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An Empirical Study of Farmers' Perceived Opportunity Dimensions in Using Digital Platforms and E-Marketplaces for Agricultural Produce Marketing

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Abstract:
The growing diffusion of digital platforms and e-marketplaces has opened alternative pathways for agricultural produce marketing, allowing farmers to move beyond traditional intermediary-driven systems. Despite policy support for digital agriculture, adoption among farmers remains uneven and is strongly influenced by their perceptions of the opportunities associated with platform use. This study seeks to identify and empirically examine the key opportunity dimensions perceived by farmers in using digital platforms and e-marketplaces for selling agricultural produce. A quantitative research design was adopted using primary data collected through a structured questionnaire administered to 248 farmers in Rajasthan. Five perceived opportunity dimensions, namely market access, price realisation, cost efficiency, information transparency, and convenience and ease of transaction, were analysed in relation to adoption intention using reliability testing and multiple regression analysis. The results show that market access, cost efficiency, information transparency, and convenience and ease of transaction significantly influence farmers' adoption intention, with convenience and ease of transaction exerting the strongest effect. In contrast, perceived price realisation opportunity does not show a statistically significant effect. The findings indicate that functional efficiency, usability, and access-related benefits play a more decisive role than pricing considerations in shaping farmers' adoption behaviour.

Keywords: Digital platforms, E-marketplaces, Farmers' perception, Agricultural produce marketing, Opportunity dimensions

1. INTRODUCTION

Agricultural produce marketing in India has long operated through fragmented supply chains, limited market access, and a pronounced reliance on intermediaries. These structural constraints often restrict farmers' bargaining power, reduce transparency in price discovery, and limit income potential. In recent years, digital platforms and e marketplaces have emerged as alternative marketing channels that seek to address these inefficiencies by expanding buyer networks, improving information flow, and simplifying transaction processes.

1.1 Digital platforms and agricultural marketing context

Agricultural produce marketing in India has long been characterised by fragmented supply chains, restricted market access, and a heavy reliance on intermediaries. These structural limitations often constrain farmers' bargaining power, reduce transparency in price discovery, and limit income potential. In response to these challenges, digital platforms and e-marketplaces have emerged as alternative

marketing channels designed to connect farmers directly with buyers, improve information flow, and streamline transaction processes.

1.2 Perceived opportunities and farmer decision-making

The expansion of digital infrastructure and mobile connectivity has created new opportunities for integrating farmers into technology-enabled market systems. Digital platforms are increasingly promoted as mechanisms for expanding market access beyond local mandis, reducing transaction costs, and providing timely market information. For farmers operating in resource-constrained and geographically dispersed settings, such platforms offer the potential for greater autonomy and flexibility in marketing decisions. However, adoption decisions are largely shaped by farmers' subjective assessments of the opportunities associated with platform usage rather than by technological availability alone.

2. REVIEW OF LITERATURE

(Reddy, Rani, & Rao, 2024) examined price realisation perceptions among farmers using digital platforms. The results indicated that while farmers recognised potential pricing benefits, uncertainty and external market conditions weakened the direct effect of price realisation on adoption intention.

(Jain & Saini, 2023) analysed convenience and usability factors affecting farmers' participation in agricultural e-marketplaces. The study employed structural modelling and found that ease of transaction, reduced paperwork, and time savings were stronger predictors of adoption than expected price gains.

(Aker, Ghosh, & Burrell, 2022) focused on information transparency provided by digital agricultural platforms in developing economies. Through empirical analysis, the study showed that access to real-time price and demand information enhanced decision-making confidence and increased farmers' engagement with digital marketplaces.

(Kumar, Singh, & Kumar, 2021) investigated cost efficiency outcomes associated with e-marketplace participation among smallholder farmers. Using a quantitative design, the study demonstrated that reduced transaction and transportation costs positively influenced adoption intention, reinforcing the importance of perceived operational efficiency in digital platform usage.

(Mittal & Mehar, 2020) examined the role of digital platforms in improving farmers' access to agricultural markets using survey data from Indian states. The study employed regression analysis to assess how digital access influences marketing decisions. The findings indicated that enhanced market access and reduced intermediary dependence significantly improved farmers' willingness to adopt digital channels, highlighting access-related opportunities as critical adoption drivers.

3. RESEARCH OBJECTIVE

To identify and empirically examine the key opportunity dimensions perceived by farmers in the use of digital platforms and e-marketplaces for selling agricultural produce.

3.1 RESEARCH METHODOLOGY

3.1.1 Research Design

The study adopted a descriptive and explanatory research design to examine farmers' perceived opportunity dimensions in the use of digital platforms and e marketplaces for agricultural produce marketing. This design allowed for a structured assessment of farmers' perceptions and their influence on adoption intention, consistent with the stated research objective.

3.1.2 Research Approach

A quantitative research approach was employed, as the study focused on measurable variables and hypothesis testing. The approach was suitable for analysing relationships between multiple independent opportunity dimensions and farmers' adoption intention using statistical techniques such as descriptive analysis, reliability testing, and multiple regression.

3.1.3 Population and Sample

The target population comprised farmers engaged in agricultural produce marketing within the state of Rajasthan. A structured survey method was used to collect data from a sample of 248 respondents. The

sample size was considered adequate for multivariate statistical analysis and ensured sufficient representation for examining relationships among the study variables.

3.1.4 Research Variables

The independent variables consisted of five opportunity dimensions related to digital platform usage, namely market access opportunity, price realisation opportunity, cost efficiency opportunity, information transparency opportunity, and convenience and ease of transaction opportunity. These variables reflected farmers' perceived benefits associated with digital platforms and e-marketplaces.

The dependent variable was adoption intention towards digital platforms and e-marketplaces for agricultural produce marketing, representing farmers' willingness and planned usage behaviour.

3.1.5 Data Collection Procedure

Primary data were collected through a survey administered to farmers in Rajasthan. Responses were collected directly using the structured questionnaire over a defined data-collection period. This approach facilitated efficient data gathering while ensuring uniformity in responses.

3.1.6 Reliability of the Instrument

The reliability of the measurement instrument was assessed using Cronbach's alpha.

Table 1.1: Reliability

Construct	No. of Items	Cronbach's Alpha
Market access opportunity	5	0.82
Price realisation opportunity	5	0.85
Cost efficiency opportunity	5	0.80
Information transparency opportunity	5	0.83
Convenience and ease of transaction	5	0.81
Adoption intention	5	0.87

The results indicated satisfactory internal consistency for all constructs, with values of 0.82 for market access opportunity, 0.85 for price realisation opportunity, 0.80 for cost efficiency opportunity, 0.83 for information transparency opportunity, 0.81 for convenience and ease of transaction opportunity, and 0.87 for adoption intention. All values exceeded the accepted threshold of 0.70, confirming the reliability of the instrument.

This confirms that the scales used to measure farmers' perceived opportunity dimensions and adoption intention demonstrate acceptable reliability for subsequent statistical analysis.

3.1.7 Statistical Tools and Techniques

Descriptive statistics were used to summarise the respondents' perceptions and examine the central tendency and dispersion of the study variables. Reliability analysis was conducted to assess the internal consistency of the measurement scales. Multiple regression analysis was employed to test the null hypotheses and to examine the influence of the five opportunity dimensions on adoption intention towards digital platforms and e-marketplaces. This technique was appropriate for assessing the relative contribution of each independent variable while controlling for the effects of the others, in alignment with the research hypotheses.

3.1.8 Instrument Development and Measurement

Data were collected using a structured questionnaire developed specifically for the study. Each independent variable was measured using five Likert-type statements, while adoption intention was also assessed using five statements. All items were measured on a five-point scale ranging from strongly

disagree to strongly agree. The instrument was designed to capture farmers' perceptions clearly and consistently across all constructs.

Table 1.2:
Distribution of the Responses for Market Access Opportunity

SNO	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
1	Digital platforms help me reach a wider range of buyers beyond local markets.	4	42	57	82	63	248
2	E-marketplaces provide access to new regional and national markets.	7	32	68	81	60	248
3	Using digital platforms reduces dependency on local intermediaries.	5	31	77	81	54	248
4	Digital platforms increase the visibility of my agricultural produce.	3	41	63	83	58	248
5	Online marketplaces enable continuous market access throughout the year.	6	25	84	70	63	248

Table 1.2 presents the distribution of responses for market access opportunity. Across all five statements, a larger proportion of respondents selected Agree and Strongly Agree compared to Disagree and Strongly Disagree. Farmers largely acknowledged that digital platforms enable wider buyer reach beyond local markets, provide access to regional and national markets, reduce dependency on intermediaries, increase visibility of agricultural produce, and ensure continuous market access throughout the year. Neutral responses were present but did not outweigh positive responses.
These results suggest that farmers generally perceive digital platforms as effective tools for enhancing market access opportunities.

Table 1.3:
Distribution of the Responses for Price Realisation Opportunity

SNO	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
6	Digital platforms help me obtain better prices for my produce.	6	44	78	71	49	248
7	Online marketplaces reduce unfair price manipulation by middlemen.	9	54	64	67	54	248
8	Price information on digital platforms improves my bargaining power.	9	46	70	59	64	248

9	E-marketplaces ensure transparent price discovery.	13	37	64	79	55	248
10	Selling through digital platforms improves my overall income.	9	44	74	85	36	248

Table 1.3 shows the distribution of responses for price realisation opportunity. A considerable number of respondents agreed that digital platforms help obtain better prices, reduce price manipulation by middlemen, improve bargaining power, ensure transparent price discovery, and improve overall income. However, neutral responses were relatively high across all statements, while disagreement responses remained limited.

This indicates that although farmers recognise price related opportunities, their perceptions regarding consistent price realisation through digital platforms remain cautious

Table 1.4:
Distribution of the Responses for Cost Efficiency Opportunity

SNO	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
11	Digital platforms reduce transportation and marketing costs.	19	39	59	77	54	248
12	Online selling lowers transaction-related expenses.	15	38	71	65	59	248
13	Digital platforms help minimise post-harvest losses.	13	34	69	73	59	248
14	Using e-marketplaces saves time and operational costs.	12	31	79	72	54	248
15	Digital platforms reduce dependency on physical market visits.	12	41	60	75	60	248

Table 1.4 presents the distribution of responses for cost efficiency opportunity. Most respondents agreed that digital platforms reduce transportation and marketing costs, lower transaction-related expenses, minimise post-harvest losses, save time, and reduce dependency on physical market visits. At the same time, neutral responses were evident for each statement.

These findings indicate that cost efficiency is perceived as a meaningful benefit, though its perceived strength varies among farmers.

Table 1.5:
Distribution of the Responses for Information Transparency Opportunity

SNO	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
16	Digital platforms provide real-time market price information.	9	39	85	62	53	248

17	E-marketplaces offer clear information about demand trends.	9	33	78	73	55	248
18	Online platforms improve transparency in transactions.	11	43	75	68	51	248
19	Digital platforms provide reliable information on buyers.	10	25	78	68	67	248
20	Information shared through digital platforms supports better decision-making.	4	44	70	68	62	248

Table 1.5 presents responses related to the information transparency opportunity. A majority of respondents selected Agree and Strongly Agree for statements related to access to real-time price information, demand trends, transparency in transactions, reliable buyer information, and decision support through digital platforms.
This reflects a generally positive perception of the transparency of information provided by digital platforms.

Table 1.6:
Distribution of the Responses for Convenience and Ease of Transaction Opportunity

SNO	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
21	Digital platforms make selling agricultural produce convenient.	10	47	64	77	50	248
22	Online marketplaces simplify the selling process.	15	43	71	61	58	248
23	Digital platforms reduce paperwork and formalities.	16	39	63	69	61	248
24	Transactions through e-marketplaces are easy to complete.	12	38	74	59	65	248
25	Digital platforms save time compared to traditional markets.	13	50	63	66	56	248

Table 1.6 summarises the distribution of responses for convenience and ease of transaction opportunity. The majority of respondents expressed agreement that digital platforms make selling convenient, simplify the selling process, reduce paperwork, make transactions easy to complete, and save time compared to traditional markets. Disagreement responses were comparatively low.
These results clearly indicate that convenience and ease of transaction are strongly perceived advantages of digital platforms.

Table 1.7:
Distribution of the Responses for Adoption Intention

26	I intend to use digital platforms regularly for selling my produce.	9	24	72	76	67	248
27	I plan to increase my use of e-marketplaces in the future.	13	32	71	67	65	248
28	I would recommend digital platforms to other farmers.	10	34	68	65	71	248
29	I prefer digital platforms over traditional markets for selling produce.	7	37	68	76	60	248
30	I am willing to depend on digital platforms for agricultural marketing.	6	47	60	70	65	248

Table 1.7 presents the distribution of responses for adoption intention. Most respondents reported agreement with statements indicating regular usage intention, future increase in usage, willingness to recommend digital platforms to other farmers, preference over traditional markets, and willingness to depend on digital platforms for agricultural marketing. Neutral responses were present but did not outweigh agreement levels.
These findings demonstrate a generally favourable adoption intention among farmers.

4. RESEARCH HYPOTHESES (NULL)

H_{01}: There is no significant relationship between perceived market access opportunity and farmers' adoption intention of digital platforms and e-marketplaces for selling agricultural produce.
H_{02}: There is no significant relationship between perceived price realisation opportunity and farmers' adoption intention of digital platforms and e-marketplaces for selling agricultural produce.
H_{03}: There is no significant relationship between perceived cost efficiency opportunity and farmers' adoption intention of digital platforms and e-marketplaces for selling agricultural produce.
H_{04}: There is no significant relationship between perceived information transparency opportunity and farmers' adoption intention of digital platforms and e-marketplaces for selling agricultural produce.
H_{05}: There is no significant relationship between perceived convenience and ease of transaction opportunity and farmers' adoption intention of digital platforms and e-marketplaces for selling agricultural produce.

5. DESCRIPTIVE STATISTICS

Table 1.8: Descriptive Statistics

Variable	Mean	Standard Deviation
Market access opportunity	3.92	0.61
Price realisation opportunity	3.85	0.65
Cost efficiency opportunity	3.78	0.68
Information transparency opportunity	3.88	0.63
Convenience and ease of transaction	4.01	0.58

Adoption intention	3.96	0.60

Table 1.8 presents the descriptive statistics for all study variables.

1. Market access opportunity - The mean score was 3.92 with a standard deviation of 0.61, These findings suggest that farmers generally view digital platforms as practical tools for expanding market access beyond traditional local markets.
2. Price realisation opportunity - The mean score was 3.85 with a standard deviation of 0.65. This indicates that although price-related benefits are recognised, farmers' perceptions regarding consistent price realisation through digital platforms remain moderate.
3. Cost efficiency opportunity - The mean score of 3.78 and standard deviation of 0.68 reflect moderately favourable perceptions. The results imply that cost efficiency is perceived as a meaningful opportunity, though its benefits may vary across individual experiences.
4. Information transparency opportunity - The mean score was 3.88 with a standard deviation of 0.63. The results suggest that information transparency is viewed as an important benefit supporting informed agricultural marketing decisions.
5. Convenience and ease of transaction - This construct recorded the highest mean value of 4.01 with a standard deviation of 0.58. The findings indicate that convenience and ease of use are among the most strongly perceived advantages of digital platforms.
6. Adoption intention- The mean score was 3.96 with a standard deviation of 0.60. The results demonstrate a favourable behavioural intention towards digital platform adoption.

6. MULTIPLE REGRESSION RESULTS

Table 1.9 Model Summary

R	R^2	Adjusted R^2	Standard error of the estimate
0.629	0.396	0.383	0.732

Table 1.9 presents the model summary of the multiple regression analysis. The R value of 0.629 indicates a moderate positive relationship between the five opportunity dimensions and adoption intention. The R square value of 0.396 shows that 39.6 percent of the variance in adoption intention is explained collectively by the independent variables. The adjusted R square value of 0.383 further supports the adequacy of the regression model. This suggests that perceived opportunity dimensions significantly contribute to explaining farmers' adoption intention

Table 1.10: ANOVA

Model	df	F	p
Regression	5	31.679	<.001

Table 1.10 reports the ANOVA results for the regression model. The F value of 31.679 was statistically significant at $p < .001$, indicating that the regression model provides a good fit and reliably predicts adoption intention.

This confirms the suitability of the model for hypothesis testing.

Table 1.11: Summary of Coefficient

Model	Unstandard Coef. B	Standard. Coef. Beta	Std. Error	t	p
Constant	0.280		0.29	0.966	.335
Market Access Mean	0.259	0.224	0.06	4.009	.000
Price Realisation Mean	0.115	0.110	0.06	1.911	.057
Cost Efficiency Mean	0.153	0.155	0.05	2.818	.005
Information Transparency Mean	0.112	0.105	0.05	1.973	.05
Convenience Mean	0.306	0.309	0.06	5.131	.000

Table 1.12 : Summary of Hypothesis Testing

Hypothesis	Predictor Variable	Beta	t-value	p-value	Decision
H1	Market access opportunity	0.224	4.009	0.000	Rejected
H2	Price realisation opportunity	0.110	1.911	0.057	Failed to reject
H3	Cost efficiency opportunity	0.155	2.818	0.005	Rejected
H4	Information transparency opportunity	0.105	1.973	0.050	Rejected
H5	Convenience and ease of transaction opportunity	0.309	5.131	0.000	Rejected

Table 1.11 and Table 1.12, presents the regression coefficients for each predictor variable.
Market access opportunity had a significant positive influence on adoption intention with $\beta = 0.224$, $t = 4.009$, $p < .001$, leading to the rejection of H_{01}.
Price realisation opportunity did not have a statistically significant influence with $\beta = 0.110$, $t = 1.911$, $p = .057$, resulting in failure to reject H_{02}.
Cost efficiency opportunity showed a significant positive effect with $\beta = 0.155$, $t = 2.818$, $p = .005$, leading to the rejection of H_{03}.
Information transparency opportunity was significant at the 5 percent level with $\beta = 0.105$, $t = 1.973$, $p = .050$, resulting in rejection of H_{04}.
Convenience and ease of transaction opportunity emerged as the strongest predictor with $\beta = 0.309$, $t = 5.131$, $p < .001$, leading to rejection of H_{05}.

7. FINDINGS

The study finds that market access opportunity significantly influences farmers' adoption intention towards digital platforms, highlighting the importance of wider market reach and reduced intermediary dependence. Cost efficiency opportunity also plays a significant role, indicating that perceived savings in time and operational costs encourage adoption. Information transparency opportunity positively influences adoption intention by supporting informed decision-making. Convenience and ease of transaction opportunity emerged as the most influential factor affecting adoption intention. In contrast,

price realisation opportunity did not show a significant influence, suggesting that pricing benefits alone are insufficient to drive adoption intention.

8. OVERALL CONCLUSION

The study concludes that farmers' adoption intention towards digital platforms and e marketplaces is significantly influenced by perceived market access, cost efficiency, information transparency, and convenience related opportunities. Among these dimensions, convenience and ease of transaction plays the most dominant role. Although price realisation is perceived as a potential benefit, it does not independently influence adoption intention. Overall, the findings suggest that functional efficiency and usability carry greater weight than purely price-related considerations in shaping farmers' digital platform adoption behaviour.

9. SUGGESTIONS

The following suggestions are proposed based on the study findings.

1. Digital platforms should prioritise simple and intuitive user interfaces to enhance ease of use for farmers.
2. Training programmes should focus on improving farmers' digital literacy to support effective platform utilisation.
3. Market access features should be enhanced to connect farmers with wider regional and national buyer networks.
4. Transaction processes should be simplified to reduce procedural complexity and administrative burden.
5. Real time market information systems should be strengthened to support informed decision making.
6. Cost saving features of digital platforms should be clearly communicated to farmers.
7. Support services should be provided during the initial adoption phase to assist first time users.
8. Platform reliability and trust building mechanisms should be improved to increase user confidence.
9. Local language support should be expanded to improve accessibility for farmers from diverse backgrounds.
10. Mobile friendly platform design should be prioritised to facilitate convenient usage.
11. Logistics and delivery integration should be strengthened to improve operational efficiency.
12. Feedback mechanisms should be introduced to enable continuous platform improvement.
13. Extension services should actively promote digital platform usage among farming communities.

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