

PRICE TRACKING BEHAVIOUR IN ELECTRONIC COMMERCE AND THE MODERATING ROLE OF FAIR PRICE PERCEPTION

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Abstract: With the rapid advancements in the Electronic Commerce sector, modern consumers are becoming increasingly aware of the prospects of the various pricing strategies, which have made their purchase decisions more sophisticated. Recent literature portrays an increased tendency among online shoppers to track product prices and wait for price markdowns prior to making their purchase decisions. This act of consumers is seen as strategic purchase behaviour, which is necessary for sellers to be aware of and frame their counter-strategies accordingly to prevent potential loss of revenue. This study aims at analyzing and measuring crucial factors that influence price tracking among online consumers. These include shopping experience, fair price perceptions and awareness about dynamic pricing. Using PLS SEM, this study also analyses the moderating effect of fair price perceptions on the overall shopping experience and price tracking behaviour of consumers. Statistical results reveal all three factors have significant direct and positive influence on price tracking behaviour and the moderation effect is significant and negatively influences consumer price tracking behaviour.

Key words: Price tracking, Strategic Buying, Consumer Behaviour, E-Commerce, Dynamic Pricing

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Introduction

Electronic Commerce (EC) or the more spirited practice of online shopping seemed to be a myth or fantasy during the 90s had become a reality at the beginning of 2000s and now online retailers are making the whole globe experience their richer and outstanding services. Since then it's notable to account that strategic advantage of dynamic pricing is ruling the EC environment. Eye-popping discounts and affordable prices along with greater convenience in shopping by saving fuel and time have made the EC sector a part of everyday life of a common man. As Doug Stephens rightly mentioned "From Bricks to Clicks", (Stephens, 2013), everything that human life requires in their daily routine is made available to them at their doorsteps, through a small screen in hands. Once a myth has now become a beguiling reality to every age group.

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Disembarking from global to the diverse Indian scenario, where people with varying cultural, traditional customs and lifestyle reside is also highly attracted to this new fancy way of shopping. The recent statistics portray that the retail worldwide EC sales have reached around 2197 trillion US dollars in 2017 out of which 20, 59 million US Dollars accrued to the online purchase of population in India (Statista, 2018). The growth potential of the Indian EC market is tremendous considering the young demographic profile of the country and its GDP position. It is remarkable to mention that a typical consumer whose psychological behaviour while purchasing a particular item, always wants to touch and feel the product for a greater satisfaction is now inclined to the arctic of online shopping.

This change in attitude towards the nature of shopping has implications with the affordable prices, huge discounts and convenience of purchase (Nathan and Yeow, 2011; Svatošová, 2013). Masses find the online prices more opportune and low-end in their budget. Importantly this pattern accommodates people belonging to different budget lines. These magical appearances of varied prices in every other screen can be stated as the aftermath of a flexible pricing strategy adopted by the retailer with the mere motive of increased surplus (Leloup and Deveaux, 2001). The dynamic pricing strategy, which accounts for the practice of bringing multiple changes in the price of a commodity at different points in a day that are based on consumer behaviour, and various other constituents. From a most familiar experience, one of the largest online shopping websites changes the price of a particular commodity on an average of every ten minutes (Kannan and Koppalle, 2001).

The practice of dynamic pricing can be traced back from the 1980s in American airline businesses, which has happened to conquer the globe irrespective of certain demographics. With the advancement in the pricing strategies, the retailers are able to target the consumers with minimized ambiguity in the consumer behaviour patterns towards the products (Dai, 2010). On the other hand, the consumers start going smart with their purchase decisions and the quality of strategic consumerism has got proclaimed. This eventually has made the shopping websites craftier in their customer fishing.

This paper in an ongoing effort to explore the online dynamic pricing behavior, attempts to figure out how consumers' shopping experience, fair price perceptions and awareness about dynamic pricing, drive towards online strategic behavior by taking advantage of the dynamic pricing strategies employed by EC firms.

Research Background and Model Development

Optimizing online revenue from strategic consumers has become one of the most widely discussed topics in Economics and Operations Management in recent times. The recent studies in the subject area have shown an increasing tendency of consumers to be strategic in their purchase decisions. Young consumers, especially Asian millennials are also found to previous studies as a segment that is consistently want to be updated and well informed of the most recent information

and trends (Nathan and Yeow, 2009). Studies by Ghemawat and Nueno (2006), Aviv and Pazgal (2008), Caldentey and Vulcano (2007), Yin et al. (2009), Mokrysz (2016) have shown that these informed consumers continuously monitor the prices of products and wait for the markdowns. This behaviour has caused adverse impacts on the revenues of the sellers.

With the consumers being strategic, the pricing plans of sellers need to be optimised in order to maximise the revenue. This requires specific knowledge about the factors, which influence the purchase decisions of consumers and their probable course of actions in different pricing scenarios. This study analyses how shopping experience, fair price perceptions and awareness about dynamic pricing influence consumers to behave strategically under a dynamic pricing situation. The factors chosen for this study is based on the results of a preceding study by Victor et al., (2018) in the same research field. The significance of the chosen factors and their characteristics based on the previous literature are further discussed here.

The shopping experience is one of the most important factors that determine the prospective purchase decisions of a consumer. By offering quality customer services in an online environment in the form of specifically crafted product recommendations, discounts, tailor-made prices etc, sellers can make their customers happier (Fedorko et al, 2017). With the advent of big data, shopping experience has become very subjective and a more personalised one as the sellers are able to provide tailor-made offers, recommendations etc to each consumer based on his/her previous purchases. This is indeed very advantageous to the consumers as they get relevant product recommendations and offers, which suit their needs (Li and Liaw, 2017). Many studies (Al-Dulaimi et al., 2018; Srinivasan et al, 2002; Nisar and Prabhakar, 2017; Otter et al., 2017) point out that customer's loyalty towards the sellers plays a very important role in their prospective purchase decisions. The aim of every consumer in the market is to maximise the satisfaction level. Purchasing products at the lowest prices (signals highest value) do certainly improve their satisfaction. There is also a high probability that consumers may eventually get acquainted with the pricing and recommendation strategies of the sellers and use them to take advantage by buying products at lowest markdown prices.

Consumer's perception of the price of a product has a significant influence on their shopping experience. The price perception of the consumers in a way moderates their overall shopping experience. With the modern pricing techniques like dynamic pricing, producers do squeeze a large portion of the consumer surplus, which adversely affects the price perceptions of consumers and in turn their shopping experience. Therefore, it is also necessary to validate the moderating effect of fair price perception of consumers on their overall shopping experience.

Previous researches studying consumer price perceptions have identified that the acceptance of a particular price by consumers depends on their perception of its fairness (Lichtenstein et al., 1988; Maxwell, 1995). Price fairness includes two significant aspects; economic and social. From an economic perspective, a price

that maximises the utility of consumers and also covers the cost of benefits that they receive is considered as acceptable. A socially acceptable price is a fair price to the consumers as the price is presupposed as a tool that operates in accordance with the rules and regulations of the society (Maxwell, 1995). With the introduction of dynamic pricing, the fair perceptions of consumers have been seriously hurt. E-commerce giants like Amazon and Walmart change the prices minute by minute and boosting their profits by 25%. (Victor and Bhaskar, 2017). The history of price changes of two different products made by Amazon.in is illustrated in figure 1 and figure 2. Table 1 and 2 show the past one year statistics of the magnitude and proximity of fluctuations in prices of two products. The price changes were tracked using adware based software named *keepa*. The products belong to apparel and electronics sections as a recent study in India by EY has pointed out that majority of the online shopping cart of Indian population is comprised of products from the above-mentioned categories (EY India E-commerce Report, 2016).

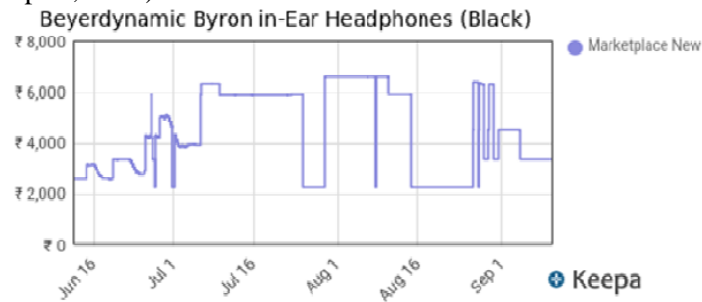


Figure 1. Price fluctuation of product 1

Table 1. Statistics for the price fluctuation of product 1

Lowest	Rs. 1,964	January 24, 2017
Current	Rs. 3,398	September 6, 2018
Highest	Rs. 12,525	April 7, 2017
Average	Rs. 4,473	Last 90 days
Drops	83	Per month

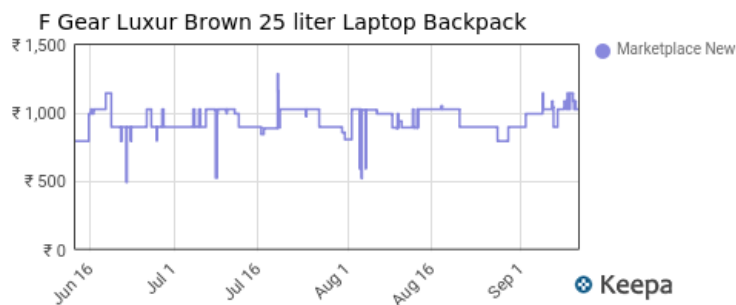


Figure 2. Price fluctuation of product 2

Table 2. Statistics for the price fluctuation of product 2

Lowest	Rs. 400	March 30, 2018
Current	Rs. 1,032	September 10, 2018
Highest	Rs. 2,580	April 4, 2017
Average	Rs. 953	Last 90 days
Drops	15	Per month

Consumers in the modern world are becoming more sophisticated in their purchase decisions. They are very conscious about the crafty practice of continuous alterations in prices employed by the sellers to maximise their revenue. The informed consumers wait for the best markdowns in prices and buy products accordingly which in turn have an adverse impact on the revenue of the e-tailers (Osadchiy and Bendoly, 2010). The more the consumers are aware of the pattern of changes in prices, the more benefit they make. In today's world, technology has made it possible to minimise the information asymmetry among sellers and buyers. According to Stiglitz (2000), "information is imperfect, obtaining information can be costly, [and] there are important asymmetries of information". Obtaining information is not as costly as before which has allowed the consumers to be aware of every aspect of a purchase, unlike the previous times where he/she had only a limited access to this crucial information, which is detrimental while making purchase decisions.

The probability of consumers who are informed of the dynamic pricing technique to make strategic decisions in their prospective purchase decisions is fairly high, hence awareness about dynamic pricing is considered as a factor influencing the strategic behaviour of consumers.

Hypotheses

H1. Fair price perceptions of consumers have a direct influence on their price tracking behaviour

H2. The shopping experience of consumers has a direct influence on their price tracking behaviour

H3. Awareness about dynamic pricing has a direct influence on consumer price tracking behaviour

H4. Price perceptions of consumers moderate their overall shopping experience leading to price tracking behaviour

Conceptual Framework

Figure 3 demonstrates the proposed model. The model perceives how the overall shopping experience, fair price perception and awareness about dynamic pricing drive consumers to act strategically in order to buy the products at minimum prices by taking maximum advantage of the dynamic pricing strategy. The model also depicts the moderating effect of Fair Price Perception of the consumers on their overall shopping experience.

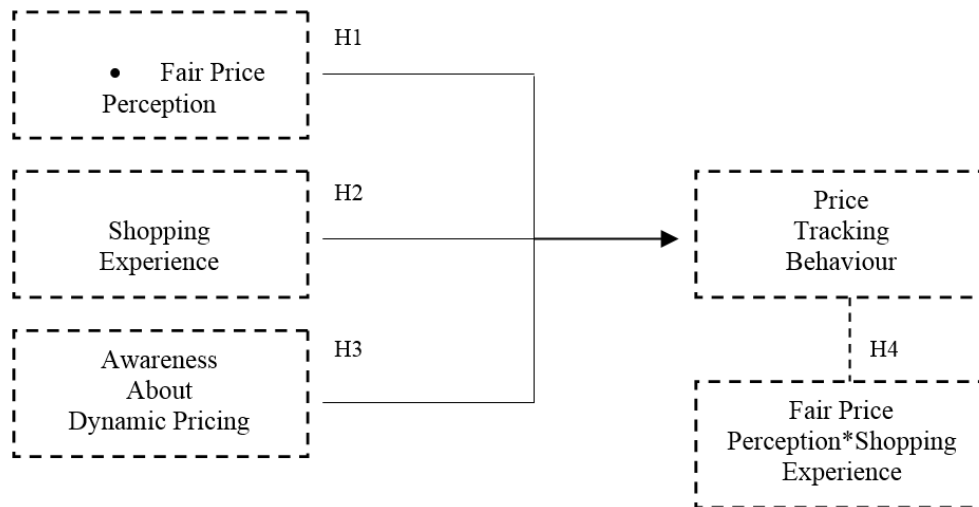


Figure 3. Conceptual Model

Methodology

Structural equation modelling using partial least squares is used for analysis purposes. This study primarily deals with the changes in human behaviour and the data although sufficiently sized (based on 10 times rule) cannot be assumed as normal due to the random nature of human behaviour, hence PLS modelling was chosen instead of covariance based (CB) path modelling. The analysis was performed using warpls 6.0.

The survey was conducted in June 2018. A structured online questionnaire using google forms was distributed to the students in South India who are active in online shopping. The questionnaire comprised of a hypothetical scenario, which helped to elicit the reaction of respondents when exposed to a potential price change of high proximity and magnitude. A purposive and intuitive sampling technique was used to choose the respondents in order to specifically include those who have had previous online shopping experience. 180 completed responses were used for the analysis after removing the incomplete and invalid responses. The respondents belonged to the age category of 18 to 27. The sample population comprised of 101males and 79 females. An interesting fact about India is that 70% of the population who are actively engaged in internet purchases belong to the age group of 18 – 35. (Victor et al, 2018). So, the population under study represents the true characteristics of the online purchasing group in the country.

Assessment of the Measurement Model

Construct validity of the proposed model has been proved by testing the content validity, convergent validity and discriminant validity of the model. Construct

validity implies whether the results obtained fit well with the theories around which the test is formulated (Sekaran and Bougie, 2010).

Hair et. al., 2017 states that all items measuring the core concept of the construct having factor loadings above 0.7 are required to ensure the content validity of the model. The items with their respective loadings are given in table 4. The items with low loadings and low communalities were removed during the confirmatory factor analysis. The loadings of the items retained in the model range from 0.71 to 0.83. The content validity of the proposed model is thus confirmed.

The table 3 shows the items retained and used in the study after meeting the content validity criterion.

Table 3. Items Used in the Study

Constructs	Items	Measurement	Adapted From
Shopping Experience	SE1	I am able to search for useful information in the e-shopping website	Le and Liaw (2017)
	SE2	Shopping Website can recommend substitute goods for the product I wish to buy	
	SE3	The results provided are quick and fit to my needs	
	SE4	I believe product recommendation is very useful to me	
Awareness about dynamic pricing	DP1	I am aware that shopping websites collect personal information through browser cookies	Victor et al., (2018)
	DP2	I am aware that the shopping websites use the information collected for personalised product recommendations and advertisements	
	DP3	I am aware that the shopping websites use the information collected for making changes in the price of the products	
Fair Price Perception	FP1	The price I paid was fair	Bo Dai (2010)
	FP2	The Price I paid was justified	
	FP3	I am satisfied with the price and purchase decision	
Price Tracking Behaviour	BS1	In future, I will track the price of the products which I intend to buy for a few days before purchase	Victor et al., (2018)
	BS2	I will use some software applications or browser extensions to track the changes in the price of the product	
	BS3	I will consider the changing prices as an opportunity to buy products at lower prices	
	BS4	I will motivate my friends & family to track the prices to avoid paying higher prices	

Composite reliability, Average Variance Extracted and Factor loadings are used to confirm the convergent validity of the proposed model. Composite reliability values higher than 0.7, Average variance extracted values higher than 0.5 and factor loadings above 0.50 confirms the convergent validity of a model (Chin,

1998). AVE values of 0.5 and above indicates that the construct is able to explain more than 50% of the variance of its indicators.

The Variance Inflation Factor (VIF) measures the probability of collinearity among the indicators. The VIF values are well below the suggested threshold value of 5 (Hair and Lukas, 2014), which means that there are no issues of multicollinearity in the model. Q squared value shows the predictive validity of the proposed model. Table 4 gives the results of the various reliability and validity indicators.

Table 4. Reliability and Validity Measures

Reliability and Validity Measures	Strategic Buying Plan	Fair Price Perception	Awareness of dynamic pricing	Shopping Experience	FP*SE
Composite Reliability	0.83	0.82	0.83	0.83	0.926
Cronbach's Alpha	0.73	0.7	0.71	0.73	0.914
Average Variance Extracted (AVE)	0.56	0.53	0.63	0.55	0.539
Variance Influence Factors (VIF)	1.175	1.06	1.17	1.183	1.049
Factor Loadings	0.72 – 0.78	0.74 – 0.77	0.71 – 0.83	0.70 – 0.80	
Q squared	0.196				

The results given in table 4 indicate that all the constructs under consideration satisfy the requirements of various reliability and validity measures hence the convergent validity of the model is confirmed.

The Fornell and Larcker's technique was used to assess the discriminant validity of the constructs. The proposed model satisfies the discriminant validity criterion if the square root of AVE of each construct is more than the correlation between the items (Fornell and Larcker, 1981).

The square roots of AVEs shown diagonally in boldface are higher than the other values given in table 5. Furthermore, the results satisfy the discriminant validity criterion set by heterotrait-monotrait (HTMT) technique, which states that the values should be less than the HTMT.85 value of 0.85 (Kline, 2011). The results given in table 5 specifies that the discriminant validity has been met.

Table 5. Correlation among Latent Variables with Square Roots of AVEs

	Price Tracking Behaviour	Shopping Experience	Awareness about Dynamic Pricing	Fair Price Perception	FP*SE
Price Tracking Behaviour	0.748				
Shopping Experience	0.226	0.747			
Awareness about Dynamic Pricing	0.211	0.354	0.794		
Price Perception	0.235	0.3	0.025	0.729	
FP*SE	0.209	0.096	0.036	0.049	0.663

In summary, the measurement model demonstrates adequate convergent and discriminant validity.

Hypothesis Testing and Discussion

The relationship between the variables were investigated with warppls 6.0 by applying a bootstrapping of 2000 in order to test the level of significance and t-statistics for all the paths. The structural path coefficients in the results indicate that there is a significant and positive relationship between shopping experience and price tracking behaviour ($\beta = .124$, $t = 1.979$), fair price perception and price tracking behaviour ($\beta = .226$, $t = 2.947$), awareness about dynamic pricing and price tracking behaviour ($\beta = .211$, $t = 3.162$). The results of the hypotheses tests are summarised in Table 6.

Table 6. Hypothesis Testing

Structural Path	Standard Path Coefficients	t values
Shopping Experience → Price Tracking Behaviour	0.124*	1.979
Fair Price Perceptions → Price Tracking Behaviour	0.226**	2.947
Awareness about dynamic pricing → Price Tracking Behaviour	0.211*	3.162
Fair Price Perception * Shopping Experience	-.201*	-2.807

*P < 0.05, **P < 0.01

In order to assess the potential moderation effects of fair Price Perception, the individual interaction of fair price perception on shopping experience was considered. This is represented as FP*SE (Fair Price Perception*Shopping Experience) in warppls terminology. The path coefficient is negative and significant here ($\beta = -.201$, $p = 0.003 < 0.005$). The results show that fair Price Perception plays a significant pull moderator role in the relation between shopping experience and price tracking behaviour. The results obtained from this study show

that Shopping Experience, Fair Price Perception and Awareness about dynamic pricing are factors that positively influence the intentions of consumers to engage in online price tracking behaviour. Price perception is the most influential factor that drives the consumers to engage in the price-tracking behaviour. In a dynamic pricing context, the pre-perceived prices of the consumers are in conflict with the continuously fluctuating prices which in turn lead the consumers to behave more strategically in their prospective purchase decisions. The studies by Dai (2010), Victor and Bhaskar (2017) have also found out that the price perceptions of the consumers are delicate and play a significant role in their purchase decisions.

The vivid experiences gained by consumers every time make them more acquainted with the strategies of the sellers, which further drive them to be strategic in their purchase decisions. This substantiates the positive relationship between shopping experience and strategic behaviour. As a consumer becomes more aware of the dynamic pricing strategy, it is obvious that he/she tends to behave more strategically in order to reap maximum benefits from his/her online purchases hence the positive relationship between the awareness about dynamic pricing and strategic behaviour. The studies of Osadchiy and Bendoly (2010), Wang (2016) also state that as consumers become more and more aware of the pricing strategies, they tend to make strategic buying plans.

The novel findings brought forth by this study include the implications of the moderation effect of fair price perceptions on the impact of shopping experience towards price tracking behaviour. The results show that the fair price perception has a negative moderation effect, which means as consumers' satisfaction of price improves; coupled with positive shopping experience, this will significantly decrease their tendency to track the prices of products. This is a meaningful finding, which shows that too much fluctuation of prices may decrease consumer trust and fair-price perception of consumers, leading to negative shopping experiences. In the event of negative price perception, this leads to even more price tracking behaviour among consumers, which reduces online sales for EC firms. EC vendors need to be more subtle in their price fluctuation strategies in order to reduce potential churn rate of online consumers.

Conclusion

The managerial implications drawn from this study centers around the finding that fair price perceptions of online consumers are sensitive and the fluctuations of high magnitude and proximity do drive consumers to track prices and inflict a negative impact on their overall shopping experience. As consumers become more aware of price fluctuations, they tend to be more strategic and their loyalty towards the seller weakens. The study also brings light onto the fact that offering prices which consumers think as fair will have a positive impact on the business by sustaining consumer loyalty rather than employing an extreme dynamic pricing approach. Hence, it is recommended that the fluctuations in prices must be in a range that does not hurt the fair price perceptions of the consumers. This also ensures that the

consumers are not so much concerned about the price fluctuations as the range of fluctuation is within the limits of their fair price perceptions and the awareness about dynamic pricing does not necessarily lead to the tendency to track prices. This study faced a limitation of including only 3 crucial factors that impact price tracking behaviour. This needs to be further explored to widen the model and improve its predictability.

The findings and implications of the study are mainly applicable to the populace of online consumers in India, with potential inference to other similar online communities elsewhere. Considering the tremendous growth of EC in India, the findings are commendable and useful for similar studies in other countries.

Future studies in the area may incorporate other dimensions of strategic consumer behaviour that can influence price tracking behaviour, for example, online trust, interface usability and ease of mobile app navigation. It is also worth exploring the price sensitivity zone of consumers, to better understand the threshold of price sensitivity and tolerable price fluctuation among consumers before engaging in price tracking.

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ZACHOWANIE ŚLEDZENIA CEN W ELEKTRONICZNYM HANDLU I MODERUJĄCA ROLA POSTRZEGANIA UCZCIWEJ CENY

Streszczenie: Dzięki szybkim postępom w branży handlu elektronicznego, nowi konsumenci stają się coraz bardziej świadomi perspektyw różnych strategii cenowych, dzięki którym decyzje dotyczące zakupów stały się bardziej złożone. Najnowsza literatura opisuje zwiększoną tendencję kupujących online do śledzenia cen produktów i oczekiwania na obniżki cen przed podejmowaniem decyzji zakupowych. Ten akt konsumentów jest postrzegany jako strategiczne zachowanie zakupowe, które jest konieczne, aby sprzedawcy byli świadomi i dostosowywali swoje przeciw-strategie, aby zapobiec potencjalnej utracie dochodów. Celem tego badania jest analiza i pomiar kluczowych czynników, które wpływają na śledzenie cen wśród konsumentów internetowych. Należą do nich: wrażenia z zakupów, uczciwe postrzeganie cen i świadomość na temat dynamicznych cen. Wykorzystując PLS SEM, niniejsze badanie analizuje również moderujący wpływ uczciwej percepcji cenowej na ogólne wrażenia zakupowe i zachowanie cenowe konsumentów. Wyniki statystyczne pokazują, że wszystkie trzy czynniki mają znaczący bezpośredni i pozytywny wpływ na zachowanie cen, a efekt moderacji jest znaczący i negatywnie wpływa na zachowanie konsumentów przy śledzeniu cen.

Słowa kluczowe: śledzenie cen, zakup strategiczny, zachowania konsumentckie, e-handel, dynamiczne ceny

电子商务中的价格跟踪行为及公平价格感知的调节作用

摘要:随着电子商务领域的快速发展,现代消费者越来越意识到各种定价策略的前景,这使得他们的购买决策更加复杂。最近的文献描述了在线购物者在做出购买决定之前追踪产品价格和等待降价的趋势。消费者的这种行为被视为战略性购买行为,这对于卖家了解并制定相应策略以防止潜在的收入损失是必要的。本研究旨在分析和衡量影响在线消费者价格跟踪的关键因素。这些包括购物体验,公平价格感知和动态定价意识。利用PLSSEM,本研究还分析了公平价格感知对消费者整体购物体验和价格跟踪行为的调节作用。统计结果表明,这三个因素对价格跟踪行为有显著的直接和正向影响,调节效应显著,对消费者价格跟踪行为产生负面影响。

关键词:价格跟踪,战略购买,消费者行为,电子商务,动态定价