Short Research Article

Digital Competency in Agriculture Sector- An outlook in Indian Context

Comment [I1]: Space after word Sctor

ABSTRACT

To become aware with how various digital tools are used in Indian agriculture and related industries nowadays. The information was gathered from various academic works and earlier research. The present study was carried out in Southern Gangetic Zone of Bihar State during the year 2021-22. The present investigation was carried out in Southern Gangetic Zone for the study Two aspirational districts (NITI Ayog, 2018) namely Gaya, Banka and two non-aspirational district namely Patna, Bhagalpur. The resulted showed that Most of the farmers reported extensively and enthusiastically about the digital technology they are using on their farms. Farmers working in digitalized environments still need a strong background of agricultural basics Government should invest time and money in spreading the word about the advantages of digitization. The importance of digital technologies in agriculture was highlighted in the report. This article discusses the various ways that digital tools can be applied, from crop planning to eventual crop purchases by farmers.

Comment [I2]: It appears from the text that the study is for one year and not for a period of two years, respectively, the year 2021.

Keywords- Digital competency, digital tool, agriculture, ICTs and Mobile smartphones etc.

Introduction

Digitization of economic processes have importantly changed the methods to transformations in rural sectors of the economy, and have affected the consumption structure. There are effective practices to strategic decision, forecasting, and analytics. It goes without saying that the spread of digital technology will have an effect on how each aspect of market relations functions to some extent. The digitalization of the economy will also lead to the emergence of new markets, the majority of which will be networked and place a greater emphasis on the end user as an individual. In the conditions of large-scale distribution of digital technologies, development of information infrastructure, increasing requirements for a minimum

set of digital competencies for famers in most sectors of the economic activity and sectors of the economy, personnel training is becoming an increasingly important task.

Digital competence is an evolving concept

Digital competence is the most recent concept describing technology-related skills. During the recent years, several terms have been used to describe the skills and competence of using digital technologies, such as ICT skills, technology skills, information technology skills, 21st century skills, information literacy, digital literacy, and digital skills. These terms are also often used as synonyms; e.g. digital competence and digital literacy (as an example, see Adeyemon, 2009; Krumsvik, 2008). Sometimes the terms are short, e.g., Internet skills, referring only to a limited area of digital technology, and some of them widen the content to media and literacy, e.g., media literacy skills or digital literacy. The wide variety of terms reflects the rapid development of technologies but also different areas of interest, such as library studies or computer science (Arnone& Reynolds, 2009; Jones-Kavalier & Flannigan, 2008). Moreover, changes in society and culture, based on the new technology, have effects on terms. It is expected that the content and the scope will still change, and that is even expected: Alamutka, Punie and Redecker (2008) recommend in their policy-related paper that the approaches should be dynamic and regularly revised because of the evolving new technologies and their use in society. OECD suggests that governments should make effort to identify and conceptualise the required set of skills and competences, and then incorporate them into the educational standards (OECD, 2010); and, as an answer to this suggestion, there are several national projects working for defining national standards.

Nowadays, all public universities across Developed countries are turning their students and faculty towards academic users of e-leaning systems. The public universities offer e-learning for students in a variety of forms such as web-facilitated learning (Allen & Seaman, 2010); usually called web-dependent (OECD, 2005) or web-enhanced learning (Ko&Rossen, 2010), hybrid (Tabor, 2007) or blended learning (McGee & Reis, 2012), and distance (Kaplan &Haenlein, 2016) or online learning (Anderson, 2008). In the web-enhanced classes, digital technology is used to deliver course materials which enhance in-class sessions. For the hybrid learning, both online and in-class sessions are utilized for content delivery, while the distance learning depends totally on online sessions. The current study dealt with the web-facilitated

learning since it is a common form of e-learning within the public universities in Saudi Arabia. In the web-facilitated classes, course materials are delivered to students via a Learning Management System (LMS), called Blackboard. Such materials include a course syllabus, homework assignments, lecture presentations, online discussion, and digital learning resources. The web-facilitated activities are utilized to reinforce in-class sessions.

The term competency is defined as "a combination of skills, knowledge, and attitudes appropriate to the context" (European Union, 2006). Thus, digital competency involves the effective and efficient use of digital technology to access and store information, to communicate with other users, and to process programs and data (Desjardins et al., 2015). In addition, digital competency involves the confident and critical use of digital technology for education, work, home, and etc. (European Union, 2006).

Digital Competency

Digital competency refers to a set of knowledge and skills that are required to perform a given task using digital technology (Rasmussen *et al*. 2018). The literature indicates that digital competency of an individual is enhanced with the breadth of experience and with one's ability and confidence to perform a given task (Desjardins et al., 2015). Thus, the GTCU framework considers both frequency of use and confidence of use as main indicators that measure digital competency (Desjardins *et al.*, 2001).

Information and Communication Technology (ICT)

ICT considers all the uses of digital technology that exist to help individuals, businesses and organizations use information to make decisions. ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form.

Information and Communication Technology (ICT) is defined by the World Bank as "any device, tool, or application that permits the exchange or collection of data through interaction or transmission". It "includes anything ranging from radio to satellite imagery to mobile phones or electronic money transfers" (Anonymous, 2011c).

ICT is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software,

satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning. (Nandeesha, 2016)

ICT in Agriculture

Farmers make decisions every day, in a lot of risky and uncertain situations in agriculture. These decisions will have to be made with the information available with them at that point of time. Access, efficiency and affordability of agricultural information continue to be a major impediment for raising agricultural productivity among smallholders in the developing Countries (Muriithi *et al.*, 2009). It is in this time that ICTs can play a very crucial role by disseminating information to farmers to help them make better well informed decisions. It is in the context of globalizing agriculture where the need for information becomes most vivid. Smallholders, who still provide a significant portion of the world's food, need information to advance their work just as much as industrial-scale producers. (Anonymous, 2011b)

ICTs can help overcome various bottlenecks present in Agriculture. Firstly, there is a lack of extension facilities available. Secondly, issue of illiteracy amongst farmers. Thirdly, capability of farmers to compete with large farmers is limited. Fourthly, the gap existing between the modern and traditional technologies is widening. Lastly, farmers are disconnected with the latest information available.

ICT can help us meet the demand for food, by collecting and sharing timely and accurate information on weather, inputs, markets, and prices; by feeding information into research and development initiatives; by disseminating knowledge to farmers; by connecting producers and consumers, and through many other avenues (Anonymous, 2011b). ICT services provide critical access to the knowledge, information and technology that farmers require to improve the productivity and thus improve the quality of their lives and livelihoods. (Nandeesha, 2016).

Materials and Method

The present study was carried out in Southern Gangetic Zone of Bihar State during the year 2021-22. The present investigation was carried out in Southern Gangetic Zone for the study Two aspirational districts (NITI Ayog, 2018) namely Gaya, Banka and two non-aspirational district namely Patna, Bhagalpur were selected purposively on the basis of highest Digital media users and easier accessibility in southern Gangetic plains in Bihar. 100 farmers were selected for the

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study. The interviews were conducted using a semi-structured interview guideline containing open questions regarding how the farming practice had changed due to the digital equipment introduced, the changed knowledge and skill requirements, as well as how the necessary knowledge and skills were acquired. The data collected from the selected respondent during the course of investigation was entered and tabulated in the excel worksheet and then appropriate analysis of data was made according to objectives formulated for study. Further, the statically techniques were applied to analyze tabulated data and interpreted it to reach up to the findings. Statistical methods to be used viz. mean, frequency and percentage.

Table 1: Categories Used in Qualitative Analysis

Main Category	Definition
(a) Digitalization at the farm	All kinds of descriptions concerning what digital technology was introduced at the farm and why.
(b) Changes of farming practice	All kinds of descriptions concerning how farming practices and work processes changed due to the digital technology introduced at the farm (new tasks, ceased tasks, qualitative change of tasks, changes concerning the relationship to Farming).
(c) Knowledge requirements	All kinds of descriptions about knowledge and skills that are required to cope with the new digital technology at the farm as well as descriptions that contrast competence requirements before and after digitalization.
(d) Learning modes	All kinds of description of how the competences required to engage with digital farming technology has been or is acquired.

Result and findings

1. **Knowledge and learning requirement on Digitalization in Agriculture**

Table No. 2- Distribution of respondent according to their knowledge and learning requirement on Digitalization in Agriculture N=100

S. No.	Category	Frequency	Percentage
1	Digitalization at the farm	62	62

2	Changes of farming practice	67	67
3	Knowledge requirements	72	72
4	Learning modes	75	75

Changes Induced by Digitalization-

Most of the farmers reported extensively and interest about the digital technology they are using on their farms. The changes induced by digitalization were strongly associated with a new and desirable mode of working on their farms in non-aspirational districts namely Patna and Bhagalpur. Daily work routines on digitalized farms were described as less physically demanding and as requiring less time to be spent within the farm field. In regard to the digital technology used at the farms, the interviewees agreed that both maintenance and cleaning of the machines are also part of their regular work.

Knowledge Requirements-

Farmers working in digitalized environments still need a strong background of agricultural basics like seed and fertilizers requirements, symptoms of diseases in the crops etc.

Learning Modes

Most of the farmers described that the knowledge and skills required to use the digital tools on their farms had not been covered or were only marginally covered in their initial (Need Based training) education. All the farmers in this study had completed at least some vocational farming degree and had some years of experience in traditional farming.

2. Information needs of the farmers

A national survey of farmers by NSS has found that only 40 per cent of the farmers' households accessed (Table No. 2) information about modern agricultural techniques and inputs. The most popular information source of these households for accessing information was 'other progressive farmers', followed by 'input dealers' (Mittal and Tripathi, 2009).

Comment [I4]: I expected to see the knowledge in 2021, not what Mittal and Tripathi found in 2009. I think that the study in this form is not relevant.

Table 3: Sources of agricultural information used by farmers

S.No.	Source	Per cent of households

1	Other progressive farmers	16.7
2	Input dealers	13.1
3	Radio	13.0
4	Television	9.3
5	Newspaper	7.0
6	Extension worker	5.7

Source: Mittal and Tripathi (2009)

Mittal and Tripathi (2009) reported that the broad categories of information required were common to all of them, irrespective of their location and crops. These information categories were: know-how which provides a farmer with such fundamental information as what to plant and which seed varieties to use; contextual information such as weather, best practice for cultivation in the locality; and market information such as prices, demand indicators, and logistical information. It was found that small farmers prioritized information on weather, plant protection, seed variety and market prices as most important. In Uttar Pradesh and Rajasthan, close to 90 per cent of farmers reported information on seed as their highest priority, while over 70 per cent cited market prices as the most important category. Although farmers were also interested in other categories of information, like best cultivation practices, crop choice, etc., only a small sample prioritized them (Mittal and Tripathi, 2009).

Comment [15]: Attention! before etc. no comma!!!

Conclusion

For digitalization the new technology requires farmers to be permanently for the modern farming technologies. Government should spend time and financial resources for socializing the digitization benefits. Inadequate connectivity in rural areas, high service charges, and a lack of basic computer literacy and understanding are obstacles for the quick development of e-agriculture. A strong understanding of digital technology will help farmers to assess critically the services offered by Agriculture Research institutions.

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Comment [16]: A lot of bibliography related to the study carried out.

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