

ADOPTION BARRIERS OF AGRICULTURAL IOT: AN INDIAN CONTEXT

M. Suresh¹, Dr. S. Manju Priya²

ABSTRACT

In India, agriculture is an important occupation and 80% of Indian population depends on agriculture for their livelihood. Application of modern technology in traditional farming practices is needed to make agriculture practices smarter and precise. Internet of Things (IoT) has been gaining more importance in almost all the fields in the recent years. IoT is a system of interconnected devices that connect and communicate with one another and exchange data in the network. Adoption of IoT in agriculture and its allied sectors is still a challenge in India due to many factors. In this paper the challenges of IoT in Indian Context are analyzed and presented.

Keywords:- Internet of Things (IoT), Agriculture, smart farming

I INTRODUCTION

A network is the interconnection of devices and is the integral part of our day to day life. Designing networks and implementing the same is the core research topic. IoT is one such network of devices that is used in our daily life. The Internet of Things (IoT) is a revolutionary trend coined as 'Modern Web' with the fundamental idea of linking everything in the world to the Internet[1]. The Internet of Things is now an evolving trend of technological, cultural and strategic importance. Automobiles, consumer durables, trucks and buses, automotive and utility devices, sensor

systems and other household appliances are paired with Internet access absolutely guaranteeing change of our lifestyle[2]. IoT influences the world we live in by connecting industries, cities and vehicles. However, application of IoT technology in agriculture will have greater impact. In 2050, the world human population is estimated to hit 9.6 billion. The agriculture sector must, therefore, accept IoT in order to meet the food needs of this great population. Faced with uncertainties such as adverse weather conditions, increasing global warming as well as environmental consequences due to intensive agriculture methods, the demand for additional food needs to be addressed[3]. Agriculture sector must be more economical. But, unfortunately farming has become an ignored area in terms of innovative use as well as application. Especially in India, where funding technological implementation is constrained, and scientific competence for the use of available techniques insufficient[4].

II LITERATURE REVIEW

Farming is still highly reliant on physical properties in India. If there are any deviations in some of the physical properties, it will have a negative influence on crop yields[5] [6]. India must highlight the sustainability of the agrarian atmosphere thereby concentrating on future agricultural yields[7]. In this kind of scenario, farming modernization is something the agriculture industry should consider in order to not only to preserve crop production but also boost crop yields [8]. Besides, the availability of irrigation, soil quality, effective use of pesticides, herbicides and plant damage due to pests are a few of the major challenges currently faced by

¹ *Research Scholar, Department of Computer Science, Karpagam Academy of Higher Education, Coimbatore, India*

² *Professor, Department of CS, CA & IT, Karpagam Academy of Higher Education, Coimbatore, India*

Indian farmers[9]. Here is where approaches such as smart agriculture, driven by the Internet of Things (IoT), will play a significant role in eliminating or reducing the risk of these metrics in India [10][11][12].

III THE IMPACT OF AGRICULTURE ON INDIAN ECONOMY

Agriculture is the most significant segment of Indian economy. India is indeed an agriculture country, where more than 50 percent of its population depends on farming. Agriculture provides the country with raw material and food, as well as business opportunities to traders. India is required to accomplish the aspiring objective of multiplying income from agriculture sector by 2022. The agricultural sector in India is expected to generate a good momentum in the next few years due to the increased preferences of the rural base for example, irrigation, storehouse, and cold storage. Improving the use of hereditary modified crop yields is likely to improve yields for farmers of India. In the near future, India expected to cultivate early-ripening varieties of fruit. India had such a vast and varied farming sector in 2011, making up for approximately 16% of GDP and 10% of total exports on average[13]. The Agriculture sector also has its own impact on trade. If the improvement procedure of agribusiness is smooth, it will increase trade and reduce imports vastly. In this manner, the agriculture sector can boost exports and save foreign exchange.

IV ADOPTION DRIVERS FOR AGRICULTURE IOT

It is basic to build the efficiency of agriculture and by adopting various cultivating procedures to improve yields and cost-viability with new innovation like the Internet of Things. The International variables and the neighbourhood elements are the two driving elements for receiving IoT by the Indian farming. Sustaining developing population and offering environmental protection are not the motivation of each farmer and yet,

the mechanical advancements and technological innovations in the segment should consider making farming increasingly profitable with less impact on nature.

(1) Population Growth

Feeding the increasing population with quality food items is one of the real driving components for receiving agri-IoT. In the previous decades, the agriculture segment addressed the problem of expanding population by technological advancements using innovative cultivating equipment, highbrid assortment seeds etc.

(2) Natural Sustainability

The ecological elements like changes in climatic conditions, uneven precipitation, a worldwide temperature alteration, and so on point to specific farm needs and the need to utilize of advanced technology. In addition, boundless use of pesticides and manures on differing land and crops lead to issues like ecological harm and increased costs bringing down profitability.

(3) Competitiveness

Farmers must adapt and encouraged to adapt, the most recent innovations and procedures to increase maintainable efficiency which will bring benefits. Automation will increase production and help producers reduce cost of production. Automation will be able to reduce time and lessen work for such tasks like identifying animals, nourishing, draining and birth recognition, reaping and cleaning, etc.

V CHALLENGES IN ADOPTING INTERNET OF THINGS

There are nine challenges identified in adopting and implementing Internet of Things in agriculture sector using google scholar, research gate and science direct. They are

(1) Cost Issues

The IoT implementation utilizes a large number of modulating and actuating equipment and will, therefore, increase the price of produce, and play back time will be a critical factor [14].

(2) Lack of talent

According to the 2014 Labor Bureau Survey, the availability of skilled labor in India is very poor when compared to other developing and developed countries [15].

(3) Security Issues

Security plays a key role in the successful operation of every system at any given point. Millions of systems are linked via IoT, which requires optimal security mechanisms that will not only help to protect data, but also enable sharing of data across the IoT based smart city network [16].

(4) Privacy Issues

The problem of privacy protection is a big issue with the use of IoT infrastructure as linked objects and sensors could be easily detected and hacked [17].

(5) Change in Business Model

When adopting IoT, the enterprise needs to revamp and embrace new models in the business [17].

(6) Lack of Infrastructure

The IoT system requires infrastructure that is capable of accommodating and handling integrated components effectively [18].

(7) Lack of Standardisation

Decentralization of norms with newer ones that are changing every day is a complicated situation to the professionals practising IoT [19].

(8) Lack of Mobility

Mobility is seen as an essential task in IoT implementation, since most of the facilities are provided to mobile devices [1

(9) Poor Internet Connectivity

Slow internet access is also one of the main problems in the implementation and dissemination of IoT, with different speeds of access to the internet around the country [15].

VI CONCLUSION

Most of the people in India are directly or indirectly depending on the agri business. Some of them are directly dependent on agriculture and some others are connected while dealing in agricultural commodities. India has the capacity to produce food crops that can have huge impact on the Indian economy. To achieve this target, farmers should be offered with help land holdings, innovative practices and a varied apparatuses. It may offer improvement in agricultural produce and agriculture-based business.

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