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TRANSFORMING THE INDUSTRIAL STRUCTURE OF THE AGRICULTURAL SEGMENT THROUGH THE USE OF NEW TECHNOLOGIES AND FINANCIAL FUNCTIONS

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BIO

Noriyuki Shimizu is a Senior Manager of KPMG FAS Co.,Ltd.

He advises clients, primarily financial institutions, on start-ups, M&A, strategic planning, and business model design mainly.

His experience includes advising on M&A, leasing company start-ups, subscription services, Embedded Finance, and BNPL business start-ups, primarily in Japan and ASEAN countries.

He has also previously worked for a leasing company, and was involved in the financing services for Chinese companies in China, cross-border financing mainly in ASEAN countries, and the consideration of establishing a shared service business company and a machinery sales company in China.

He has expertise in the financial domain, ranging from financing services in Japan and abroad to new business start-ups and financial services.



TRANSFORMING THE INDUSTRIAL STRUCTURE OF THE AGRICULTURAL SEGMENT THROUGH THE USE OF NEW TECHNOLOGIES AND FINANCIAL FUNCTIONS

I. Introduction

- The impact of the Covid-19 infection, inflation, and supply chain disruption are being discussed around the world, and each country is seeing these as pressing issues.
- As these global changes occur, structural changes are beginning to emerge in various industries. Among other things, the agricultural sector has begun to transform itself into a new industrial structure.

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- The agricultural sector faces many challenges related to the supply chain, and the use of new technologies and financial functions to solve these issues is attracting attention. Also, agriculture has been positioned as an important agenda item since it is related to the national security of each country.

- In this article, I would like to introduce how the use of new technologies and financial functions has brought about a transformation in the industrial structure of the agricultural sector.

II. Summary

- By utilising new technologies and financial functions within the agricultural sector, which is traditionally an industrial area, many problems and issues are being solved and the traditional industrial structure is being transformed into a new industrial structure.
- By utilising new technologies and financial functions, the supply chain from R&D to consumption, which is currently vertically divided and fragmented, will be transformed into a unified horizontal flow, and an optimal structure in the supply chain will be established, leading to further development of the agricultural sector.



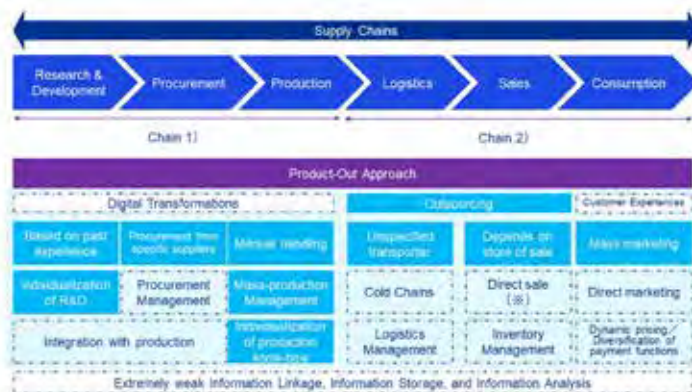
- The transformation of the agricultural sector is supported by the financial sector. Along with the transformation of the agricultural sector, the financial sector will move from the provision of traditional financial functions to a more business side, aiming to make a leap into new business areas.

[Formulas for industrial transformation in the agricultural sector]



III. Conventional industrial structure and Current Issues in the Agricultural Segment

- The traditional industrial structure in agriculture is set forth in the figure below. Dotted areas indicate no implementation or weak implementation.
- The supply chain in the aforementioned industrial



Source: Based on original research by KPMG FAS Co., Ltd.

* A method of selling directly from the production place to the consumer without going through wholesalers.

structure, as in other industries, consists of a series of functions from R&D to consumption. While many issues remain in the agricultural segment, the main challenges in each of these areas are summarised in Chain 1) and 2. Chain 2).

1. Chain 1)

a. Declining global agricultural population and aging farmers

The number or ratio of new farmers is declining based on data from the World Bank's statistics*1 and the aging of the farming population in Japan*2 and the U.S.*3 is beginning to pose a challenge for business takeovers, and there might be also concerns about declining production in the future.

*1 Source: Employment in agriculture (% of total employment) (modeled ILO estimate)

*2 Source: Based on Ministry of Agriculture, Forestry and Fisheries

*3 Source: Based on 2017 Census Full Report of United States Department of Agriculture

b. Inefficient production system

Production system and R&D rely on manuals and past experience, and reproducibility of the production system and R&D has decreased due to the individualisation of production know-how.

c. Lack of integration of R&D, Procurement and Production

Even if an efficient production system is in place, it is difficult to achieve efficient production without efficient procurement management that can be applied to that production system. In addition, an efficient production system cannot be achieved overnight; it is necessary to conduct several rounds of R&D, involving trial and error, and it is necessary to upgrade the production system through R&D and trial and error.

d. Low profitability

Many low-priced products are not profitable despite the amount of labour required, and a transition to a highly profitable structure is needed.

2. Chain 2)

a. Limited sales channels

When selling to designated wholesalers and to designated stores, sales methods and products sold are dependent on the stores. Establishment of efficient sales routes and Sales Marketing is required.

b. Product-out approach

Failure to break away from a product-out approach to consumers, and inability to satisfy consumers' needs (taste, size, price, etc.).

c. Logistics management

It is not well developed, including timely deliveries and deliveries with refrigeration capabilities whenever possible.

- In each area in the supply chain, DX and automation are not advanced, and functions and services that can provide CX to consumers have not been developed.

- Finally, each area of the chain 1) and chain 2) is vertically segmented, and each area does not have a unified flow, resulting in an inefficient structure.

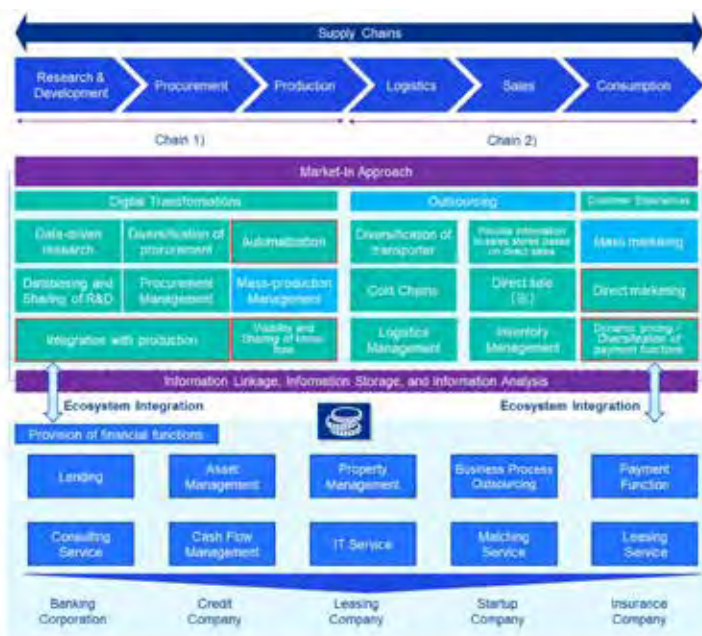
- In the agricultural sector, one of the traditional industries, there are many such issues, but many of them remain unresolved, and conventional efforts have continued and have not brought about major changes. Under these circumstances, the financial sector, which is utilising new technologies, is expected to play a more in-depth role than in the past, and it will be explained in detail in the following section.

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The number of new farmers is declining and the aging of the farming population is beginning to pose a challenge for business takeovers.

IV. Transformation of the agricultural segment into a new industrial structure

- To illustrate how the transformation from a traditional industrial structure to a new one is being achieved through the use of new technologies and financial functions, a diagram has been created and is set forth below.
- The green areas in this diagram show the changes from the conventional structure. As you can see, many changes have been brought about dramatically.
- You can also see that the financial segment is supporting the transformation from a traditional industrial structure to a new industrial structure.
- Due to space limitations, not all items can be explained here, so I will focus on the items outlined in red and explain how these changes have been brought about.



Source: Based on original research by KPMG FAS Co., Ltd.

- First of all, with regard to the Automatisation mentioned in Chain 1), the conventional manual application of pesticides, crop monitoring, crop harvesting, and post-harvest quality inspections can now be carried out by drones and image analysis technology, which enables pesticides to be applied by drones and the quality of the crops to be inspected by the drone's on-board equipment. The use of drones and image analysis technology has made it possible to apply pesticides by drone and monitor crop growth using image sensors mounted on the drone. This enables pesticides to be applied to the right places at the right time according to the growth status of the crops, thereby reducing the adverse effects on crops caused by wasteful or excessive application of pesticides, and improving production efficiency by reducing labor and pesticide costs, which account for a large proportion of agricultural costs. The drone and image analysis technology has also been used to improve the efficiency of production.

- In addition, by accumulating and analysing data collected by drones and image analysis technology, more appropriate application of pesticides could be realised, and a high level of reproducibility could be ensured so that many people can implement the system, instead of relying on know-how and experience, which had previously been the responsibility of the individual.

- Furthermore, by monitoring the growth of crops and collecting, accumulating, and analysing data, research is also being conducted to predict the appropriate timing for harvesting, the production period of crops, and the quantity of crops to be harvested. Based on the data accumulated, data is used to manage the purchasing of agricultural chemicals and crop seeds etc., and to share data with procurement companies / suppliers so that necessary items can be procured at the appropriate time.

- The introduction of drones and imaging sensors is costly. It is difficult for farmers alone to tackle this issue, as methods of image analysis and methods of storing and analysing the collected data require specialised knowledge. Leasing companies are beginning to offer services in which they partner with drone manufacturers, sales companies, and IT companies (including start-ups) to procure drones, lease them to farmers, manage and analyse the data collected by the IT companies, and return the information to the farmers. In these services, in addition to the provision of leasing services by leasing companies, there are also partnerships with drone manufacturers to conduct drone maintenance and repairs (Property Management), partnerships with IT companies to provide IT services, and consulting services using this data, and leasing companies may focus on building these ecological systems.
- Next, Chain 2) provides retailers with e-wallet and mobile payment functions and POS systems to diversify consumers' payment methods and increase convenience and has also begun to analyse consumer purchasing trends and hot-selling products based on data collected through the provision of these functions and services. In addition, research has begun to analyse consumer purchasing trends and hot-selling products based on data collected through the provision of these functions and services, and to conduct research on dynamic pricing, such as changing product prices based on business hours.
- Based on the results of these analyses, retailers are beginning to introduce hot-selling products to their members, provide dynamic pricing, and offer direct sales with cash back and point rewards as membership benefits.
- The results of these analyses and data are not limited to the domain of Chain 2), but can be returned to the production domain (farmers) of Chain 1), enabling production activities based on consumer trends, which is expected to further improve productivity.

- As in Chain 1), these ecosystems cannot be established solely by farmers and retailers but require the cooperation of financial segment and IT companies to provide payment functions, POS systems, and data analysis. In the provision of payment functions, financial segment and IT companies are collaborating to design and build systems and other components. In the case where the leasing companies introduced in Chain 1) above lease POS systems and other equipment to retailers, it may become possible to analyse the data and return the analysis results to the production domain "Market-In Approach" in partnership with IT companies, and Chain 1) and Chain 2) may begin to function as a coherent ecosystem.

- In this way, we can see that new technologies and financial segment are transforming the industrial structure of agriculture and forming a new ecosystem to support the industry.

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V. Further development in the future

- In addition to improving production efficiency and profitability through the use of technology and data analysis in the production domain, there is the potential to subdivide the supply chain by each crop and implement appropriate production, distribution, and sales management in the future as technology evolves.
- By establishing an integrated supply chain structure from R&D to consumption through the use of various financial functions, the financial segment and the agricultural segment will be synergised, and the financial segment will also transform from the conventional framework of providing financial services and shift to a more business-oriented approach.
- This combination of the agricultural sector and the financial sector is beginning to develop not only in the agricultural sector but in other sectors as well, and the financial sector is beginning to support and drive the growth of these sectors.

VI. Conclusion

- With the impact of the Covid-19 infection, worldwide inflation, and supply chain disruption still recognised as pressing issues around the world, we are at a major turning point not only in the agricultural segment, but also in other industrial sectors.
- The combination of new technology, finance, and the agricultural segment is expected to transform the industrial structure and provide significant insights into future development possibilities in other industrial sectors as well.

- In this article, an explanation of the relationship between the traditional agricultural segment and the financial segment, as well as their roles in the industry, is given. I hope that you have been able to see how the financial segment, in particular, is bringing about change within traditional industries by adopting these cutting-edge technologies. Not only those who are involved in the agricultural segment, but also those in the financial segment may gain new perspectives by looking at how the recent changes in the industrial structure were brought about.

- I hope you will use the information presented in this article as a starting point for looking at the transformation of the industrial structure in other fields and for analysing what kind of transformation will be brought about in the future. As we enter the new year 2023, I hope this article will contribute to the development of your business.

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The combination of new technology, finance, and the agricultural segment is expected to transform the industrial structure.



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