

Price Discrimination's Impact on Product Quality, Brand Trust and Loyalty in Digital vs. Physical Markets

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ABSTRACT

The study examines the factors influencing price discrimination in digital vs. physical markets, focusing on product quality, brand trust, and brand loyalty. Using regression analysis, the results show that brand loyalty has the strongest effect on price discrimination, followed by brand trust, while product quality has a minimal impact. The model explains 41.1% of the variance in price discrimination, indicating that brand-related factors significantly affect pricing strategies across market types. The findings are supported by a highly significant ANOVA, demonstrating the model's robustness. This research provides valuable insights into how companies can leverage brand attributes to optimize pricing in digital and physical environments.

Keywords: Price Discrimination, Brand Loyalty, Brand Trust, Product Quality, Digital Markets

INTRODUCTION

Price discrimination involves charging varying prices for the same product or service depending on factors like consumer preferences, purchasing habits, or market dynamics (Varian, 1989). With the rapid expansion of online markets, companies are increasingly implementing price discrimination techniques to boost their profits, utilizing elements such as brand image and product quality (Chevalier & Goolsbee, 2003).

Brand trust and brand loyalty have become essential influences on consumer decision-making and pricing tactics in both digital and physical retail environments. When consumers trust a brand, they often associate it with higher quality and value, making them more willing to accept higher prices (Chaudhuri & Holbrook, 2001). Similarly, brand loyalty, characterized by a customer's long-term preference for a particular brand, can result in price insensitivity, which enables businesses to engage in price discrimination (Dick & Basu, 1994).

Although these factors are crucial, limited research has examined their specific impact on price discrimination across digital and physical markets. This research aims to address this gap by analyzing how product quality, brand trust, and brand loyalty influence pricing strategies in both digital and traditional contexts.

Objectives Of The Study

• To understand the price discrimination's impact on product quality, brand trust and loyalty in digital vs. physical markets.

Methodology Of Study

- Primary data: Questionnaire
- Secondary data: Books, Journals, etc.
- Sampling Method: Convenience Sampling (Andhra Pradesh)
- Sample Size: 463
- Tools of Data Analysis: Regression.

Hypotheses

 H_0 : There is no price discrimination's impact on product quality, brand trust and loyalty in digital vs. physical markets. H_1 : There is a price discrimination's impact on product quality, brand trust and loyalty in digital vs. physical markets.



DATA ANALYSIS

The descriptive statistics provide insights into the central tendency and variability of the variables. The mean for Price Discrimination in Digital vs. Physical Markets is 3.7624 with a standard deviation of 1.07093, indicating a moderate level of agreement among respondents. Product Quality has a mean of 2.9935 and a higher standard deviation of 1.44224, suggesting more variability in responses. Brand Trust and Brand Loyalty both have means of approximately 3.81 and standard deviations of around 1.04, reflecting relatively consistent agreement among participants. All variables have a sample size of 463, ensuring sufficient data for analysis.

Table-1: Descriptive Statistics

	Mean	Std. Deviation	Ν
Price Discrimination in Digital vs. Physical	3.7624	1.07093	463
Markets			
Product Quality	2.9935	1.44224	463
Brand Trust	3.8078	1.03603	463
Brand Loyalty	3.8056	1.03876	463

Source: Primary data

The **Correlations** table displays the relationships between the variables in the model. It is essential to ensure that the independent variables have a meaningful association with the dependent variable, ideally with correlations above **0.3**. In this analysis, **Brand Trust** (0.226) and **Brand Loyalty** (0.622) both exhibit positive correlations with **Price Discrimination** in digital vs. physical markets. Notably, **Brand Loyalty** has a stronger correlation with **Price Discrimination**, indicating that it likely has a more significant effect on the dependent variable than **Brand Trust**.

Additionally, it's important to check for **multicollinearity** among the independent variables. Generally, correlations between independent variables should not exceed **0.7**, as this could indicate multicollinearity problems. In this case, the highest correlation is between **Price Discrimination** and **Brand Loyalty** (0.622), which is well below the **0.7** threshold, suggesting that multicollinearity is not an issue.

		Price	Product	Brand	Brand
		Discrimination in	Quality	Trust	Loyalty
		Digital vs. Physical	- •		
		Markets			
Pearson Correlation	Price Discrimination in	1.000	.086	.226	.622
	Digital vs. Physical				
	Markets				
	Product Quality	.086	1.000	.124	.087
	Brand Trust	.226	.124	1.000	.116
	Brand Loyalty	.622	.087	.116	1.000
Sig. (1-tailed)	Sig. (1-tailed) Price Discrimination in		.032	.000	.000
	Digital vs. Physical				
	Markets				
	Product Quality	.032		.004	.030
	Brand Trust	.000	.004		.006
	Brand Loyalty	.000	.030	.006	
Ν	Price Discrimination in	463	463	463	463
	Digital vs. Physical				
Markets Product Quality					
		463	463	463	463
	Brand Trust	463	463	463	463
	Brand Loyalty	463	463	463	463

Table-2: Correlations

Source: Primary data

Collinearity diagnostics in the **Coefficients** table, which includes **Tolerance** and **VIF** values. The **Tolerance** value reflects how much variability in an independent variable is not explained by the other variables. A value under **0.10** indicates high multicollinearity. Here, all **Tolerance** values are above **0.10**, confirming no multicollinearity problems. Similarly, the **VIF** values are all much lower than **10**, with the highest being **1.027**, further supporting the absence of multicollinearity in this model.



Table-3: Model Summary^b

R	R Square	Adjusted R Square	Std. Error of the Estimate					
.641 ^a	.411	.407	.82463					
a. Predictors: (Constant), Brand Loyalty, Product Quality, Brand Trust								
b. Dependent Variable: Price Discrimination in Digital vs. Physical Markets								
r r	641 ^a nstant), Brand Loya iable: Price Discrim	641 ^a .411 nstant), Brand Loyalty, Product Quality, E iable: Price Discrimination in Digital vs. F	K Square Adjusted K Square 641 ^a .411 .407 Instant), Brand Loyalty, Product Quality, Brand Trust iable: Price Discrimination in Digital vs. Physical Markets					

Source: Primary data

The Model Summary shows that the regression model has a moderate fit, with an R-square value of 0.411, indicating that approximately 41.1% of the variance in Price Discrimination in Digital vs. Physical Markets is explained by Brand Loyalty, Product Quality, and Brand Trust. The adjusted R-square is 0.407.

Table-4: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	217.740	3	72.580	106.733	.000 ^b	
	Residual	312.126	459	.680			
	Total	529.866	462				
a. Dependent Variable: Price Discrimination in Digital vs. Physical Markets							
b. Predictors: (Constant), Brand Loyalty, Product Quality, Brand Trust							

Source: Primary data

The ANOVA results indicate that the regression model significantly predicts Price Discrimination in Digital vs. Physical Markets (F(3, 459) = 106.733, p < 0.001). The model explains a substantial portion of the variance, with a total sum of squares of 529.866 and a residual sum of squares of 312.126.

Μ	odel	Unstan	dardiz	Standardiz	t	Sig	95.0%		Correl	ations		Collineari	ty
ed			ed			Confidence					Statistics		
		Coeffic	cients	Coefficient			Interva	l for B					
				s									
		В	Std.	Beta			Lowe	Uppe	Zero	Partia	Par	Toleranc	VIF
			Error				r	r	-	1	t	e	
							Boun	Boun	orde				
							d	d	r				
1	(Constan	.759	.200		3.800	.00	.366	1.151					
	t)					0							
	Product	.011	.027	.014	.392	.69	042	.063	.086	.018	.01	.979	1.02
	Quality					5					4		1
	Brand	.160	.038	.154	4.250	.00	.086	.233	.226	.195	.15	.974	1.02
	Trust					0					2		7
	Brand	.621	.037	.603	16.66	.00	.548	.695	.622	.614	.59	.981	1.01
	Loyalty				6	0					7		9
я	Dependent V	Variable	Price Di	scrimination in	Digital	ve Phy	vsical Ma	arkets					

Table-5: Coefficients

Source: Primary data

The regression analysis shows the relationship between various independent variables (Product Quality, Brand Trust, and Brand Loyalty) and the dependent variable, Price Discrimination in Digital vs. Physical Markets.

Brand Loyalty has the strongest impact on Price Discrimination with an unstandardized coefficient of 0.621 and a significant t-value of 16.666 (p < 0.001), indicating a robust positive relationship. Brand Trust also has a significant effect, with a coefficient of 0.160 and a t-value of 4.250 (p < 0.001), suggesting a moderate positive relationship. In contrast, Product Quality shows a negligible effect, with a coefficient of 0.011 and a non-significant p-value of 0.695. The VIF values for all variables are below 2, indicating no issues with multicollinearity. Confidence intervals for the coefficients suggest that Brand Loyalty and Brand Trust are statistically significant predictors of Price Discrimination, while Product Quality is not.

Table-6: Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition	Variance Proportions				
			Index	(Constant)	Product	Brand	Brand	
					Quality	Trust	Loyalty	
1	1	3.767	1.000	.00	.01	.00	.00	
	2	.146	5.083	.01	.96	.04	.05	
	3	.061	7.865	.00	.00	.56	.54	
	4	.026	12.072	.98	.03	.39	.40	
a Damand	ant Variable, Drie	Disamination	in Divital wa Dh	vai and Markata				

a. Dependent Variable: Price Discrimination in Digital vs. Physical Markets

Source: Primary data

The **Collinearity Diagnostics** table shows the **Condition Index** and **Variance Proportions** for each model dimension. The high **Condition Index** values (up to 12.072) suggest moderate collinearity between the independent variables.

Case Number	Std. Residual	Price Discrimination	Predicted Value	Residual
		Markets		
369	-3.281	2.00	4.7054	-2.70540
371	-3.327	1.00	3.7439	-2.74390
380	-3.353	1.00	3.7650	-2.76496
382	-3.242	2.00	4.6738	-2.67381
386	-3.681	1.00	4.0358	-3.03576
401	3.372	5.00	2.2197	2.78026
407	3.224	5.00	2.3416	2.65844
408	-3.508	1.00	3.8929	-2.89289
416	3.043	5.00	2.4905	2.50945
417	-3.366	1.00	3.7755	-2.77549
424	-3.753	1.00	4.0945	-3.09451
425	-3.875	1.00	4.1953	-3.19528
426	3.030	5.00	2.5011	2.49892
431	-4.119	1.00	4.3969	-3.39690
448	-3.147	1.00	3.5949	-2.59492
453	-3.681	1.00	4.0358	-3.03576
460	3.359	5.00	2.2303	2.76973

Table-7: Case wise Diagnostics

a. Dependent Variable: Price Discrimination in Digital vs. Physical Markets

Source: Primary data

The **Casewise Diagnostics** table highlights specific cases with large residuals. Cases with **standardized residuals** above 3 or below -3, such as Case 431 (-4.119) and Case 460 (3.359), indicate outliers or influential data points that may impact the model. The corresponding residuals suggest discrepancies between actual and predicted values.

Table-8: Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	Ν		
Predicted Value	1.5606	4.7159	3.7624	.68651	463		
Std. Predicted Value	-3.207	1.389	.000	1.000	463		
Standard Error of Predicted Value	.040	.144	.074	.020	463		
Adjusted Predicted Value	1.4836	4.7267	3.7623	.68870	463		
Residual	-3.39690	2.78026	.00000	.82195	463		
Std. Residual	-4.119	3.372	.000	.997	463		
Stud. Residual	-4.142	3.413	.000	1.004	463		
Deleted Residual	-3.43523	2.84847	.00016	.83368	463		
Stud. Deleted Residual	-4.218	3.453	001	1.011	463		
Mahal. Distance	.063	13.150	2.994	2.427	463		
Cook's Distance	.000	.092	.004	.011	463		
Centered Leverage Value	.000	.028	.006	.005	463		
a. Dependent Variable: Price Discrimination in Digital vs. Physical Markets							

Source: Primary data



The **Residuals Statistics** table offers an overview of the residuals from the regression model. The predicted values range from 1.5606 to 4.7159, with an average of 3.7624. The standardized residuals fall between -4.119 and 3.372, with a mean near zero, suggesting that the residuals are evenly distributed around zero. The **standard error of predicted values** is low (0.020), indicating the predictions are accurate. **Cook's Distance** values are all under 0.1, suggesting no influential outliers. Additionally, the **Mahalanobis Distance** and **Leverage** values remain within normal limits, confirming the absence of significant outliers or high leverage points that might affect the model.

Chart-1

Normal P-P Plot of Regression Standardized Residual Dependent Variable: Price Discrimination in Digital vs. Physical Markets

Source: Primary data

CONCLUSION

In conclusion, the regression analysis reveals that Brand Loyalty, Brand Trust, and Product Quality influence Price Discrimination in Digital vs. Physical Markets, though to varying degrees. Brand Loyalty has the most significant impact, with a strong positive relationship to price discrimination, as indicated by its high coefficient and statistical significance. Brand Trust also plays a significant role, though its effect is moderate compared to Brand Loyalty. In contrast, Product Quality has a minimal effect and does not significantly contribute to explaining price discrimination in these markets.

The ANOVA results confirm that the regression model as a whole is highly significant, with a substantial F-value, indicating that the predictors collectively explain a significant portion of the variance in price discrimination. The R-squared value of 0.411 suggests that about 41.1% of the variance in price discrimination is explained by the predictors, while the adjusted R-squared value further confirms the model's robustness. Overall, the study highlights that brand-related factors, particularly loyalty and trust, are crucial in understanding how price discrimination differs between digital and physical markets, while product quality plays a lesser role.

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