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Original Article

Dynamic pricing as an innovative approach in drug sales and its effect on consumers' perception of pre-purchase and post-purchase behavior

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ABSTRACT

Background and Aims: Drug companies worldwide engage in intense global competition, focusing on consumer satisfaction, profitability, and promotion to gain an edge. This study aims to explore the effects of dynamic pricing on pre-purchase and post-purchase behaviors among drug consumers in Turkey.

Methods: The study employed a quantitative research design, utilizing a structured questionnaire administered to 414 employed individuals in Turkey. Data were analyzed using a structural equation modeling (SEM) approach to assess the relationships between consumers' perception of dynamic pricing and their behaviors accordingly.

Results: Statistical analyses revealed that consumers' perception of dynamic pricing significantly influences pre- and post-purchase behavior, satisfaction levels, loyalty, and positive word-of-mouth communication. Moreover, the study highlights the interconnectedness of consumers' post-purchase behavior, especially regarding experiences with dynamically priced drugs.

Conclusion: Dynamic pricing significantly influences pre-purchase decisions and post-purchase loyalty, highlighting the importance of customer-centric strategies for pharmaceutical companies. Post-purchase satisfaction and loyalty enhance word-of-mouth communication, fostering long-term customer relationships. However, broader studies with diverse participants and timelines are recommended to strengthen the statistical insights and applicability of findings.

Keywords: Drug Sales, Dynamic Pricing, Pre-Purchase Behavior, Post-Purchase Behavior, Financial Effect.

INTRODUCTION

Due to advancements in technology and the Information Technology (IT) sector, businesses now operate in an increasingly competitive environment, making customer retention and acquisition critical (Porter, 2008). Modern consumers, who act more rationally than ever, drive businesses to adopt customer-centric approaches (Simonson & Winer, 2014). The activities companies undertake regarding their products and services significantly influence consumer purchasing behaviors across three stages: before, during, and after purchase (Engel, Blackwell, & Miniard, 1995). To succeed in this dynamic landscape, businesses must gather comprehensive market information and develop strategies aligned with consumer decision-making processes. After filtering the thoughts of elements such as quality, price, promotion and presentation, they usually make choices that they perceive will maximize their benefits for themselves (Nagle & Hogan, 2006). Ultimately, it is an uncertain fact that ethical physiological characteristics and activities are important in the variety of sustainable and long-term business relationships (Laczniak & Murphy, 1993).

This dynamic care mentioned is an example of the pharmaceutical industry, where fierce competition is experienced and innovation is at the forefront (Chen & Zhang, 2014). Brands and products in this area, product features, advertising and installation strategies are the link to minimize perceived financial risks and ensure trust. Dynamic structural elements that can be adjusted according to price and time and provided play an important role in shaping the perception of adjustment. Due to this importance, distributed solutions are provided with analysis views related to the behaviors of the applications of dynamic processes before and after the purchase of consumption.

Before defining dynamic pricing, it is useful to explain the concept of price. Price is one of the marketing mix components that businesses manipulate to influence demand for goods or services. Tek (1999) describes price as a differentiation tool that balances supply and demand while ensuring measurability.

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Consumer purchasing decisions can change randomly or systematically due to factors like seasonal effects, fashion trends, or shifts in purchasing power. Philips (2005) emphasizes that understanding such changes is critical for predicting customer price expectations and maintaining organizational continuity. Organizations tailor pricing processes based on consumer demand, market conditions, and financial circumstances. For instance, airline companies adjust ticket prices as the flight departure date approaches, reflecting fluctuating demand.

Rohani & Nazari (2012) highlight that dynamic pricing is driven by consumer demand, with prices changing based on feedback. Kleindle (2003) defines it as selling goods or services at prices that vary to balance supply and demand. While originally used as a bargaining strategy, dynamic pricing has evolved with technological advancements and is now widely applied, especially in sectors like aviation. Ancarani (2002) notes that analyzing dynamic pricing data enables organizations to adapt to market conditions and achieve profit maximization. The rise of e-commerce has further integrated dynamic pricing into everyday practices, allowing consumers to compare prices and enabling businesses to forecast demand and create personalized strategies (Önder & Oktay, 2011).

Dynamic pricing adjusts prices flexibly based on consumer interest, demand patterns, and competitor pricing. Monahan, Petruzzi, & Zhao (2004) explain that the goal is to maximize income, while Korkmaz, Öztürk, Eser, & Işın (2009) emphasize its role in reducing stock levels and increasing profitability through targeted price policies. However, Megep (2011) identifies disadvantages, such as reduced customer loyalty, dissatisfaction with frequent price changes, and challenges in maintaining quality perceptions. Implementing dynamic pricing also requires significant investments in technology and expertise.

Recent literature shows growing interest in dynamic pricing. Studies highlight its impact on stock management, retail, and products with short sales lifespans (Chatwin, 2000; Zhao & Zheng, 2000). Research by Bilisik & Gurgen (2012), Rahimi (2014), and Mammadli (2017) demonstrates how dynamic pricing affects repurchase intentions by shaping price perceptions. Kuzay (2018) found that dynamic pricing on websites positively influenced consumer value when coupled with additional benefits. Similarly, Machmud & Minghat (2020) analyzed the impact of dynamic pricing on hand sanitizer during COVID-19, finding that prices stabilized post-pandemic. Despite customer concerns, businesses defend dynamic pricing as a response to global changes, using it across various sectors to adapt strategically.

The fields of pharmacology and medicine have always collaborated to develop essential drugs, making them indispensable to human life. Globally and in Turkey, the pharmaceutical industry holds a significant share in the economy, driven by the growing market and competition with derivative drugs. Since 1970, Turkey's pharmaceutical industry has seen substantial growth, with exports to approximately 160 countries, including EU nations. Özçelikay & Bilginer (2002) note that advancements in technology have brought significant developments to the sector, with Turkey aligning its practices with international standards. Fırat & Asil (2006) highlight that meeting global quality standards is now a necessity rather than a luxury, supported by legal regulations and modernization.

The pharmaceutical industry is distinct from other sectors due to its economic and health impacts. Increasing diseases and patient numbers boost medicine demand, driving investments in research and development (Kayserili & Kiyak, 2019; Konca, Özer, & Uğurluoğlu, 2015). While global pharmaceutical activity is concentrated in developed countries, Turkey has emerged as a key player, attracting international investment and addressing challenges like raw material imports, exchange rate fluctuations, and licensing issues (Fırat & Asil, 2006; Gumus, 2014).

Purchasing behavior, as defined by Pride & Ferrell (2000), involves consumers acquiring goods to meet personal or family needs. Pharmacies, combining commercial and public service roles, navigate industrial and situational factors influencing their purchasing decisions (Bilginer & Unal, 2019). Marley, Collier, & Meyer Goldstein, (2004) describe satisfaction derived from pharmacy services as "patient satisfaction" or "customer satisfaction." Satisfied customers tend to increase demand and generate repeat business, highlighting the importance of meeting expectations throughout the supply chain, from pharmaceutical companies to patients.

According to the World Health Organization, medicines are formulated combinations of active substances used for diagnosis, prevention, or treatment (Bayrac, 2011). Advances in the pharmaceutical sector reflect changes in disease patterns, demographics, and healthcare services. PMAT (2020) reports attribute the industry's expansion to globalization, increased healthcare access, and longer life expectancies. Globally, international companies dominate 95% of the market, with the USA, EU countries, and Japan leading in production and imports (KPMG, 2018). In 2019, global pharmaceutical imports grew by 4.6%, reaching $706.7 billion.

Turkey's pharmaceutical industry demonstrates strong production capacity and advanced technology, with significant contributions to trade in medical supplies (PMAT, 2020). High production costs and technological requirements have led to reliance on imports for certain biotechnological products, vaccines, and cancer drugs (KPMG, 2018). PMAT (2020) highlights 77 pharmaceutical manufacturing facilities in Turkey, with a notable presence of multinational companies. However, challenges such as raw material shortages and high costs persist, impacting foreign trade. Despite this, Turkey continues to manufacture cutting-edge biotechnological and medical products in specialized centers

MATERIALS AND METHODS

The aim of this study is to statistically determine the impact of dynamic pricing, one of the innovative pricing elements, on consumers' pre- and post-purchase behavior when purchasing medicines. In this study, a quantitative research method was preferred, and 14,925,783 paid employees affiliated with the social insurance institution in Turkey were selected as the research population in June 2023 (TSI, 2023). The reason for choosing this research population is that certain health expenses are deducted from the premium payments of the employees. Considering the purpose of the research, it was thought that the individuals who are financially affected the most by drug prices are these paid employees. A survey was chosen as the data collection technique in the research, and in this survey, in addition to questions to determine the demographic information of the participants, questions were asked to understand the perception of dynamic pricing and the pre-purchase and post-purchase behaviors of consumers (satisfaction, loyalty, repurchase intention, word of mouth communication). It was planned to use the scales (pre-purchase, satisfaction, loyalty, repurchase intention, word of mouth communication) included in the questionnaire. The first three questions were used in order to determine attitudes about dynamic pricing. These were related to price consciousness and were taken from the scale developed by Donthu & Gilliland (1996). The other six questions related to dynamic pricing were about perceived price fairness and procedural price fairness scales and were based on the Martin, Ponder, & Lueg, (2009) study. Statements aimed at determining the pre-purchase behavior of consumers who planned to take part in the survey were taken from İşlek's (2012) study. The four statements to measure participants' post-purchase satisfaction with dynamic pricing were from Casalo et al. (2008). The seven-item scale, which includes statements to measure participants' loyalty to the same product or company after purchasing regarding dynamic pricing, was taken from the scale developed by Anderson & Srinivasan (2003). The survey includes a three-item word-of-mouth scale developed by Babin, Lee, Kim, & Griffin, (2005), which includes statements about participants recommending the seller of the product they purchased to others after their purchasing experience. Ethics committee approval for this study was obtained from Istanbul Aydin University (Report No: 2024/12), confirming compliance with ethical standards. The survey was digitized and conducted online from 01.09.2023 to 14.09.2023. Of 457 responses, 43 were excluded due to inconsistencies, leaving 414 usable datasets. Structural equation model is used in the analysis of the data obtained according to the research purpose. The research model created according to the research purpose regarding the scales planned to be used in the research is given in Figure 1 below.

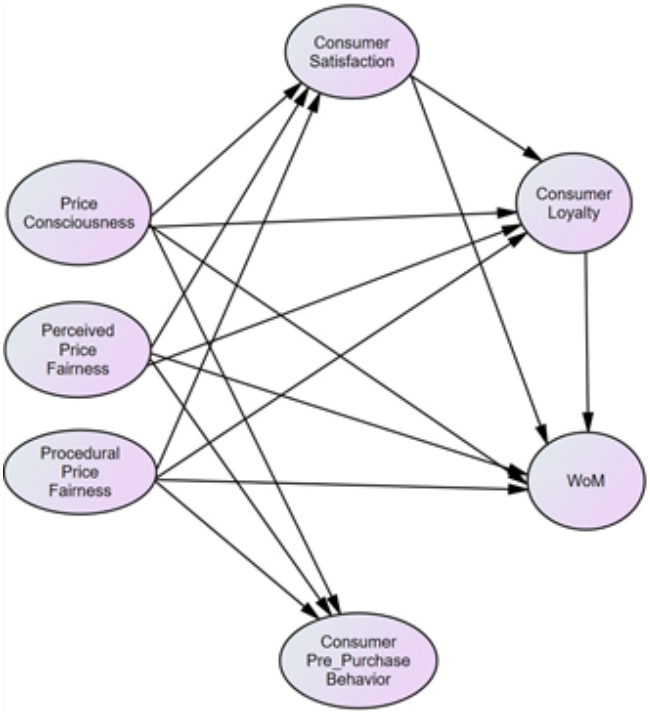

Figure 1. Research Model

RESULTS

A pilot questionnaire comprising scale expressions and demographic questions was administered to 50 participants to evaluate scale suitability. Confirmatory factor analysis (CFA) was applied to the dynamic price application scales, revealing acceptable fit values (X2/df: 3.913, GFI: .946, AGFI: .894, CFI: .957, RMSEA: .079, P=0.000<0.05) (Shermelleh-Engel et al., 2003). Reliability tests showed Cronbach's Alpha values exceeding 0.70 for all scales: dynamic price (α = .872), pre-purchase behavior (α = .906), satisfaction (α = .791), loyalty (α = .893), and word of mouth (α = .786), indicating reliability. Demographic characteristics of the participants showed in the Table 1 below.

Taking the research model of this study into account, the structural equation model (SEM) was used to analyze the relationship between variables. SEM is a statistical technique that allows examining the relationship between continuous or discrete independent variable(s) and continuous or discrete dependent variable(s) (Collier, 2020). SEM was created in accordance with the research model and is shown in the path diagram in Figure 2 below.

According to Figure 2, which shows the path diagram drawn with the research variables, the effects of price consciousness, perceived price fairness, and procedural price fairness subdimensions of the dynamic price scale on satisfaction, loyalty, word-of-mouth communication, and pre-purchase behavior were examined. Additionally, the effect of satisfaction on

Table 1. Demographic Distribution of Participants

		Frequency	Percent			Frequency	Percent
Gender	**Male**	213	51.4	**Education Level**	**High school**	21	5.0
	Female	201	48.6		**Undergraduate**	100	24.2
	Total	**414**	**100%**		**Graduate**	217	52.4
Marital Status	**Married**	252	60.9		**Postgraduate**	76	18.4
	Single	162	39.1		**Total**	**414**	**100%**
	Total	**414**	**100%**				
		Frequency	**Percent**			**Frequency**	**Percent**
Age	**18-23**	32	7.7	**Household Income**	**14500 TL and less**	86	20.8
	24-29	61	14.8		**14501-18000 TL**	71	17.1
	30-35	185	44.7		**18001-21500 TL**	97	23.4
	36-41	70	16.9		**21501-25000 TL**	101	24.4
	42 and more	66	15.9		**25001 TL and more**	59	14.3
	Total	**414**	**100%**		**Total**	**414**	**100%**
		Frequency	**Percent**			**Frequency**	**Percent**
Drug Use (Month)	**Never**	77	18.6	**Chronic Disease**	**Yes**	127	30.7
	1 – 5	261	63.1		**No**	287	69.3
	6 – 10	63	15.2		**Total**	**414**	**100%**
	11 and more	13	3.1				
	Total	**414**	**100%**				

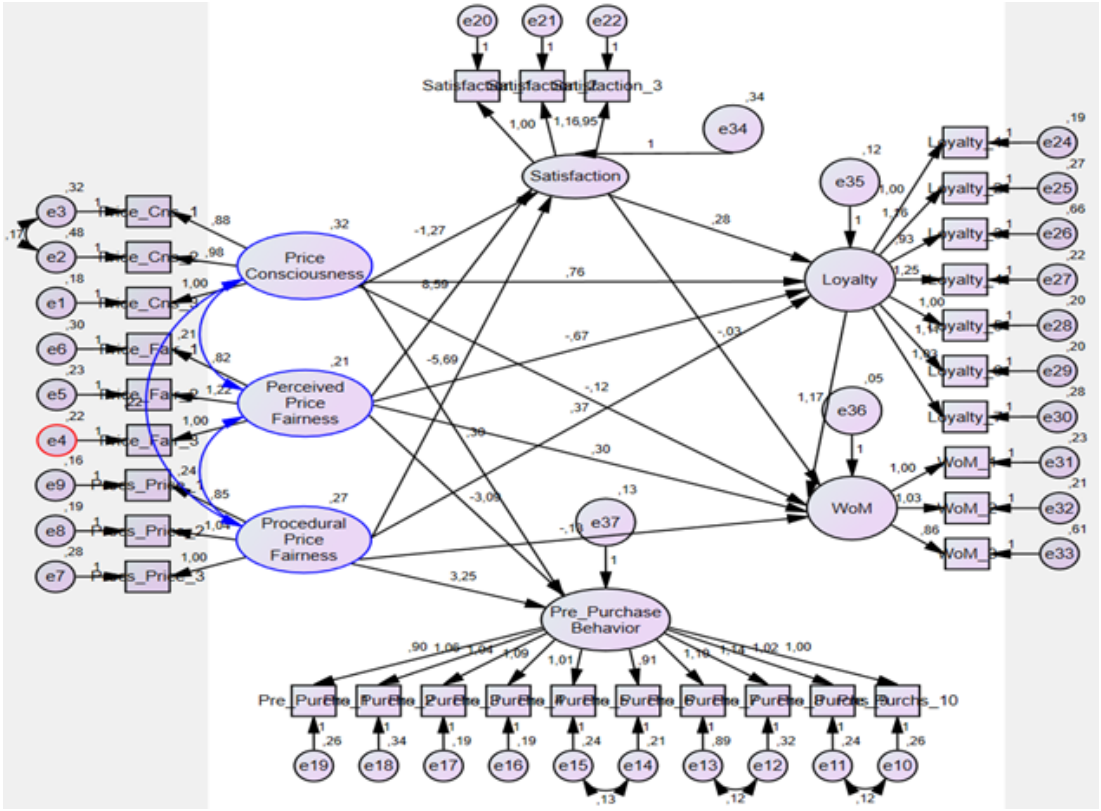

Figure 2. Path Diagram

loyalty and word-of-mouth communication and finally the effect of loyalty on word-of-mouth communication were examined. When the goodness of fit values of the established structural model are examined (X2/df= 2.970, CFI= .903, GFI= .9, AGFI= .852, RMSEA= .069), it is clear that it falls within the acceptable goodness of fit values. The values of the relationship between the variables in the established model are given in Table 2 below.

An examination of Table 2, where the regression weights of the path diagram created with the research variables are given, is examined, shows that there are four situations with significance levels below .05. For this reason, it is understood that four situations in which the effect exists will be mentioned in

Table 2. Regression Weights

			Estimate	S.E.	C.R.	P
Satisfaction	<---	Price Consciousness	-1.268	.985	-1.288	.198
Satisfaction	<---	Perceived Price Fairness	8.588	6.942	1.237	.216
Satisfaction	<---	Procedural Price Fairness	-5.695	5.517	-1.032	.302
Loyalty	<---	Price Consciousness	.757	.128	5.917	***
Loyalty	<---	Perceived Price Fairness	-.673	.468	-1.439	.150
Loyalty	<---	Procedural Price Fairness	.373	.448	.833	.405
Loyalty	<---	Satisfaction	.276	.100	2.754	**.006**
WoM	<---	Price Consciousness	-.119	.126	-.947	.343
Pre_Purchase	<---	Price Consciousness	.305	.378	.806	.420
WoM	<---	Perceived Price Fairness	.297	.383	.777	.437
Pre_Purchase	<---	Perceived Price Fairness	-3.087	1.700	-1.816	.069
WoM		Procedural Price Fairness	-.132	.354	-.373	.709
Pre_Purchase		Procedural Price Fairness	3.252	1.250	2.601	**.009**
WoM		Satisfaction	-.027	.092	-.298	.766
WoM		Loyalty	1.167	.101	11.501	***

- ***** : p<0.05**
- Estimate: Regression weight

which an effect exists, according to the statistical result of the study. The first of these is the positive effect of price consciousness, one of the sub-dimensions of the dynamic price scale, on customer loyalty (.757). The second effect is the positive effect of the procedural price justice sub-dimension of the dynamic price scale on pre-purchase behavior (3.252). The effect of satisfaction, one of the research variables, on loyalty is another effect obtained from the structural model (.276). Finally, the positive effect of loyalty, one of the research variables, on word-of-mouth communication is another effect obtained from the model (1.167). When the other relationships in the table are examined, it cannot be said that there is a statistical effect because their significance level is greater than the margin of error (p>.05).

DISCUSSION

Today, people adopt a rational approach when purchasing consumer goods, prioritizing quality at affordable prices. However, this rationality often diminishes in health-related expenditures. Public authorities enforce regulations and inspections to protect consumers, particularly regarding drug expenses. Pharmaceutical companies may apply dynamic pricing strategies within the limits of legal regulations, but they must prioritize customer satisfaction and long-term sustainability. Dynamic pricing is critical to minimize sociological and psychological impacts on consumers who allocate limited resources to health expenses, making this an essential area of study.

This research focused on paid working individuals in Turkey, aiming to assess their perceptions of dynamic pricing in drug purchases and the effects on pre- and post-purchase behavior. A questionnaire was used to collect data from 414 participants, and the structural equation model was applied to analyze the relationships between dependent and independent variables. Findings revealed that procedural price fairness influences pre-purchase behavior, indicating that consumers' perception of fairness in dynamic pricing impacts their purchasing decisions.

Post-purchase behavior analysis showed that price consciousness affects customer loyalty. This suggests that consumers' awareness of dynamic pricing strategies influences their loyalty in drug purchases. Additionally, satisfaction was found to impact loyalty, which, in turn, affects word-of-mouth communication. Loyal customers contribute to positive word-of-mouth, enhancing brand reputation.

Literature on dynamic pricing supports these findings, showing no negative impact on satisfaction (Haws & Bearden, 2006; Kuzay, 2018; Kolsuz & Erenkol, 2021) and a positive relationship with word-of-mouth communication (Martin et al., 2009; Weisstein, Monroe, & Kukar-Kinney, 2013; Ajorlou, Jadbabaie, & Kakhbod, 2018). These studies emphasize that dynamic pricing strategies can foster loyalty and improve customer relationships.

CONCLUSION

When consumers' pre- and post-purchase behaviors regarding dynamic pricing are examined structurally with the statistical findings obtained as a whole, it is seen that dynamic pricing effects on pre-purchase customer decisions. It is also understood that post-purchase decisions have an impact on loyalty.

Based on the results, it is clear that pharmaceutical companies planning to carry out long-term operations should be customer-centered in dynamic pricing decisions. Considering the impacts of post-purchase behaviors observed in research, satisfaction and loyalty variables are noted to positively influence word-of- mouth communication, which in turn typically effects long term behaviors.

Although the research is informative for companies operating in this sector with its statistical findings, it has limitations as it is only applied to employed people in one month. For this reason, in future studies in this field, it is recommended that the research survey be administered at different times and to other individuals with purchasing power in order to provide more comprehensive statistical information.

Ethics Committee Approval: Ethics committee approval for this study was obtained from Istanbul Aydin University (Report No: 2024/12)

Informed Consent: Informed consent was obtained from the participants

Peer-review: Externally peer-reviewed.

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