Differential Effect of Digitization level on Knowledge Empowerment of Farmers: A Comparative Analysis

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ABSTRACT

The information is playing the key role in today's knowledge economy. The Information Communication Technologies are well known for providing timely and relevant information. So, one kind of access and skill *i.e.* knowledge of ICTs will affect another kind of access and skill, the knowledge of respective subject matter and skill. So, in the present study, an attempt was made to delineate the relationship between digital divide and knowledge empowerment where digital divide was operationalized as the gap between two sets of people due to differential access, skill and uses of ICTs. Knowledge empowerment was defined as the gaining of confidence due to real time access to information or knowledge of subject matter, the better sharing of information through digital network and hence, leading to easier decision making. The state of Maharashtra and Uttar Pradesh were selected purposively with due literature exploration. Three villages from each district were selected randomly with a sample size of twenty from each village making sixty farmers per district and one hundred twenty farmers as total sample size. The interview schedule was developed for the study. Personal and focus group discussion methods were used as tools for data collection. Upon analysis it was found that the digitization index for farmers of Nashik (Mean=0.61) were significantly higher than farmers of Varanasi (Mean=0.33) thus, the two population were digital divided. The digitization and knowledge empowerment were found to be strongly correlated with a Pearson Correlation Coefficient score of 0.79 which was statistically significant at 1 per cent level of significance, implying that where there was less digitization there was less knowledge empowerment also.

Keywords: ICTs, Digitization, Digital Divide, Knowledge sharing, Knowledge empowerment

INTRODUCTION

India is the world's largest sourcing destination for the information technology (IT) industry, accounting for approximately 67% of the US\$124– 130 billion markets (IBEF, 2017). This is no less than a boon to Indian agriculture which is excelling in terms of production, productivity, marketable surplus, new innovations *etc*. The fast development in the ICT sector and the growing amount of content that is transmitted through the internet make it necessary to be informed about ICT and the information that could be found in the Internet and other media (Smith, 2002). Thus, to harness complete benefit of unbound potential of ICTs and agricultural innovation at hand, the Indian agriculture needs to be knowledge empowered. The Oxford dictionary defines empowerment as the process of becoming stronger and more confident, especially in controlling one's life and claiming one's rights and hence, knowledge empowerment can be defined as the process of becoming stronger and more confident through gaining, networking and applying knowledge for decision making in respective enterprises. So, one can safely assume that knowledge empowerment can come through higher gain of information, easier sharing of information among peer groups and prompt decision making through timely gain of up-to-date and credible information yielding economic benefit and confidence as well, and with all its virtues, ICTs are no doubt can be very efficient in information providing, networking and helpful in decision making. Studies acknowledge that the knowledge society, an intellectually challenging and skills-intensive society including knowledge sharing and knowledge that needs to be stimulated in new generations which can be

made possible by modern technological developments and digital resources (Fonseca, 2010). Thus e-powerment can bring knowledge empowerment of Indian farmers.

But, the boon of ICTs is not devoid of negative and unintended consequences of digital divide. The digital divide can be defined as the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access ICTs and to their use of the internet for a wide variety of activities (OECD, 2003). Knowledge empowerment is the gain of knowledge through own endeavor, seeking and sharing of knowledge among peer groups and improved decision making due to timely and relevant information on subject matter. The ICT tools and ICT led information delivery may bring the knowledge empowerment on the part of users by enhancing real time interaction, by providing timely and relevant knowledge, by making knowledge sharing easier through interactive technologies, and by making decision making easier and quicker by virtue of specificity and timeliness of information. As stated by Proto *et al.* (2012) knowledge networks consist of three components which can interact with each other. These components were the generation, transfer and application of knowledge. On the other hand, the people outside such knowledge networks may face a knowledge divide thus, aggravating the situation where rich will get richer and poor get poorer. So the question is what are impact of the digital divide on knowledge empowerment which can be simply deducted to whether digital divide and lack of knowledge empowerment go hand in hand and if farmers are digitally divided then they are less empowered in gaining, sharing and using the farming knowledge for decision making. The study showed that the ability to use computers and communication hardware was an essential precondition for knowledge development and the success in creating a knowledge society rather than providing just an ICT infrastructure would not be sufficient to determine when and how the digital divide to vanish and the knowledge gap to be narrowed (Evers, 2103). The OECD (2010) performed a study about the results of the PISA test and the use of computer in the OECD countries. The study showed that the children using the computer more often achieved better results in the PISA study. This leads to the point where it is possible to state the following: Access to Information and Communication Technologies (ICT) is an important

means gain knowledge. Keeping these points in mind, the present a study was designed and conducted to assess what is the impact of digital divide on knowledge empowerment of farming community.

MATERIAL AND METHODS

The study was conducted in purposively selected states of Maharashtra and Uttar Pradesh. Maharashtra was having faster growth rate in agriculture as well as access to different ICT tools (computer with internet-36.94 per cent, teledensity-98.98 per cent, according to report of Telecom Regulatory Authority of India, August, 2016) whereas U.P. had a sluggish growth rate in both agriculture and ICT usage (computer connected to internet-17 per cent and tele-density 68 per cent). From the available literature, the three digitally best performing districts were identified in both the states and one of them selected for the study district. The districts with basic digital infrastructure were selected for study so that infrastructure will not remain as the only factor behind digital deprivation and hence, knowledge gap. Nashik district was selected for study area form Maharashtra as it was leading both agriculturally and digitally, similarly, Varanasi was taken as study area from Uttar Pradesh for an even comparison. Simple random sampling technique was used for selection of respondents. Three villages in each of the districts were selected randomly. A sample size of 20 farmers was selected by simple random sampling method from each selected village thus making 60 per district and 120 total farmers. The interview schedule was designed with due procedure and data collected through personal interview, questionnaire and focus group discussion. The digitization level and knowledge empowerment were measured through indices. The digitization index was comprised of five components; ownership of ICT tools, access to ICT tools and services, digital literacy, frequency and quality of use of ICTs. The components were measured using interview schedule and each component was given an index weight through expert suggestion (Table 1). Similarly, the knowledge empowerment index was comprised of three sub-indices and those were knowledge gain through ICT, knowledge sharing over digital network and use of obtained knowledge for better decision making. The knowledge gain through ICT was measured using a well validated knowledge test where the question were formulated through an in depth probing of the contents of various broadcasted farm

related programmes and e-agricultural services. The knowledge sharing using ICT media and decision making were measured through well designed interview schedule. The weightage for all three components were derived from the average weights given by experts in the field (Table 1). The farmers of both the districts were compared with respect to their respective level of digitization level and knowledge empowerment scores and then the constructs "level of digitization" and "knowledge empowerment" were checked for extent of association using correlation statistics.

Table 1: Average Weightage of Index Components

Components of Digitization Index	Weigh-tage	Components of Knowledge Empowerment Index	Weigh-tage
Ownership	1.56	Knowledge Gain	1.92
Accessibility	2.43	Knowledge Sharing	3.69
Digital Literacy	1.79	Decision making	3.67
Quantity of use	2.02		
Quality of use	2.2		

For the present study, hypotheses proposed were:

H_0: There is no association present between digitization and knowledge empowerment.

H_1: The level of digitization and knowledge empowerment are significantly correlated.

RESULT AND DISCUSSION

In present study, the digital divide had been operationalized as the difference in digitization level among the stakeholders. To calculate digitization level, the digitization index was constructed by combining five sub-components. The components of digitization index were ownership of ICT tool, accessibility to ICT tools and services, digital literacy, frequency of use and quality of use. The components of digitization were measured separately and tested for significance. Table 2 showed that in Nashik, the mean ownership score of farmers of Nashik was found to be 30.5 whereas the same for farmers of Varanasi was 23.8. Therefore, the farmers of Nashik and Varanasi were significantly different (t=4.3) at 5 per cent level of significance in terms of ownership of ICT tools. The farmers of Nashik and Varanasi were significantly different in access to ICT tools (t=9.3), digital literacy (t=14.6), frequency of use (t=6.00)

Table 2: Significance Test of Digitization components between Farmers of Nashik and Varanasi

Differential Levels	Nashik (n=60)		Varanasi (n=60)		"t" value
	Mean	S.D.	Mean	S.D.	
Ownership	30.5	8.7	23.8	8.1	4.3*
Accessibility	40.2	6.8	29.5	5.5	9.3**
Digital Literacy	98.5	19.0	55.2	12.8	14.6**
Frequency of use	39.8	12.2	28.9	7.1	6.00**
Quality of use	38.1	5.9	28.9	7.1	7.6**

(*significant at 5% level of significance, ** significant at 1% level of significance)

and quality of use (t=7.6) of ICT tools and services as shown in Table 2.

The digitization index was formulated and it was found that farmers of Nashik were significantly highly digitized than those of Varanasi. In Table 3, it could be seen clearly that there was a significant difference in digitization level of farmers in both the district.

Table 3: Comparative Digitization level of farmers of Nashik and Varanasi

Districts	n	Mean	Std. Deviation	t value
Nashik	60	0.641	0.189	9.6**
Varanasi	60	0.334	0.163	

**significant at 1% level of significance

Similarly for knowledge empowerment index, the components taken were knowledge gain, knowledge sharing through ICT media and decision making using ICT media and measured using knowledge test and interview schedule, respectively. The knowledge gain was essentially the availability of up-to-date information through a credible ICT medium and thus, people who were better accessed and exposed to ICT media were assumed to be getting a good amount of information experiencing a knowledge gain in terms of farming practices over them who did not have such exposure. The knowledge sharing could be easier among peers through ICT media and now-a-days the social media could be harnessed for the same. For decision making, the timely and relevant piece of information was an indispensable commodity. With above assumptions in mind, farmers of both the districts were tested for knowledge empowerment scores.

Figure 1, Figure 2 and Figure 3 showed the relative distribution of farmers of Nashik and Varanasi on
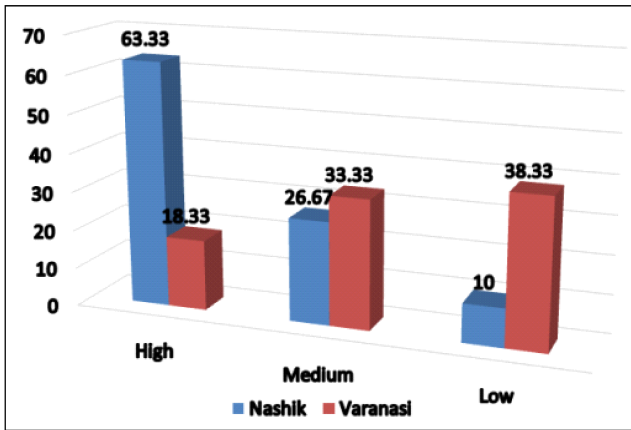
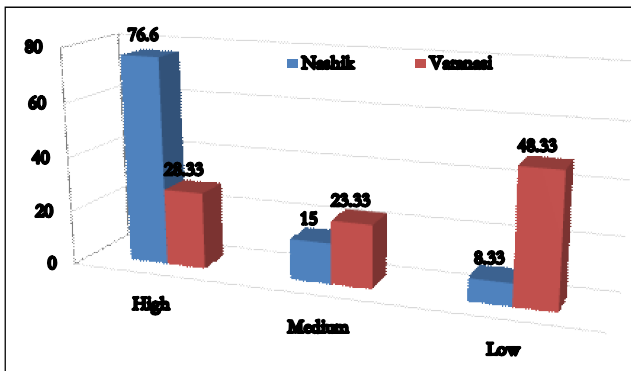**Figure 1: Relative distribution of farmers on ICT mediated knowledge gain**

Figure 2: Relative distribution of farmer's information sharing through ICT

Figure 3: Relative distribution of farmers on ICT mediated decision making

knowledge gain, information sharing through ICT and decision making using the information gained through ICT tools and services, respectively. It was found that in Nashik 63 per cent of farmers had higher gain of knowledge through ICT, 88 per cent farmer mostly shares farm information through ICT media like SMSs, social media applications *etc.*, and 76.6 per cent of farmers use ICT led information in farm decision making. Similarly, in Varanasi, only 18.33 per cent of farmers gained most of the agricultural information through ICT tools and services, 6 per cent farmers
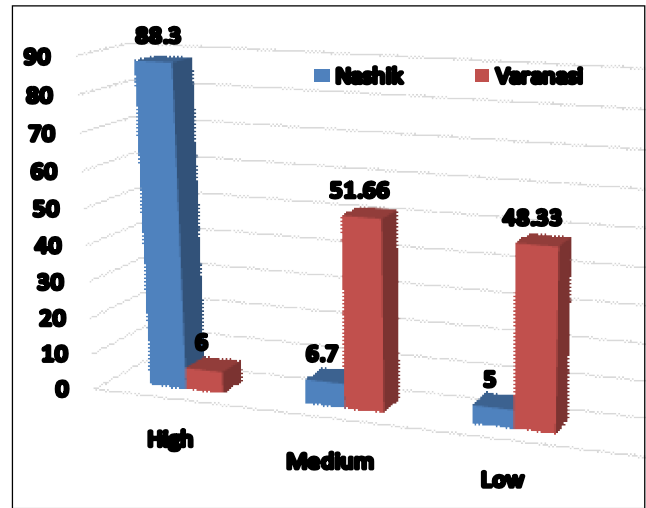
mostly used ICT media to share farm related information and 28.33 per cent of the farmers were highly using the ICT mediated information for farm decision making.

The knowledge gain through ICT was measured and the mean knowledge score of farmer of Nashik and Varanasi district was found to be 21.53 and 15.21, respectively which was statistically significant at 5 per cent level of significance. Table 4.3.3 showed that there was significant difference in mean information sharing though ICT in both the districts. The stakeholders of Nashik being more digitized preferred ICT tools as the easier mode to share agricultural information than the stakeholders of Varanasi. The day-to-day decision making for agricultural activities is a very complex affair. The timely and specific information can help decision making. The people who access such information through ICT are getting the benefit of easier decision making than those who do not. The stakeholders of Nashik and Varanasi were enquired on this construct and it was found that stakeholders of both the districts who were significantly different in digitization were also significantly different in decision making through ICT.

Table 4: Test of Significance of Knowledge Empowerment components between Farmers of Nashik and Varanasi

Differential Levels of	Nashik (n=60)		Varanasi (n=60)		Mann Whitney U	Z
	Mean	S.D.	Mean	S.D.		
Knowledge Gain	21.53	1.59	15.21	1.29	6.0*	-9.482
Knowledge Sharing through ICT	40.0667	6.51951	19.3167	4.71741	58.5**	-9.176
Decision Making	44.8833	5.68701	21.4167	5.76163	20.00**	-9.357

*significant at 5% level of significance; **significant at 1% level of significance

Table 5: Correlation between digitization level and knowledge empowerment level of stakeholders

Variables	n	Correlation Coefficient
Digitization Level Knowledge Empowerment	120	0.790**

** significant at 1% level of significance

The mean decision making behavior score for Nashik farmers lied at 44.88 whereas for Varanasi farmers it was 21.41.

It could be seen from the Table 5 that the constructs digitization and knowledge empowerment were strongly correlated with a Pearson Correlation Coefficient score of 0.79 which was statistically significant at 1 per cent level of significance, implying that where there was less digitization there was less knowledge empowerment also. Thus the alternate hypothesis was accepted proving that differential level of digitization had a significant effect on knowledge empowerment.

CONCLUSION

From present study, it could be comprehended that the ICT access and use and knowledge empowerment level covary together, and hence enhancing the level of digitization could lead to better knowledge gain, sharing and decision making. So, this finding might help policy makers, researchers and academicians for further study, developing knowledge management models and designing ICT-led agricultural information delivery programmes.

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