

Opportunities and Obstacles of Digitalization for Farmers: A case of BigHaat Agro Pvt. Ltd.

Dissertation Submitted To



The IIHMR University, Jaipur

1, Prabhu Dayal Marg, Sanganer, Airport

Jaipur-302029, Rajasthan

Ph.: 0141 3924700, Fax: 3924738

Website: www.iihmr.edu.in

For the partial fulfilment for the award of the degree of

Master of Business Administration (MBA)

in

Rural Management (RM)

Academic Year: 2020-2022

By

Muskan Chauhan

Under the Supervision and Guidance of

Prof. Rahul Ghai

2022

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DECLARATION BY STUDENT

I hereby certify that the dissertation I am submitting, **Opportunities and Obstacles of Digitalization for Farmers: A Case of BigHaat Agro Pvt. Ltd.**, is a true and accurate account of the original study I conducted. I certify that it has not been applied for a degree or certificate from any other university or institution. Information that was taken from other people's unpublished work has been properly acknowledged in the text.

(Signature)

Name of Student: Muskan Chauhan

Date: 26/06/2022

Certificate

This is to certify that **Muskan Chauhan** in partial completion of the needs for the honour of **MBA Rural Management** degree from the **IIHMR University, Jaipur** has successfully completed her/his internship at **BigHaat Agro Pvt. Ltd.** during April 1, 2022, to June 30, 2022.

Place:

Preceptor/Head of the Department

Date:

Name of the organization

Certificate

This is to certify that Muskan Chauhan's dissertation, Opportunities and Obstacles of Digitalization for Farmers: A Case of BigHaat Agro. Pvt. Ltd. was written under my guidance and supervision and that Muskan Chauhan's approach to the research study was sincere, scientific, and analytical. The dissertation is a partial fulfilment of the requirements for the award of the degree of MBA (Rural Management) from the IIHMR University, Jaipur.

Faculty Guide

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Abstract

This dissertation is a study conducted in BigHaat Agro Pvt. Ltd. with its headquarter in Bangalore. BigHaat is an innovative Agri Digital Platform that transforms the agriculture value chain, leveraging science, data, and technology throughout the value chain. The study is about the benefits and the challenges that are faced by different stakeholders in the Digitization of Agriculture Sector. The objectives of this study are,

- To understand how farmers will benefit from technical advancement (digitization).
- To compare the pretechnological times with post intervention of Digital technology in the field of Agriculture.
- To identify the aspects that can help farmers in adapting Digital Technology.

By the means of this study, the agriculture advisors have come up and provided some major opportunities coming up in this sector through the digitization such as better decision-making, climate forecasting, easy and efficient returns. The other stakeholders i.e., Farmers have presented their point of view and have highlighted some of major issues, that they face in adapting the complete Digitization. Lastly, there are a number of suggestions provided for the BigHaat to help create Digitization an easily accepted concept for farmers so that more and more people can easily adopt it.

Keywords: farmer, farming, digitization, technology, digital, technical advancement, agriculture.

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Table of Content

S.no.	Topic	Page no.
1.	Chapter 1: Introduction 1.1. Background 1.2. Organization Profile	10-13
3.	Chapter 2: Literature Review	14-16
4.	Chapter 3: Methodology	17
5.	Chapter 4: Results	18-23
6.	Chapter 5: Findings	24-25
7.	Chapter 6: Suggestions	26
8.	Reference	27

List of Figures

Fig. 2.1.	Technological Changes in Agriculture-All India
Fig. 4.1.	Age Group
Fig. 4.2.	Gender
Fig. 4.3.	Occupation
Fig. 4.4.	Current City
Fig. 4.5.	Do you think education is important for agriculture?
Fig. 4.6.	Is digitization required in Agriculture sector?
Fig. 4.7.	Do you think Digitization is boosting agricultural economy?

Chapter 1: Introduction

1.1. Background

Despite employing more than 65 percent of the workforce, India's agriculture industry only provides roughly 18 percent of the country's GDP (Role of Modern Technology in Agriculture, 2021). The administration wants to enhance the contribution of agriculture to GDP, there are several challenges that remain to be overcome despite significant improvements in food grain production. Nature plays an important role in India's agriculture, and climate change and global warming contribute their own complexities. To improve productivity and profitability, it is vital to educate farmers about modern technology and innovative approaches. Technology has been playing a major role in evolution of agricultural practices. Digital technology has contributed to reduce losses and increasing efficiency of farmers. Farmers are benefiting from this. Digital technology is driving constant development in agriculture, and this trend is here to stay. This leads to better crop yields and higher farmer incomes.

It is widely acknowledged that Indian agriculture has to be digitalized, and efforts are being undertaken to digitize the existing value chain. ADI, a Cisco platform that enhances agriculture and creates a better understanding of transfers, was launched in August 2019. The Department of Agriculture will likely use this ADI extensively in the data pool it creates as part of the National Agri Stack. India's pilot projects for the effort will be held at Morena (Madhya Pradesh) and Kaithal (Haryana) (The digital technology in farming, 2022).

To empower farmers, the Jio Agri (JioKrishi) platform, which was unveiled in February 2020, digitizes the agricultural ecosystem throughout the whole value chain. The platform's core function uses data from standalone apps to offer advice; advanced features take data from various sources, input it into AI/ML algorithms, and then deliver precise, customized advice (The digital technology in farming, 2022).

By digitizing the agricultural ecosystem along the whole value chain, the Jio Agri (JioKrishi) platform empowers farmers. Its core function is to offer advice using data from standalone apps; advanced features integrate data from several sources, input it into AI/ML algorithms, and then present personalized, precise advice (The digital technology in farming, 2022).

The Ministry of Agriculture and Farmers Welfare has created several significant digital applications to encourage farmers to use technology: -

- To provide a single national market for agricultural commodities, the National Agriculture Market (eNAM), a pan-Indian electronic trading system, links the Agricultural Produce Market Committee (APMC) mandis that are already in place. It was introduced in April 2016. eNAM vision is to eliminate the lack of information between buyers and sellers, streamline processes across integrated marketplaces, and encourage real-time price discovery using the most recent supply and demand data to improve consistency in farm marketing and mission is to simplify pan-India commerce in agricultural commodities, APMCs from all across the nation will be integrated through a single online marketplace platform. This would improve using an open auction method to determine prices depending on the quality of the output and prompt online payment. (Government of India, n.d.).
- Transfer of Direct Benefits (DBT) Agri-Portal Central: - The DBT Agri Platform, which was launched in January 2013, is an agriculture gateway that is centralised initiatives throughout the nation. Through government incentives, the gateway assists farmers in adopting innovative farm machinery (Digital Agriculture - The Future of Indian Agriculture, 2021).

Agriculture and Farmers Welfare Ministry signed a Memorandum of Understanding with Microsoft in June 2021 to operate a trial programme in 100 communities across six states. Microsoft will use its cloud computing technologies to establish a 'Unified Farmer Services Interface' as part of the MoU. The ministry's long-term goal is to create "AgriStack," a single platform that would offer farmers end-to-end services along the agricultural food value chain. In order to do this, the government plans to create distinctive farmer IDs for all farmers in the nation., which would be integrated with other government initiatives and used to establish digital agricultural ecosystems.

The technology plays a significant role in farming and agriculture activities, and with the introduction of digital technology, the scope has grown considerably. Agricultural innovation has led to a shift in farming practices that has reduced losses and increased efficiency. The technology used in agriculture impacts fertilizers, insecticides, seed technology, among other things. Through biotechnology and genetic engineering, crops are becoming more resistant to pests and yielding more. Mechanization has made labor-intensive tasks like tilling, harvesting, and physical labor more efficient. Improved irrigation and transportation networks, automated processing and transportation have drastically reduced waste.

Some of them are more recent technology, like robots, precise farming, artificial intelligence, block chain, and others. The agribusiness industry has benefited from technical developments like:

- **Productivity in agriculture has grown thanks to mechanization:** Hybrid machines are becoming more and more common as a means of reducing human labour and accelerating procedures. Indian farming is characterized by small landholdings, making cooperation with others necessary to take use of contemporary technology (Digital Agriculture - The Future of Indian Agriculture, 2021).
- Modern AI-based technology and technologies that support precision farming and well-informed decision-making facilitate data collecting (Digital Agriculture - The Future of Indian Agriculture, 2021).

Sustainable systems are on the rise worldwide. Irrigation, fertilizers, and the increase of agricultural land have all recently allowed agricultural production to keep up with population growth. It is still important to consider that it should be given to increased land losses, soil usage, water pollution, deforestation, and soil degradation, brought on by salinization, desertification, sea level rise and erosion among others, which, when considered together, pose a new challenge about long-term viability of agriculture. The globalization process, development of technology, information, and capital concentration all influence agriculture is dynamic. Globalization and liberalization have resulted in increased agricultural spending, the rise of the food business, and the expansion of global food commerce. For a determined period, the current pandemic slowed globalization and people headed for the local markets. As digital innovations become more common, socio-technical

processes of digitalization become increasingly prevalent. Artificial intelligence, machine learning, digital twins, cryptocurrency, and the Internet of Things (IoT) are a few of the latest buzzwords and other technologies that are now being used, and the digital revolution involves many phenomena and technologies. Every link in the agri-food chain will be affected by artificial intelligence-based innovative data analysis and digital technologies: production, processing, distribution, and consumption.

1.2. BigHaat (BigHaat, n.d.)

In 2015, BigHaat was founded by a team of entrepreneurial enthusiasts. BigHaat is an innovative Agri Digital Platform that transforms the agriculture value chain, leveraging science, data, and technology throughout the value chain. The E-commerce platform is empowering millions of farmers across the country with access to a broad selection of high-quality inputs, comprehensive crop consulting, and linkages to markets for other commodities, giving farmers a 360-degree solution utilizing a new approach. Through BigHaat's data-driven business intelligence platform, Agri Inputs manufacturers can efficiently manage distribution, marketing, and operations. Data strategy allows stakeholders of Agri value chain to collaborate for building an end-to-end ecosystem and enable sustainable agriculture (BigHaat, n.d.).

Chapter 2: Review of Literature

Green revolution technology started to slow during the 1990s, a decade that heralded the beginning of the end of the green revolution (Ramasamy, Untitled, 2004). A mere 1.95 per cent was the average annual rate of agricultural production growth during the 1970s. Growing at a rate of 3.82 percent per year, it reached a record in the 1980s. The rate of growth of production, which was 2.09 percent per annum in 1990, has slowed significantly since that time. In order to assess technological stagnation, we estimated, using the method of Intimidator the contribution of technological change to agricultural production during the period.¹ The output of the analysis suggests that this contribution declined over time (Tables 1 and 2). When it comes to land, the output elasticities were high and positive. Although institutional credit has not had a major impact in the agricultural sector in the early years, its contribution in the later years is felt thanks to the very low and negative elasticity of production (Ramasamy, Untitled, 2004).

TABLE 1. TECHNOLOGICAL CHANGES IN AGRICULTURE-ALL INDIA (REGRESSION ESTIMATES)

Particulars (1)	Coefficients (2)	t- value (3)
1970s		
Constant	0.983	0.808
Cropped area	1.103	7.781
Agricultural labour	-0.074	-0.795
Credit	-0.120	-1.389
1980s		
Constant	-0.860	-0.781
Cropped area	1.144	7.794
Agricultural labour	-0.044	-0.503
Credit	-0.080	-0.954
1990s		
Constant	-14.53	-4.684
Cropped area	1.991	4.254
Agricultural labour	-0.304	-0.863
Credit	0.297	1.209
Overall		
Constant	0.556	0.511
Cropped area	0.832	3.633
Agricultural labour	0.111	0.671
Credit	0.034	0.372
R ² : 94 F: 44.66 (1970s) R ² : 0.94, F = 85.54 (Overall), R ² : 96, F: 94.34 (1980s) R ² : 92, F: 48.80 (1990s).		

TABLE 2. OUTPUT ELASTICITIES AND RATES OF TECHNOLOGICAL CHANGE FOR INDIAN AGRICULTURE, 1970-71 TO 2001-2002

Period (1)	Elasticity with respect to			Rate of technological change (5)
	Land (2)	Labour (3)	Credit (4)	
1970s	1.103	-0.074	-0.120	0.011
1980s	1.144	-0.044	-0.080	0.006
1990s	1.991	-0.304	0.297	-0.050
Overall	0.832	0.111	0.034	0.010

Fig 2.1: Technological Changes in Agriculture-All India (Ramasamy, Untitled, 2004)

As productivity trends are not consistently upward in most states of India, a trend of technological stagnation is supported by stagnating productivity growth of crops even in many potential areas. A few of the progressive states have started declining in growth and reversing that trend will not be easy. There are multiple factors contributing to this, including systems of water control, uneven infrastructure development, and differences in levels of adoption of new technologies. Stagnating yield levels can also be attributed to differences in the adoption of modern varieties. Although existing varieties have been adopted partially, there has still been a lack of adoption of modern varieties.

As of now, public investment has been largely focused on irrigation used in agriculture to boost output. Public investments sparked private investment in agriculture because public and private investment complimented each other. Approximately 70% of India's cropped acreage lies in less-favoured areas, whereas around 40% of the whole output is produced. The majority of the in-demand items are supplied by these regions. There is no way to ignore the contribution of irrigation to the economy. Nevertheless, productivity returns to investments resulting in economic growth have substantial spill over effects to the poor both in irrigated areas and those residing in less-favourable neighbourhoods. Small and marginal farmers dominate large areas of less-favoured areas, and they suffer from a lack of agricultural support services, facilities, and infrastructure. Low investments in technologies and inputs harm small scale farmers. Because evaporative demand and soil moisture supply are not equal, in dry areas, droughts and crop failures can occur quite frequently. Ramasamy and Selvaraj estimate that droughts in Tamil Nadu during the last 30 years have led to a 30 % decrease in rainfed rice production. According to the employment elasticity of 0.6, the loss in employment was 17 percent. (Ramasamy, Untitled, 2004)

Challenges (Shrivastav, 2021)

Agriculture and digital technology have huge capability, in spite of this, quite a lot of troubles that must be addressed earlier than this could be broadly followed and effectively achieved:

- The digital divide has been a problem in India for a long time. As of February 2020, more than 1160 million cellular users in India were reported by the Telecom

Regulatory Authority of India in its monthly report. There are more than 400 million people around the world without internet access at present. There are only a few people in India who have access to the internet.

- If period is not used carefully, it might harm the biological makeup of the herbal soil. The proper use of time, especially in big agricultural districts, must never result in soil degradation. This is quite likely to happen if the farmer lacks a background in soil science and technology, as is the case in India.
- Small-scale farmers are probably going to get left behind because they may not have the funding needed for investments in the digital age and the outreach necessary to keep up with emerging technologies.
- The use of digital technology necessitates an effective and dependable power supply that reaches every nook and cranny of the farming network in general and farmers. Both physical and virtual connection are essential.

Chapter 3: Methodology

Research Question:

- What are the challenges faced by the farmers in shifting towards digitization?
- What can be done to overcome these challenges in long term scenario?

Objectives:

- To understand how farmers will benefit from technical advancement.
- To compare the pretechnological times with post intervention of Digital technology in the field of Agriculture.
- To identify the aspects that can help farmers in adapting Digital Technology.

Materials and Methods:

This is a Cross-sectional type of research study design. Since this research methodology evaluates data from a population or a representative sample of the population at a certain moment. And in this case, this study will be conducted on the customers of BigHaat Agro Pvt. Ltd., which is based in Bangalore, Karnataka for 3 months (22 March 2022 to 18 June 2022). The data will be collected through interviewing individuals based on the questionnaire that will be prepared for each segment of the subject of study.

Sample size: 20 individuals.

includes male farmers and female farmers, and agriculture advisors.

Inclusion Criteria: individuals who have done maximum orders and agriculture advisor within the organization.

Exclusion Criteria: individuals who have done minimum orders and agriculture advisor outside the organization.

Data Analysis: Microsoft Excel.

Chapter 4: RESULTS

The objective of the study is:

- To understand how farmers will benefit from technical advancement.
- To compare the pretechnological times with post intervention of Digital technology in the field of Agriculture.
- To identify the aspects that can help farmers in adapting Digital Technology.

The survey's results are shown graphically in the section below.

Age Group: -

Fig. 4.1: Age group

The graph illustrates that out of 20 respondents, 40 % of the respondents are in the age group of 18-24 years; 50% of the respondents are in the age group of 25-30 years; and 10% of the respondents are in the age group of above 40 years.

No. of respondent=20

Gender: -

Fig. 4.2: Gender

The graph illustrates that out of 20 respondents, 65% of the respondents are male, and 35% of the respondents are female.

Occupation: -

Fig. 4.3: Occupation

The graph illustrates that out of 20 respondents, 50% of the respondents are farmers; 30% of the respondents are agriculture advisor and 20% of the respondents do other works.

Current City: -

The graph illustrates that out of 20 respondents, 15% of the respondents are residing in Bangalore; 10% of the respondents are residing in Ara, while 75% of the respondents are residing in Bhabua, Bhopal, Delhi, Gurgaon, Hyderabad, Kharagpur.

Do you think education is important for agriculture?

Fig. 4.5: Do you think education is important for agriculture?

The graph illustrates that out of 20 respondents, 80% of the respondents believe that education is important for agriculture; 5% of the respondents believe that education is not important for agriculture 15% of the respondents responded it may be.

Is digitization required in Agriculture sector?

The graph illustrates that out of 20 respondents, 90% of the respondents believe that digitization is required in agriculture sector; 5% of the respondents believe that digitization is not required in agriculture sector; 5% of the respondents responded it may be.

Do you think Digitization is boosting agricultural economy?

Fig. 4.6: Is digitization required in Agriculture sector?

The graph illustrates that out of 20 respondents, 75% of the respondents believe that digitization is boosting economy; 15% of the respondents believe that digitization is not boosting economy; 10% of the respondents responded it may be.

What are the fields in which digitization helps in Agriculture?

- Traditional growing techniques- By giving expert guidance in most accessible manner.
- Finding the real value of the material
- Rates of Products, Advanced technical details, subsidies
- Marketing and precision farming
- Market linkages
- Market value of goods which is essentially required for doing crop cultivation
- End to end tracing of agricultural practices
- Designing the farm equipment's, farm activity operations, weather forecasting etc.
- Organic farming- By providing knowledge and trends that are followed across the globe even to a small-scale farmer.
- Identifying disease
- Traceability, reduce labor, water wastage, control pest and disease, recording and analyzing data helps for future use in trading and forecasting

What are the key challenges that you face in adopting Digitization?

- Incomplete data sources and manipulation in data according to time
- Lack of technical literacy
- Lack of awareness, high initial cost, traditional mindset
- Lack of education in both younger and older people.
- Cost effective and skilled workers are required for changing the standards digitization in farms
- Expensive for a common man

What are the areas where innovation should happen in Agri-tech sector?

- Majorly Subsidy part. Apart Technical by Parts
- Hassle free operation, less expensive.

- Export from farmers
- Digitized supply chain management
- Farm machinery and update of prices
- Detecting fungal infections
- Supply chain
- Block chain technology
- Opportunity to farmers to process their raw materials and sell to higher profits
- Agri tech sector should be solution oriented quick and precise.
- Improving the buying and selling facilities of goods and services. It helps in improving livelihood of the farmers.
- Understanding how germination of seeds affects the seasonal crop. Also, learning about hybrid seeds and the results because of their usage.

Chapter 5: Findings

The results of the research have turned out to be useful for deriving the findings or inferences of the study. Hereby, below given is a list of findings that are developed based on the conducted research over the span of 3 months.

- BigHaat Agro Pvt. Ltd consumer expansion is all over country, it means that individual getting aware about the organization like 15% of the respondents are residing in Bangalore; 10% of the respondents are residing in Ara, while 75% of the respondents are residing in Bhabua, Bhopal, Delhi, Gurgaon, Hyderabad, Kharagpur.
- 80% of the respondents believe that education is important for agriculture; 5% of the respondents believe that education is not important for agriculture 15% of the respondents responded it may be. It means that respondents wants that education is important in agriculture.
- 90% of the respondents believe that digitization is required in agriculture sector; 5% of the respondents believe that digitization is not required in agriculture sector; 5% of the respondents responded it may be. It means that most of the respondents are aware of digitization in agriculture.
- 75% of the respondents believe that digitization is boosting economy; 15% of the respondents believe that digitization is not boosting economy; 10% of the respondents responded it may be. It means that some respondents are aware while 25% of the respondents lacks the knowledge.
- The customers and advisors have provided some of the major fields in which digitization is helping. Traditional growing techniques: by giving expert guidance in most accessible manner, finding the rates of products, advanced technical details, subsidies, marketing and precision farming, market linkages are some of the major areas that changed by the digitization positively.

- Lack of education, awareness and technical literacy and the cost of technology are some of the major challenges pointed out by the sample population. While some other challenges are incomplete data or data manipulation.
- The areas in which the innovation is still required are, opportunity to farmers to process their raw materials and sell to higher profit. Agri tech sector should be solution oriented quick and precise. Improving the buying and selling facilities of goods and services. It helps in improving livelihood of the farmers. Understanding how germination of seeds affects the seasonal crop. Also, learning about hybrid seeds and the results because of their usage. Other important sectors are supply chain, crop disease, and their precautions. Market opportunities for the farmers.

Chapter 6: Suggestions

In India, small-holder farmers are a major reason for the gradual acceptance of digital farming. This complicates data gathering due to the large number of segregated farms. As well, natural calamities that often occur in the sector, the implementation of digital solutions has been significantly hampered by events like floods, droughts, and heavy monsoon rains. In that case, digital agriculture must be adjusted to the average Indian farm before being expanded up and made accessible to numerous Indian farmers.

Digital agriculture have been made successful in BigHaat by the implementation of the following measures: -

Knowledge session with Crop expert: -

The Digitization has brought the concept of Podcast and Videos. And expectedly, it is very easy to know and search about anything because of the internet. But when it comes to farmers, the content is very less. Therefore, BigHaat can take initiative either through social media or launching a feature in app which will allow users to get detailed information about Crop diseases and their measures.

Introduction of new portal

Along with providing farmers with the agricultural equipment, BigHaat can provide Farmers with a portal wherein they can sell their products at a good price. This will allow farmers to be open to market and help them boost their learnings as well as earnings.

Low-cost technology: -

A small Indian typical farmer generates a low income, explaining their precarious financial situation. Reducing technology prices will therefore help.

Portable Equipment: -

Plug and play equipment has the highest chance of working in India due to most farms there being tiny. In addition, BigHaat Agro Pvt. Ltd. can also establish its Research & Development center and bring some innovative tools and equipment.

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