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DYNAMIC DECREASING PRICING METHOD

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Online trading firms have to get involved in some kinds of marketing and promotion activities in the new world that appears with electronic trade. The firms that aim to profit and sell more products use different pricing methods. Aspects of internet pricing involve: consumer aspect, seller aspect, competitive aspect, relational (value focused) aspect. First of this aspects includes price differentiation and dynamic pricing. Increasing and decreasing pricing is a new kind of dynamic pricing method. Both psychological and strategical pricing methods that force customers to buy, and even to advice the goods to other customers, are used when the prices decrease. Dynamic pricing issues turns out satisfactory in industries with high initial cost, consuming capacity, short term selling, price sensitive demand. The psychological effect of the price is an important factor that makes impact on the decision to buy or on the sense of quality. The decision to buy an unnecessary product can motivate a customer to buy it by means of the price experience of another customer. The price is an important factor when the product features are satisfactory; price comparison is fast and easy on the internet. In this study it is explained that Dynamic Decreasing Pricing (DDP) benefits both psychologically and strategically as a method of pricing. With this method, buying decreases the prices, therefore the costumers are forced to buy or advice the product to other customers to make the final price lower. The firm can sell product rapidly till its limits, and therefore the loss of profit can be ignored as the selling in target time interval is high. The Dynamic Decreasing Pricing method is going to be formulated mathematically, designed with stored procedure and it is going to be practicable in database.

Keywords: e-commerce, dynamic pricing, stored procedure.

Statement of the problem

Nowadays the firms trading on the internet have to get involved in different marketing and promoting activities. The firms that aim to profit and sell more products use different pricing methods. Dynamic pricing is one of these methods; Dynamic pricing refers to the process of controlling product prices over the sales season to maximize expected revenue [1–3]. There isn't only one description of Dynamic pricing. As Lydeka and others refer, there are different academic branches and so, there are different definitions. But in this article dynamic pricing is discussed in terms of its advantages as it makes the customers buy and makes the customers make the other customers buy. Some aspects of internet pricing are shown in Table 1.

Table 1

Some aspects of Internet pricing

Pricing Aspect	Pricing strategy
Consumer Aspect	Price differentiation Dynamic pricing
Seller Aspect	Individual pricing Adaptation pricing Package pricing
Competitive Aspect	Price differentiation depending on brand Optional pricing
Relational (Value focused) Aspect	Lifelong pricing Alternative channel pricing

The shopping robots which can be used by means of technological developments on the internet can be discussed as an element that strengthens the customer's price decision and enables the customer's price comparison. In terms of application the dynamic pricing issues turns out satisfactory in industries with high initial cost, consuming capacity, short term selling, price sensitive demand.

Gurgen expresses the classifying quantitative

models in literature as in the below:

– deterministic demand model in terms of discussing the demand;

– fixed or uncertain price in terms of discussing the price distribution of customer's paying desired;

– pricing in terms of considering or disregarding the sales returns;

– pricing in terms of discussing the price set.

Analysis of recent research and publications

Hong Yuan and Song Han discuss that for general demand functions in price and quality, two effects work in different directions. The sales effect is negative, that is, if the price increases, the sales decrease. The markup effect is positive, that is, if the price increases, the markup increases. Hence, the impact of quality on pricing is ambiguous. For separable additive demand functions, the sales effect vanishes and the markup effect holds. Any improvement in quality increases the product price. Finally, both process investment and product investment determine the dynamic pricing policy [4].

Paul B. Ellickson and the others make three contributions in their Repositioning Dynamics and Pricing Strategy article. First, they draw attention to three salient features of repositioning decisions in marketing: that they involve long-term consequences, require significant sunk investments, and are dynamic in their impact. They illustrate that positioning decisions can be empirically analyzed as dynamic games to measure structural constructs such as firm's repositioning costs. Second, they cast empirical light on an age-old question in the marketing of consumer packaged goods: the costs and benefits of using EDLP versus PROMO. Despite the significant interest in this topic, a full accounting of the long-term costs and benefits of these strategies remains lacking in the literature. Their estimates add to the evaluation of either strategy and also identify the sources of heterogeneity in the relative attractiveness of either across markets. This increases understanding of the economics of the supermarket industry and the determinants of long-term market structure. Third, they illustrate how observed switches combined with auxiliary postgame data (e.g., revenues, prices, sales) are useful in cleanly articulating the costs and benefits of repositioning in an environment with strategic interaction [5].

Y. Narahari, and others discuss that there are different models that have been used in dynamic pricing. Dynamic pricing includes two aspects: (1) price dispersion and (2) price discrimination. Price dispersion can be spatial or temporal. In spatial price dispersion, several sellers offer a given item at different prices. In temporal price dispersion, a given store varies its price for a given good over time, based on the time of sale and supply-demand situation.

The other aspect of dynamic pricing is differential pricing or price discrimination, where different prices are charged to different consumers for the same product.

A variety of mathematical models have been used in computing dynamic prices. Most of these models formulate the dynamic pricing problem as an optimization problem. Depending on the specific mathematical tool used and emphasized, we provide a list of five categories of models: Inventory-based models, Data-driven models, Game theory models, Machine learning models, Simulation models [6].

Formulation of the research objective

The formulas needed to price a product sold online in Dynamic Decreasing Method are given below.

$$\text{rate}=\text{sellprice}-\text{lowerbound}; \quad (1)$$

$$\text{rate\_n}=\text{rate}/\text{number of stock}; \quad (2)$$

$$\text{sellprice}_n=\text{sellprice}_{n-1}-\text{rate\_n}. \quad (3)$$

Sell price is the price at which the product is sold first. Lowerbound is the last limit price in decreasing pricing. The price difference of sell price and lower limit gives the rate. Rate is divided into total number of stocks to be sold, in order to get rate_n. The difference between sell price_{n-1} and rate_n gives sellprice_n of n price. In our sample scenario a 10-item product in stock and 1000 planned unit to be sold is re-priced via DDF-M pricing. After each selling the price is calculated by $\text{sellprice}_n=\text{sellprice}_{n-1}-\text{rate\_n}$.

Statement of the main research material

In our sample scenario, there is a 10-item product in stock and it is planned to be sold at initial price of 1000 unit, being then re-priced via DDP-M pricing. After each selling the price is calculated by $\text{sellprice}_n=\text{sellprice}_{n-1}-\text{rate\_n}$. Initial data, calculated rates and discounts for this scenario are shown in tables 2–4.

Table 2

Initial data

Cost	800	lowerbound	900	Sellprice	1000	Number of stock	10

Table 3

Calculated rates

rate	100	rate_n	10

Eventually while first item is sold for 1000 units, the last item is sold on 900 units. If each item was sold on 1000 unit, 2000 unit profit would be earned.

In this method the profit is 1450 unit. The loss is 550 units. The description of results is given in Table 5.

Table 4

Discount applied

	Sum Sell	8550	Discount
1.	Price	990	10
2.	Price	980	10
.	Price	970	10
.	Price	960	10
8.	Price	920	10
9.	Price	910	10
10.	Price	900	10

Table 5

DDP-M results

DDP-M profit	1450	Standard profit	2000	Ignored loss	550

When the example is discussed in terms of the firm and customer, there are two results.

1. The decreasing price has a positive effect on the customer by advising to buy the product with the positive effect of this method.

2. The firm can sell product rapidly till its limits, loss of profit can be ignored as the selling in target time interval is high.

In fig. 1, 2 the database developed using DDP-M model is shown.

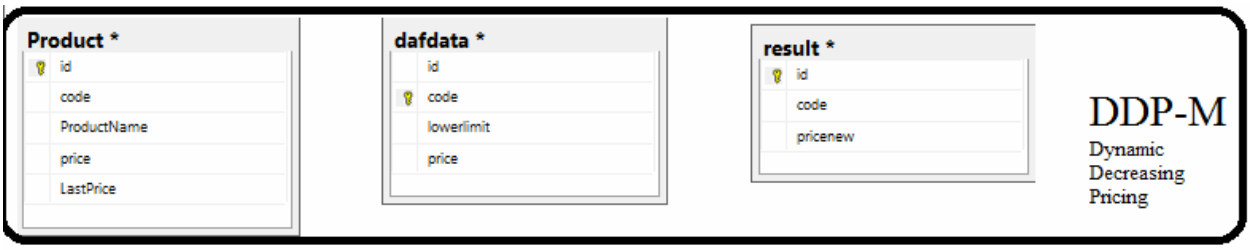

Fig. 1. The database design

	id	code	lowerlimit	price
▶	1	blk2014	900	1000
	2	blk2015	450	500
*	NULL	NULL	NULL	NULL

Fig. 2. The data table design

The stored procedure is shown on Fig. 3.

Conclusion

In this article it is discussed that dynamic decreasing pricing (DDP-M) can be used as a method on internet trading. Formulas are defined and applied. It is proved that DDP-M can raise the selling rates. Both psychological and strategical pricing methods, that force the customers to buy, and even to advice the goods to other customers, are used when the prices decrease. The psychological effect of the price is an important factor on the decision to buy or the sense of quality. The decision to buy an unnecessary product can motivate a customer to buy it by means of the price experience of another customer. But this study is only focused on firm. Costumer focused researches are also possible; real world modeling of markets, buying behavior, dynamic pricing strategies can be researched.

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```
procedure [dbo].[Daf-M]
@code nvarchar(50)

 as
declare @lowerlimit int
declare @productcount int
declare @price decimal(18,0)
declare @rate int
declare @rate_n int
declare @price_n decimal(18,0)
declare @pricenew decimal(18,0)

 DECLARE @counter INT

 set @lowerlimit=( select lowerlimit  from dafdata where code=@code)
 set @price=( select price  from dafdata where code=@code)
 set @productcount=(select COUNT(*) from Product where code =@code)
 set @rate_n=@price-@lowerlimit
 set @rate =(@rate_n/@productcount)

DECLARE CRS_sayhesapla CURSOR FOR

SELECT code,lowerlimit FROM dafdata where code =@code

OPEN CRS_sayhesapla
FETCH NEXT FROM CRS_sayhesapla INTO @code,@pricenew
set @sayac =0

WHILE @@FETCH_STATUS =0
BEGIN
SET NOCOUNT ON;

                while  @counter<@productcount
                begin
                SELECT @counter = @counter + 1
                set @rate =(@rate_n/@productcount)
                set @rate=@rate
                insert into  result (id,code,pricenew)values (@counter,@code,(@price-@rate))
                end
  SET @pricenew = @price
          UPDATE result SET @pricenew = pricenew = @pricenew -@rate where code=@code
 FETCH NEXT FROM CRS_sayhesapla INTO @code,@pricenew
       end
CLOSE CRS_sayhesapla
DEALLOCATE CRS_sayhesapla
```

Fig. 3. The stored procedure

МЕТОД ДИНАМИЧЕСКОГО СНИЖЕНИЯ ЦЕН

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Компании онлайн-трейдинга должны участвовать в некоторых видах маркетинговых и рекламных акций в новом мире, который появился с приходом электронной торговли. Фирмы, которые стремятся получить прибыль и продавать больше продуктов, используют разные методы ценообразования. Аспекты интернет-ценообразования включают в себя: потребительский аспект, аспект продавца, конкурентный аспект, реляционный (ориентированный на ценность) аспект. Первый из этих аспектов включает дифференциацию цен и динамическое ценообразование. Увеличение и снижение цен – это новый метод динамического ценообразования. При снижении цен используются как психологические, так и стратегические методы ценообразования, которые заставляют клиентов покупать и даже советовать товары другим клиентам. Динамическое ценообразование демонстрирует удовлетворительные результаты в отраслях с высокой начальной стоимостью, потребляющей способностью, краткосрочными продажами, чувствительному к цене спросу. Психологический эффект цены является важным фактором, который влияет на решение о покупке или на ощущение качества. Решение о покупке ненужного продукта может побудить клиента купить его с помощью ценового опыта другого клиента. Цена является важным фактором, когда характеристики продукта удовлетворительны; сравнение цен быстро и легко осуществляется в Интернете. В этом исследовании объясняется, что динамическое снижение цен выгодно и психологически, и стратегически как метод ценообразования. При таком способе покупка снижает цены, поэтому заказчики вынуждены покупать или

рекомендовать продукт другим клиентам, чтобы снизить конечную цену. Фирма может быстро продавать продукт до своих пределов, и поэтому потеря прибыли может быть проигнорирована, поскольку продажи в целевом временном интервале высоки. Метод динамического снижения цен сформулирован математически, реализован в виде хранимой процедуры и практически применен в базе данных.

Ключевые слова: электронная коммерция, динамическое ценообразование, хранимая процедура.

МЕТОД ДИНАМІЧНОГО ЗНИЖЕННЯ ЦІН

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Компанії онлайн-трейдингу повинні брати участь в деяких видах маркетингових і рекламних акціях в новому світі, який з'явився з приходом електронної торгівлі. Фірми, які прагнуть отримати прибуток і продавати більше продуктів, використовують різні методи ціноутворення. Аспекти інтернет-ціноутворення включають в себе: споживчий аспект, аспект продавця, конкурентний аспект, реляційний (орієнтований на цінність) аспект. Перший з цих аспектів включає диференціацію цін і динамічне ціноутворення. Збільшення і зниження цін – це новий метод динамічного ціноутворення. При зниженні цін використовуються як психологічні, так і стратегічні методи ціноутворення, які змушують клієнтів купувати і навіть радити товари іншим клієнтам. Динамічне ціноутворення демонструє задовільні результати в галузях з високою початковою вартістю, споживчою здатністю, короткостроковими продажами, чутливим до ціни попитом. Психологічний ефект ціни є важливим фактором, який впливає на рішення про покупку або на відчуття якості. Рішення про покупку непотрібного продукту може спонукати клієнта придбати його за допомогою цінового досвіду іншого клієнта. Ціна є важливим фактором, коли характеристики продукту задовільні; порівняння цін швидко і легко здійснюється в Інтернеті. У цьому дослідженні пояснюється, що динамічне зниження цін вигідно і психологічно, і стратегічно як метод ціноутворення. При такому способі покупка знижує ціни, тому замовники змушені купувати або рекомендувати продукт для клієнтів, щоб знизити кінцеву ціну. Фірма може швидко продавати продукт до своїх меж, і тому втрата прибутку може бути проігнорована, оскільки продажі в цільовому часовому інтервалі високі. Метод динамічного зниження цін сформульовано математично, реалізовано у вигляді збереженої процедури і практично застосовано в базі даних.

Ключові слова: електронна комерція, динамічне ціноутворення, збережена процедура.

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