

Analyzing the Agro based mobile apps and farmers' social performance

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Abstract:

Among a very few promising endeavors towards scientific and sustainable agriculture, ICT and specifically Agro based mobile apps stand prominent in today's era. Agro based mobile apps facilitate timely and scientific information as well as a platform to run many activities in the process of agriculture. These apps are embedded with many features which help farmers in many ways like; getting reliable and scientific information about every activity to be followed in the entire process of cultivation, detecting many infections and pests and deciding the best and scientific way to resolve treat and save the crops from infections, calculating the quantity of chemicals required throughout the crop life cycle, getting the updated information about the prices for the crops in different markets, joining the farming community, etc., which are very crucial for the farmers for walking the way of scientific agriculture. This study is intended towards finding out the impact of using such agro based mobile apps by the farmers of Kalyana Karnataka region on their social performances like; sharing of crucial information with other farmers in the community and helping them to resolve their problems, helping other farmers in keeping many problems away, enhancing the standard of living in the society, contribution to the environmental wellbeing by reduced usage of chemical and reducing the harm to the environment, etc., 405 farmers (app users) were chosen randomly for this study and they were surveyed to carry out the study of the impact. This study revealed that there is a significant impact of the usage of agro based mobile apps on the farmers' social performance.

Key words: agricultural apps features, Farmers' social Performance, Agro Based Mobile Apps, Scientific agriculture, information dissemination, environmental wellbeing, technology intervention

Introduction:

Human existence is unimaginable without agriculture. Human population is increasing drastically which is exerting enormous pressure on scaling up food production, specifically quality food production to meet the ever growing need. In order to meet this demand for food, farmers are forced to use more and more chemicals on the crops to boost production which is exerting a negative impact on the quality of food, soil and environment by and large. Consumerism in the field of agri – inputs industry is also fueling this trend of usage of chemicals. On the other face, the farmers are also not aware of the scientific and eco-friendly ways of agriculture and even if known, they are reluctant to follow such practices as they doubt the reliability on such ways to earn profits. The small and medium scale farmers are the people who are actually facing it very difficult to make livelihood depending only on agriculture. Hence, the rate of attrition in this industry has also increased drastically. The farmers are not able to accomplish the social needs in the need hierarchy. This paper is a study in the direction of finding out the impact of using the agro based mobile apps on the social performance of the farmers of Kalyana Karnataka region, which helps us to interpret the impact of every feature of the apps on the social performance of the farmers and decide on engineering and enhancing those features that contribute to the society by and large. This study showed that there is a significant impact of using the agricultural apps on the social performance of the farmers in this region.

The features of agro based mobile apps includes; the set of practices to be followed in the entire process of cultivation from seed variety selection to harvesting of the crops, the calculator feature to find out the right quantity and combination of chemicals to be used to reap the best productivity in the process, finding out the changing values for the crops in the market which helps the farmers in making relevant decisions, facilitating the ability to identify and cure different infections on the crops, making right decision keeping the weather changes into consideration, sharing knowledge with other farmers and creating a win-win situation with other farmers in the community, getting access to different markets to procure agri-inputs where the farmers can avoid being pray to monopoly and have the power of negotiation to reduce the expenses in the process of agriculture, etc., these features are a real advantage to the farmers if they utilize them in a proper way.

One of the advantages that the farmers can reap from using these apps is to be able to reach their social needs and contribute to the farming society and the environment by large. This study intends to study how far the farmers are able to increase their social performance

by using these agro based mobile apps and even find out which feature among the ones discussed above are creating what level of impact on the farmers social performance.

Social performances in this study includes; level of interactions with the farming community, sharing of crucial information with other farmers in the community and helping them to resolve their problems, helping other farmers in keeping many problems away, participating in the events relating to agriculture to enrich and share knowledge among other farmers, getting access to advices and suggestions from experts in the industry, enhancing the standard of living in the society, contribution to the environmental wellbeing by reduced usage of chemical and reducing the harm to the environment.

Problem Statement:

Increasing food production has become the need of the hour and to satisfy this need, there is utmost necessity of scientific and reliable information and platforms which can facilitate many activities of agriculture. Agro based mobile apps in this direction seem very promising to satisfy the ever increasing demand for food. These mobile apps are having many features which caters to majority of the problems of the farmers, which will help the farmers to increase their standard of living and meet the social needs by enhancing their social performance. The question of what is the level of contribution of each feature of the agro based mobile apps no the social performance of the farmers of Kalyana Karnataka region? remains unanswered.

The farmers' (users of apps) social performance includes; farmers' level of interaction with other farmers, solving the problems faced by other farmers, involvement in agriculture related fairs, knowledge sharing with other farmers, access to suggestions from experts in the industry, contribution to the environmental wellbeing, standard of living, etc., in Kalyana Karnataka region are to be studied.

This studies tries to answer the following questions;

Up to what extent the different features from agro based mobile apps are associated with the farmers' social performance?

What is the impact of usage of each feature on the performance of the farmers in terms of 'social performance'?

Objectives:

1. To inspect the association between the agro based mobile apps and farmers' social performance.
2. To measure strength of the relationship between the usage of every feature of agro-based mobile apps and the farmers' social performance.
3. To examine the impact of usage of agro based mobile apps on the farmers' social performance.

Main Hypothesis:

H0: Agro based mobile apps have no significant impact on farmers' social performance

H1: Agro based mobile apps have significant impact on farmers' social performance

Sub Hypotheses:

Ha0: POPs have no significant impact on farmers' social performance

Ha1: POPs have significant impact on farmers' social performance

Hb0: Calculators have no significant impact on farmers' social performance

Hb1: Calculators management information have significant impact on farmers' social performance

Hc0: Pest and disease management have no significant impact on farmers' social performance

Hc1: Pest and disease management have significant impact on farmers' social performance

Hd0: Market value information have no significant impact on farmers' social performance

Hd1: Market value information have significant impact on farmers' social performance

He0: News and updates have no significant impact on farmers' social performance

He1: News and updates have significant impact on farmers' social performance

Hf0: Weather forecast have no significant impact on farmers' social performance

Hf1: Weather forecast have significant impact on farmers' social performance

Hg0: Farmers' community have no significant impact on farmers' social performance

Hg1: Farmers' community have significant impact on farmers' social performance

Hh0: E Commerce have no significant impact on farmers' social performance

Hh1: E Commerce have significant impact on farmers' social performance

Methodology:

Type of the study: Descriptive – Survey research, as the features of the agro based mobile apps and the demographics of farmers are described and a survey is carried out to explore and examine the apps' and its features' usage levels and the social performance of the farmers.

Population: Farmers from Kalyana Karnataka region who are using agro based mobile apps

Sample size: 405

Sampling Techniques: Convenient Sampling

Data Analysis and Hypothesis Testing: Descriptive statistics and Inferential statistics; Chi-Square test and Cramers' V value

Data Collection Instrument: Structured Questionnaire in which the responses are collected using 5 point likert scales;

For collecting the responses on the Independent variable (features) 5 point likert scale is used with the following scales: 1: SD – Strongly Disagree, 2: D – Disagree, 3: N – Neutral, 4: A – Agree, 5: SA – Strongly Agree

For collecting the responses on the dependent variable (Social performance) 5 point likert scale is used with the following scales: 1: SII – Significantly Increased, 2: SLI – Slightly Increased, 3: NC – No Change, 4: SLD – Slightly Decreased, 5: SID – Significantly Decreased

Results:

In order to test research hypothesis, Chi-Square test was used to find out the association between the variables and Cramer's V value was calculated to measure the strength of the relationship between the variables.

H0: Agro-based mobile apps have no significant impact on farmers' social performance

Table 1: Chi-Square test for the association between Agro-based mobile apps usage and farmers' social performance

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	119.664 ^a	2	.000
Likelihood Ratio	164.616	2	.000
Linear-by-Linear Association	119.267	1	.000
N of Valid Cases	405		

The table indicates that, χ^2 is 119.664 and p value is 0.000 which is less than 0.05. Therefore we reject the null hypothesis and conclude that Agro-based mobile apps usage has a significant association with farmers' social performance. Since there is a significant association between the variables, it can be inferred that the independent variable (Agro-Based Mobile Apps) has an impact on the dependent variable (Social performance)

Ha0: Package of practices have no significant impact on farmers' social performance

Table 2: Chi-Square test for the association between Package Of Practices usage and farmers' social performance

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	407.975 ^a	4	.000
Likelihood Ratio	151.879	4	.000
Linear-by-Linear Association	206.076	1	.000
N of Valid Cases	405		

The table indicates that, χ^2 is 733.987 and p value is 0.000 which is less than 0.05. Therefore we reject the null hypothesis and conclude that POP has a significant association with farmers' economic performance. Since there is a significant association between the

variables, it can be inferred that the independent variable (Package Of Practices) has an impact on the dependent variable (Economic performance)

Hb0: Calculator facilities have no significant impact on farmers' social performance

Table 3: Chi-Square test for the association between Calculator facilities usage and farmers' social performance

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	148.648 ^a	4	.000
Likelihood Ratio	54.652	4	.000
Linear-by-Linear Association	81.304	1	.000
N of Valid Cases	405		

The table indicates that, χ^2 is 148.648 and p value is 0.000 which is less than 0.05. Therefore we reject the null hypothesis and conclude that Calculator facilities usage have a significant association with farmers' social performance. Since there is a significant association between the variables, it can be inferred that the independent variable (Calculator facilities) has an impact on the dependent variable (social performance)

Hc0: Pest and disease management facilities have no significant impact on farmers' social performance

Table 4: Chi-Square test for the association between Pest and disease management facilities usage and farmers' social performance

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	292.143 ^a	6	.000
Likelihood Ratio	233.622	6	.000
Linear-by-Linear Association	169.547	1	.000
N of Valid Cases	405		

The table indicates that, χ^2 is 641.623 and p value is 0.000 which is less than 0.05. Therefore we reject the null hypothesis and conclude that Pest and disease management facilities usage has a significant association with farmers' social performance. Since there is a significant association between the variables, it can be inferred that the independent variable (Pest and disease management facilities) has an impact on the dependent variable (social performance)

Hd0: Market Value Information have no significant impact on farmers' social performance

Table 5: Chi-Square test for the association between Market Value Information usage and farmers' social performance

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	144.294 ^a	2	.000
Likelihood Ratio	96.024	2	.000
Linear-by-Linear Association	135.294	1	.000
N of Valid Cases	405		

The table indicates that, χ^2 is 144.294 and p value is 0.000 which is less than 0.05. Therefore we reject the null hypothesis and conclude that Market Value Information usage has a significant association with farmers' social performance. Since there is a significant association between the variables, it can be inferred that the independent variable (Market Value Information usage) has an impact on the dependent variable (social performance)

He0: News and Updates have no significant impact on farmers' social performance

Table 6: Chi-Square test for the association between News and Updates usage and farmers' social performance

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	176.542 ^a	2	.000
Likelihood Ratio	119.737	2	.000
Linear-by-Linear Association	176.017	1	.000
N of Valid Cases	405		

The table indicates that, χ^2 is 176.542 and p value is 0.000 which is less than 0.05. Therefore we reject the null hypothesis and conclude that News and Updates usage has a significant association with farmers' social performance. Since there is a significant association between the variables, it can be inferred that the independent variable (News and Updates usage) has an impact on the dependent variable (social performance)

Hf0: Weather Forecast Information have no significant impact on farmers' social performance

Table 7: Chi-Square test for the association between Weather Forecast Information usage and farmers' social performance

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	164.438 ^a	4	.000
Likelihood Ratio	171.706	4	.000
Linear-by-Linear Association	149.626	1	.000
N of Valid Cases	405		

The table indicates that, χ^2 is 164.438 and p value is 0.000 which is less than 0.05. Therefore we reject the null hypothesis and conclude that Weather Forecast Information usage has a significant association with farmers' social performance. Since there is a significant association between the variables, it can be inferred that the independent variable (Weather Forecast Information usage) has an impact on the dependent variable (social performance)

Hg0: Farmers' Community facilities have no significant impact on farmers' social performance

Table 8: Chi-Square test for the association between Farmers' Community facilities usage and farmers' social performance

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	344.256 ^a	4	.000
Likelihood Ratio	361.476	4	.000
Linear-by-Linear Association	267.601	1	.000
N of Valid Cases	405		

The table indicates that, χ^2 is 344.256 and p value is 0.000 which is less than 0.05. Therefore we reject the null hypothesis and conclude that Farmers' Community facilities usage has a significant association with farmers' social performance. Since there is a significant association between the variables, it can be inferred that the independent variable (Farmers' Community facilities usage) has an impact on the dependent variable (social performance)

Hh0: E Commerce facilities have no significant impact on farmers' social performance

Table 9: Chi-Square test for the association between E Commerce facilities usage and farmers' social performance

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	159.076 ^a	2	.000
Likelihood Ratio	187.820	2	.000
Linear-by-Linear Association	140.558	1	.000
N of Valid Cases	405		

The table indicates that, χ^2 is 159.076 and p value is 0.000 which is less than 0.05. Therefore we reject the null hypothesis and conclude that E Commerce facilities usage has a significant association with farmers' social performance. Since there is a significant association between the variables, it can be inferred that the independent variable (E Commerce facilities usage) has an impact on the dependent variable (social performance)

Strength of relationship between the variables:

Table 10: The strength of relationship between every independent variable (POP, CALC, PDM, MVI, NU, WF, FC & EC) and farmers' social performance

Cramer's V values	
Independent Variables	Dependent Variable (Farmers' Economic Performance)
Package Of Practices Information (POP)	.710
Calculator Facilities (CALC)	.428
Pests and Disease Management (PDM)	.601
Market Value Information (MVI)	.597
News & Updates (NU)	.660
Weather Forecast information (WF)	.451
Farmers' Community facility (FC)	.652
E Commerce facility (EC)	.627
Agro - based mobile apps	.544

Chi squared results showed a significant association between the independent and dependent variable. Hence, further the values of Cramer's V was used to measure the strength of the relationship between each independent variables and the dependent variable. Table 10 shows that Package Of Practices (POP) feature led the independent variables with the Cramer's V value of .710 which shows that there is a strong relationship between POP and farmers' social performance followed by moderate to strong relationship by News and Updates (NU) at a Cramer's V value of .660, followed by a Cramer's V value of .652 was found between Farmers' Community services (FC) and farmers' social performance, and .627 in case of E Commerce (EC), .601 with respect to Pest and Disease Management (PDM) and .597 Cramers' V value in case of Market Value Information (MVI) with social performance. Weak to moderate relationship of Weather Forecast information (.451) and Calculator facility (CALC) carrying the lowest value of .428 with social performance of the farmers.

Discussion:

From the above study it can be derived that all the features of agro based mobile apps are significantly associated with social performance of the farmers of Kalayana Karnataka region. Below is the discussion about the inferences that can be made based on the results of the study.

Strongly related variables:

Package of Practices (POP) led the features (independent variables) that showed a strong relationship with the social performance of the farmers of Kalyana Karnataka region. According to the study made, the farmers who have used the agro based mobile apps for accessing the information about the Package of Practices are being able to increase their social performance. Significant association and a strong relationship among these variables is evident form the results of the study. It can be inferred that by using the above said feature the farmer is able to share more information regarding the best practices of cultivation with other farmers, and in order to crosscheck the gathered information, they have increased the interaction with experts in the industry to get a second opinion from them.

Moderate to strongly related variables:

The features; News and Updates (NU), Farmers' Community (FC), E-Commerce (EC), Pest and Disease Management (PDM) and Market Value Information (MVI) showed moderate to strong relationship with the social performance of the farmers of Kalyana Karnataka region. According to the study made, the farmers who have used the agro based mobile apps for accessing the services from the above discussed features have increased

information sharing, solving other farmers' problems and even accessing information from other farmers have also increased and hence, increased the social performance of the farmers under the study. Significant association and a moderate to strong relationship among the variables is evident from the results of the study.

Low to Moderately related variables:

Weather Forecast (WF) and calculator facility (CALC) are the features (Independent variables) that showed very low to moderate relationship with the social performance of the farmers in Kalyana Karnataka region. According to this study, the farmers who have used the agro based mobile apps to access the Weather Forecast information, and calculator facility have either found it difficult to use, or have not relied on the information, but they have not showed interest in sharing the information with other farmers. there is significant association between the variables, but the strength of the relationship remains very low to moderate relationship. This shows that there is less impact of usage of the above said features on the social performance of the farmers.

Conclusion:

The study says that there is an association between the agro based mobile apps and farmers' social performance and the strength of association in case agro based mobile apps as a whole and farmers' quality performance is moderate with a Cramer's V value of .544. However Package of Practices showed a strong relationship with the social performance of the farmers, followed by News and Updates, Farmers' Community services, E-Commerce facilities, Pests and Disease Management, Market Value Information, Weather forecast and Calculator facilities. Farmers under the study perceived these features of agro based mobile apps as very necessary and as a result they have moderately shared the information with other farmers and have opined that their social status has increased by using these apps and have also showed a perception that they are contributing to the environmental wellbeing as they have reduced the usage of chemicals in the process of agriculture. As a whole, their Social performance is moderately impacted by the usage of these apps.

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