Pricing Strategies and Technologies for On-Line Delivered Content

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Electronically traded On-line Delivered Content (ODC) is data, information, and knowledge traded on the Internet or through other on-line means. ODC includes on-line newspapers, magazines, music, education, searchable databases, consulting, and eventually expertise and ideas. This paper describes market structures and pricing strategies for ODC. So far businesses have been restricted to versioning and group pricing, when differentiating their offerings. New information technologies enable businesses to charge personalized prices on the Internet. A crucial precondition for this is detailed knowledge about a customer’s preferences. We describe the latest trends in electronic catalog technology and new ways how on-line merchants can learn about their customers on the Internet.

On-line Delivered Content (ODC) (Loebbecke, 1999) includes on-line newspapers, magazines, music, education, searchable databases, consulting, and eventually expertise and ideas. The emergence of the Internet as a distribution channel for ODC has created new opportunities for product and price policy. In the past, there was a significant cost associated with changing prices. For a publisher with a large product line, for example, it could take months for price adjustments to filter down to distributors, retailers, and salespeople. Especially in the case of ODC, networks allow users to reduce costs for price adjustments to near zero; prices can be changed quasi-instantaneously.

ODC typically has the property that it is very costly to produce the first copy and very cheap to produce subsequent copies. This cost structure leads to substantial economies of scale—the more one produces, the lower are average costs of production (Shapiro & Varian, 1999). While economies of scale are important, they are not necessarily special to ODC. However, in addition to marginal production and distribution costs being close to zero, there is basically no capacity constraint for producers.

With incremental costs towards zero, cost-based pricing makes little sense and will generally not recoup sufficient revenue to cover fixed costs. One strategy is to increase sales volume in order to leverage economies of scale and have low average costs. As this is not always easy, differential pricing becomes more and more attractive to businesses in this field.

In this paper we analyze market structures and pricing strategies for ODC. We survey the latest trends in electronic catalog technology and outline new ways how on-line merchants can learn about their customers on the Internet.

Market Structures for ODC

Microeconomic theory says that pricing depends heavily on the market structure for a certain product. In the classic case of a ‘perfectly competitive market’ with many economic agents on each side, sellers are price takers and cannot influence prices (see for example Mansfield (1996) for a detailed discussion). These findings are only correct under the assumptions of ‘perfect competition’. Economists speak of ‘perfect competition’ as a set of market conditions, namely homogeneous products, perfect market knowledge of each participant, atomism of market participants and mobility of...
resources (Browning & Zupan, 1999).

Markets for ODC do not look like competitive markets in a textbook, simply because the incremental cost of production converges towards zero for each supplier. More realistic market structures for ODC are the ‘(quasi-) monopoly’, in which one producer enjoys cost advantage over smaller rivals by virtue of its size. The high amount of sales combined with low marginal costs results in a low average cost for the monopolist.

A perfectly competitive market with heterogeneous goods is called ‘monopolistic competition’. This market structure assumes that there is product differentiation and consequently, there are preferences of buyers for certain sellers (Mansfield, 1996). In markets for newspapers, journals or consulting for example there are several somewhat different products, some of which are close substitutes. Here sellers have some market power as the product is different enough from other products so that the customers’ willingness to pay is a more important parameter for pricing than the competitors’ behavior (Varian, 1996a).

Practically, there is no clear borderline between these two market structures. One may say that all products are differentiated, it is just a question of by ‘how much’. In both market structures, however, sellers are not merely price takers and can set prices actively. A widespread strategy, which can be deployed in these market structures is ‘differential pricing’ (also known as ‘price discrimination’). In the following, we describe different forms of price differentiation and their practical implementation.

**Pricing ODC**

In most markets for ODC, the customers’ Willingness-To-Pay (WTP) are heterogeneous. Thus, it would be advantageous to charge different users different prices. The basic principle can be shown with a very simple example. Let’s assume two consumers, X and Y. X is willing to pay $5 and Y is willing to pay $2. Further we assume, that it costs $6 to produce the first copy of the good and every additional copy costs $0 (think, for example, of an on-line journal). If every consumer would pay a price according to his WTP, the revenue would be $7. If the seller charges a uniform price of $2 that is accepted by both consumers, he would not be able to cover his costs. If he would charge $5, he would earn more but still not cover his costs. This is only one example where differential pricing is the only alternative to not producing the good and leads to prices that reflect more closely their true market value.

There are two problems with differential pricing. If we assume that customers are generally anonymous. First, a seller has to determine the WTP of different groups of buyers. Second, the seller has to prevent customers with a high WTP to purchase the product intended for customers with a lower WTP. This means the market has to be separable - by artificial creation or naturally through some actual or imputed characteristics. Also, regrading or communication between market segments must be limited.

One strategy is base pricing on some customer characteristics (individual or group level), e.g., if the customer is a business or a private person or if the customer is a student or some kind of club member. Another strategy is to differentiate prices based on the characteristics of the product like the quality or the time when it is shipped. A classic microeconomic taxonomy of price differentiation is the one of Pigou (1920), who used the word price discrimination instead:

- ‘First-degree price differentiation’ (or ‘perfect price discrimination’) means a producer sells different units of output for different prices and the prices may differ from person to person.
- ‘Second-degree price differentiation’ (or ‘nonlinear pricing’) means that the producer sells different units of output for different prices, but every individual who buys the same amount of the product pays the same price.
- ‘Finally, third-degree price differentiation’ occurs when each consumer faces a single price, but the price differs among categories of consumers. This is probably the most common type of price discrimination.

Shapiro and Varian (1999) use different more descriptive terms, namely ‘personalized pricing’, ‘versioning’ and ‘group pricing’. In the next sections we will cover these three forms in the context of ODC.

**Personalization**

Personalization is an important new concept in Electronic Markets. It aims at identifying potential customers and offering them the required products at the right time, price and conditions. Theoretically, ‘personalization’ assumes that suppliers know their customers’ WTP and extract from each consumer the full value of his or her consumer surplus.

Nowadays, perfect personalization has limited applications. It can only occur in the few cases in which a firm has a small number of buyers and is able to guess the maximum prices those buyers are willing to accept. However, the amount of information that can be gathered about customers by means of electronic catalogs enables more ‘personalized’ offerings. The catalog owner can collect data about names, zip code, buying history, etc., and can target their offerings based on this information. For instance, Lexis-Nexis, an online database provider, sells to virtually every user at a different price, depending on the kind of industry and the size of the customer’s organization, when and how often she accesses the database (Shapiro & Varian, 1999).

**Group Pricing**

Group Pricing occurs when each consumer faces a single price and can purchase as much as desired at that price, but the price differs among categories or groups of consumers. People who have certain purchase histories, zip codes or behavior patterns are offered different prices. This is prob-