jilin Province. As a province with abundant resources of merchant foods, green foods as well as emerging animal husbandry and boosting farming products processing industry, it becomes an issue of primary importance for Jilin Province that how to carry out “Internet +” action plan to accelerate the construction of agricultural information thus to push the agricultural modernization and create new industry development form integrating network, intellectuality, service and synergy into a whole.

Introduction

“Internet + Agriculture”, a new economy format, provides a new historical opportunity for China to solve "three rural issues". As an important merchant foods province, over the years, its per capita share of grain, rate of food commodities, and quality of food allotment all ranked the highest in the nation. Besides, Jilin has abundant resources of green food, emerging animal husbandry and booming agricultural products processing industry. Jilin province has significantly improved its agricultural comprehensive production capacity to produce advantageous farming products like commodity grain, further enhanced its integrated strength, quality and effectiveness to process farming products, comprehensively raised the market competitiveness of its products, create its own advantages to develop countryside and agriculture in Jilin province thus to achieve rapid development of agriculture and rural economy.

Current Situation of Agricultural Information Development in Jilin Province

Development of agricultural Information started relatively late in our country. It didn't really develop till 1980s. According to requests in Thirteenth Five-year Plan of the countrywide agricultural and rural Information development, the objective of “Internet+” modern agricultural construction is expected to be completed by 2020, when the level of agricultural and rural information will be further improved, information technology will be deeply and comprehensively integrated with agricultural production, operation, management and service. Information will be the leading force of development of agricultural modernization. Information level should be achieving the objectives as shown in Table 1 in following:

Table 1 Major Indices of the countrywide agricultural and rural information development in “Thirteenth Five-year Plan”

indices	2015	2020	Annual average Growth rate
1.Proportion of application of agricultural Internet of things and other information technology	10.2	17	10.8
2.proportion of farming products online retails sales to total value of farm output	1.47	8	40.3
3.coverage rate of information service station allowing the information enter into the villages and peasants' households	1.35	80	126.2
4.popularity rate of Internet in countryside	32.3	>51.6	>9.8

The goals of agricultural Information include: greatly improving the ability of intelligent production, networking operation, digitized management and online service. Currently, agricultural Information in Jilin province still needs a long way to go to achieve the objective, which is mainly reflected by several aspects as following:

Current Situation of Application Maturity of Agricultural Information Technology.

Currently, Jilin province has made some remarkable achievements in agricultural information technology and built up agricultural comprehensive database and application system. Optimization processes technology is used to conduct seed selection, irrigation and fertilization, guide the peasants to utilize the land properly and effectively, timely provide information consulting service; realize forecasting control over crop disease and production, lead pesticide enterprises to appropriately arrange the production activities and adjust the production structure; stimulate growing environments of different kinds of crops, help agricultural managers make agricultural production plans; set appropriate feed usage based on growth needs of different animals to help the manufacturers and farmers obtains maximized profit. Though Jilin province has made great progress in development of agricultural information technology, but there are still some problems. For example: low degree of applying agricultural information technology, single product; low standardization level of countryside information consulting and information technology products, leading failure to satisfy the need of agricultural production; low application level of information technology in research of agricultural science, high technology repetition rate; immature research on decision support system, complicated software application with poor practicability.

Current Situation of Agricultural Information Industrialization Development in Jilin Province. Development of agricultural information industrialization has taken the shape. Especially, when considerable achievements have made in service information development, construction of hardware information infrastructure have been perfected, agricultural software infrastructure has become mainstream and pillar sector of agricultural information industry which has exceeded hardware industry in Jilin province.

Current Situation of Agricultural Information Talents in Jilin Province. Talents have been the major driving forces of development. Agricultural Information require the talents not only acquire the knowledge about modern information technology and agriculture but familiarize with management of modern information industry and rules of agricultural economy, so that during agricultural Information, the dealers can not only provide product information timely and accurately but effectively collect, sort, analyze network information and then address any difficult problems. However, currently, agricultural Information talents are in severe short supply in Jilin province. Talents majored in single profession, leading their inability to meet the demand of the development of agricultural Information.

SWOT Analysis of Agricultural Information Development in Jilin Province

SWOT analysis, namely, an urgent situation analysis method based on internal and external competitive environment as well as the race condition, is an easy way to find your worthwhile advantages and drawbacks that needs to be avoided to find problems existing and corresponding countermeasures thus to define the development direction in the future.

Strengths. For the first of all, geographic dominant position and convenient traffic would help to conduct circulation of commodities through carrying out e-commerce. Jilin province, situated in the central part of northeast China and middle of songliao plain, adjoins the Russia in the east, North Korea in the southeast with Tumen River and the Yalu River as the boundary rivers, Liaoning province on southwest, Nei Monggol Autonomous Region in the west and Heilongjiang province in the north, covering 187 thousand and 400 square kilometers, accounting for 2% of the whole area. The residential population by the end of 2016 reached 27.533 million, with rural population accounting for about 45%. Secondly, abundant resources. Jilin province is one of six major forest regions in China. With abundant resources of forest, grassland and wildlife, it becomes the hometown of well-known “3 treasures of China North East” , ginseng, mink, velvet antler. In Changbai mountain region, there are more than 2.3 thousand kinds of plants , with more than 900 kinds of plants with high economic value. Furthermore, fertility of the soil in Jilin province made it the perfect area to plant special grain, beans, oil-bearing crops, tobacco, hemp, potato, ginseng and other crops in Northeast. With grain-sown area of 3.959 million hectares, per capita share of grain, the rate of food commodities, quantity of food allotment and corn exports in Jilin province all ranked the highest in the nation. Jilin province is the largest commodity grain base in China. As shown in Fig.1, the grain production is increasing year by year. Finally, with a certain foundation to conduct Information Jilin province has implemented “triple play” convergence service platform and carried out network bidirectional transformation project. 9313 administrative villages have implemented broadband access, in which 9021 administrative have achieved fiber-to-the-village. Average broadband for rural area users have been over 4Mbps. Information infrastructure’s comprehensive service capabilities and social popularity have been effectively enhanced; information industry develops rapidly; construction of large project industry park has been carried out; advantages of software in the field of education, information security, agriculture and so on gradually stands out; information technology works well to transform traditional industries, all agricultural enterprises have applied information technology to production, circulation, operation and management, with more than 90% having built their own portals. Enterprises have learned to win good economic and social benefits by various information means such as developing e-commerce; construction of agricultural information service system and e-government are steadily advanced, Province-City-County-Township agricultural information service system has been built up, perfecting the construction of internal e-government network. Platform construction outside the electronic government affairs has been launched, realizing connection of inside and outside network, achieving platform’s effective link with the national platform.

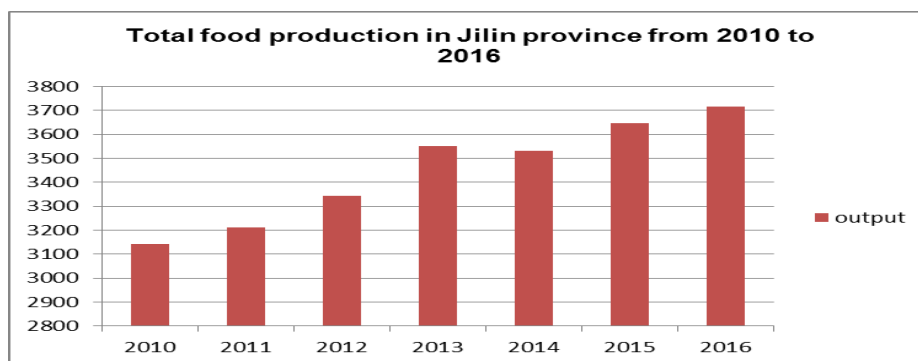


Figure 1. Total food production in Jilin province from 2010 to 2016

Weaknesses. For the first of all, poor foundation in Jilin province to establish information system. Since agricultural Information in Jilin province are mainly conducted in inconvenient and remote area, and implementation of Information requires those necessary infrastructures to cover every corner, a large amount of funds should be invested into these, which is quite difficult to achieve due to the limitation of economic condition. Besides, the base to provide information service is still weak. Agricultural Information mainly focuses the attention on the countryside, where the sources are limited and means to transmit information are relatively backward, greatly restricting the coverage area. Even after the resources are developed and utilized, there is still a lack of information service mechanism and benefit mechanism, becoming the “bottleneck” to extend information network service, restricting the popularization and application of agricultural Information to a certain extent. Thirdly, information promotion tools are lagging behind compared with that in developed areas. Information transmission in countryside only relies on low-cost terminal equipment, without essential fiber-cable and broadband to handle the “last mile” of information transmission. According to statistics, only 8% of peasant users are willing to purchase information terminal equipment, in which only 37% are willing to purchase those durable and qualified products. Most peasants haven’t been fully conscious of the information’s important role in production and management. 82% of peasants are still in need of guidance from public welfare information service system and village governments to obtain information channel. Finally, rural areas are lack of related information technology. Classical models of rural Information are not necessarily appropriate for countryside in Jilin province. But there are no too much successful cases to be learned. Furthermore, rural Information requires relative technology to be integrated with agriculture. However, current developing and operating mechanism can not meet the needs of Information, leading rural government’s implementation of Information, though have achieved some positive results, and are lagging behind due to difficulties regarding the technology, talents and finances.

Opportunities. Firstly, preferential policy to conduct rural Information. Gain support from both the nation and local government. During “Thirteenth Five-year Plan”, to accelerate agricultural modernization and construct well-off society comprehensively, it becomes an urgent need to vigorously develop rural Information. It has been clearly stated in 18th CPC National Congress that the Information is the commanding height of rural modernization. Premier Li Keqiang also pointed out that Internet innovation achievements should be deeply integrated into all different fields of economy and society thus to enhance the social creativity and productivity and form a broader economy development format with Internet as the infrastructure and implementation tools, providing powerful policy guarantee for the development of rural Information. Meanwhile, the Belt and Road development strategy as well as Strategy to Revitalize the Old Industrial Bases in China's Northeast by the nation will all accelerate our pace to open overall and create greater opportunity for our province to speed up the Information construction. Jilin Province has successively announced relative policies, including: Guidance to Jilin government on actively promoting “Internet +” Action in Jilin province as well as Guidance to Jilin government on vigorously developing develop e-commerce and accelerating cultivating economic strength made in 2016. Additionally, in November, 2015, Jilin Provincial People's Government stated in Guidance on accelerating the construction of high speed broadband network to increase the network price while decreasing its fee to promote the synchronous development of new industrialization, Information, urbanization and agricultural modernization to effectively support mass entrepreneurship and innovation. To push the development of “Internet +”, we need to accelerate infrastructure construction, greatly raise the network speed, effectively reduce the network fee, constantly lift services standard, improve various ancillary support policy and strengthen organizing and implementing in a series of activities, from basic platform development to Information Technology Application, from providing financial support to spreading technological knowledge to farmers. We need to vigorously encourage the rural people to spare no efforts to realize Information and boost the regional economy with the help of Information.

Threats. Rural Information in Jilin province started late and developed slowly, as a result of a weak foundation. Rural peasants' awareness level of Information is relatively low, thus, there is a room for all levels of agricultural departments to raise the awareness and sense of urgency of rural Information. Social atmosphere to speed up the development of rural Information should be further perfected. A certain foundation to establish infrastructure has been laid during "Thirteenth Five-year Plan". Network construction has also been popularized. More than 93% of counties(cities and zones) have set up their Information service station, pushing the information to enter into the villages and farmers' households. 1310 Farmers' Intelligence Units have been found in 8 trial counties, training 15450 village-level information assistants. However, means to collect, store and transmit the data are relatively backward. Agricultural products are too single and haven't been able to reach standardization and branding. Package, Storage, Cold chain logistics and etc. that support the development of e-commerce are facing great challenges. Service system and standardization system of agricultural information has not been perfected; information security guarantee has not been in place; technological innovation has not been integrated with agricultural innovation in depth; lack of capacity to conduct independent innovation and deep data mining with agricultural information infrastructure; short of relative technicians, R&D team and leaders, leading failure to meet the demand of the development of modern rural Information; conversion, popularization and application ratio of information technology achievements are all low; market service and supervision system should be improved constantly.

Countermeasures to Accelerate the Development of Agricultural Information in Jilin Province

Fasten the Development of Rural E-Commerce. With abundant resources, Jilin province can promote its farming products by e-commerce, setting the creation of "new Jilin" as the main objective to achieve rural Information and promote the development of Jilin's economy. Firstly, accelerate the development of rural e-commerce. Currently Jilin province has built up an agricultural e-commerce trading platform, named "Kaili", with trading volume topping 1500 hundred million RMB. But there are still space and opportunities for continuous development, therefore, the platform needs to strengthen its deep cooperation with those large-scale e-commerce enterprises including Alibaba and JD, guide various agricultural trading entities to dock with e-commerce enterprises, expand supply channel and marketing network channel, establish model appropriate for the development of agriculture in our country, realize the two-way flow pattern between farming products, handiwork and villagers' necessary consumption goods, enlarge the application range of e-commerce, enhance the cooperation among the government, enterprises and farmers, promote the Cold-chain transportation of fresh farming products, provide special assistance to agricultural production and management activities by e-commerce in poorer regions, carry out innovation to develop leisure and tourism of agriculture to drive regional economy. Secondly, define the dominant position of rural e-commerce market. Carry out training for new-type agricultural business entities; conduct e-commerce training in places where rural and agricultural Information concentrates; the government should take the lead to encourage the farmers to carry out and participate in e-commerce operation activities; agricultural departments should built the bridge to realize a variety of business management models for vertical e-commerce and county e-commerce, support and encourage high-quality e-commerce farming products to be exported, keep broadening rural economic business, encourage to develop and use new agricultural management system and etc.

Promote the Construction of Agricultural Governance Information Development Platform. Development of governance Information is an important link to raise government's governance capability to build service-oriented government. Jilin province should accelerate the development of intelligent agriculture. Set up agricultural big data platform to form "sky-land" agriculture-forest information capture system composed of high-low-altitude UAV, remote sensing satellite and grounding farming machinery, further promoting development of agriculture and forest of precision, digitization and intelligentialization. For the first of all, expand sharing of agricultural governance

information. Standard system of governance information can promote effective integration of resources as well as effective application of Internet and business resources in agriculture. Keep perfecting the construction of governance information sharing open service platform, achieve the mutual connection and communication among all levels of agricultural departments and data, reach cross-department and cross-region agricultural governance information resources sharing pattern, push the publication of all data resources, gradually implement the collection, analysis, intelligent analysis and sharing of rural and agricultural data. Secondly, speed up to realize cloud-computing big database in countryside, accelerate the development of agriculture. Construction of rural and agricultural bid database requires related information service departments in villages and counties to collect, transmit, analyze a bunch of information, promote to establish a group of data centers, develop strong points of our province, gradually set up Information service system, use data mining technology to carry out data calculating and predicting, combine the agricultural data resources at home and abroad to effectively improve the database. Standardize agricultural data supervision, information releasing and service system, improve the capability of agricultural data information to support macro-management, induce the market and guide the production.

Accelerate Popularizing Rural and Agricultural Information Service. Widespread adoption of rural Information n can generally improve rural information level and contribute to effectively innovate the new service mechanism to speed up the development of rural Information. Firstly, enhance farmers' ability to use information. Facing new agricultural management entities, service entities, occupational peasants and staffs in agricultural departments, carry out projects to train their ability to apply information technology including agricultural IoT, agricultural e-commerce and so on, improve their technological level, management capability and information literacy. Accelerate raising overall Information level of agricultural workers, make full use of training projects and resources from all levels of agricultural departments; mobilize multi-party forces including various enterprises and associations to carry out agricultural information skills training projects; recommend the peasant to use application software on mobile phone to learn and exchange agricultural knowledge; promote the Information of agricultural technology promotion service; realize mutual connection and communication among agricultural research experts, technicians and peasants thus to improve capability to provide information service and provide different guidance for peasants to carry out different activities. Secondly, advance the building of agricultural information socialized service system. Encourage the peasants to seize the opportunities brought by "mass entrepreneurship and innovation" and "Internet+" to carry out all different agricultural activities, actively participate in basic links including proxy service, logistics and so on, to conduct agricultural activities, keep perfecting the pattern of information services including the integration, development and online sales of farming products, gradually filter into every aspects of agricultural production and management.

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