Pricing Strategies for Information Products

Academic Research

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Digital trade with information products is the core of electronic commerce. Pricing these information products raises great demands on companies. Choosing the right revenue and pricing strategy will be one of the crucial factors determining the success or failure of Internet companies in future. By analyzing the special features of information products, this article seeks to provide some hints for the conception of pricing strategies.

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1 Introduction

The need to be informed is as indisputable as the ever-increasing importance of information in the economy and in society. The term "Information Society" is one possible description of this development. The content industry plays a crucial role in this information society. The compilation of content is the prerequisite and lifeblood of electronic commerce or, in other words, "content is trump". This content which is offered on a wide range of media (CD-ROMs, Internet, Web-TV, ...) includes information products ranging from simple WWW pages and real-time stock market information to multimedia encyclopaedias – just to name a few examples.

The production of information products is expensive, while their reproduction is very cheap. The fixed costs of the first copy are very high compared to the costs generated by each additional copy. These reproduction costs and the distribution costs via the Internet are virtually zero. Accordingly, this rules out the lower limit for the price that normally corresponds to the marginal costs, resulting from one of the fundamental laws of economics, according to which in a competitive market the price equals marginal costs. The marginal costs are the costs which arise from the production and sale of an additional unit of a product. In this case, it is simply the costs for copying and sending a piece of information over the Internet.

Accordingly, cost-oriented pricing can largely be excluded (these rules, although widely applied, are logically incorrect for 'normal' products, either[1]). But information products have characteristics which allow other pricing strategies. These are based on customers' appreciation of the product and are ideally suited for pricing information products.

2 Characteristics of Digital Information Products

Before one starts to analyze pricing strategies for information products, one should bear in mind those characteristics that lead to fundamental differences between markets for information and traditional markets. These characteristics can be derived from information goods and digital goods.

2.1 Characteristics of Digital Goods

The possibility to digitalize a product is a condition for its sale via electronic networks. The following characteristics can be ascribed to digital goods[2]:

- Indestructibility
  Digital goods are not subject to

[1] Compare, for example, Simon (1989), p. 46ff.

[2] Choi/Stahl/Whinston (1998), p. 69

wear and tear (if one disregards the life span of the media they are stored on).

- **Transmutability**
  Digital products can easily be altered or combined to form new products.

- **Reproducibility**
  It is very easy to produce perfect copies of digital products. This can be done at very low cost.

2.2 Characteristics of Information Goods

Information products typically have the following characteristics. These characteristics, however, may be more or less pronounced.

- **Cost Structure**
  The relationship between very high costs for the first copy (fixed costs) and very low costs for each additional copy (variable costs) as well as the resulting problems were already mentioned in the introduction. Moreover, this leads to massive economies of scale as there are virtually no capacity restrictions.

- **Experience Goods**
  In general, information is an experience good, i.e. the user is only in a position to evaluate the quality of a good after its consumption. Information asymmetries arise from this constellation.

- **Individual Use**
  The value of a piece of information depends strongly on individual preferences. In connection with the alterability of digital products, this is a strong incentive to customize products.

- **Transitory and cumulative Value**[3]
  Many information products have a highly time-dependent value. On the one hand, no one is interested in yesterday's stock market data. On the other hand, these data can be very valuable when analyzing share price time series.

- **External Consumption Effects/ Network Effects**
  Information goods have positive external consumption effects, in particular in the form of network effects. This means that consumers benefit from the availability of a standard product and that their appreciation of this product rises the more units are sold. Users of a standard operating system such as Windows benefit from the fact that more applications are developed for their operating system than for other less popular operating systems. Ultimately, this leads to demand-driven economies of scale.

- **Switching Costs and Lock-in**[4]
  Information products often require durable investments in complementary assets (e.g. in the form of training or specific hardware and software). These investments would be lost, when switching to another brand, thus leading to substantial switching costs.

2.3 Consequences for Product and Sales Strategies

Different product and sales strategies can be derived from the characteristics outlined above, which can also be observed in practice. These, in turn, constitute the framework in which pricing strategies must range.

Suppliers must aim to achieve a certain **critical mass** very quickly, as they will otherwise be unable to recoup their fixed costs or will be squeezed out of the market by a competitor as a result of the network effect.

The ease with which digital information products can be modified allows a degree of **personalization and product differentiation** that was hitherto not possible to this extent. It also meets customers' desire to maximize their individual benefit.

A useful way in which suppliers can avoid the problem of information asymmetry is to allow customers to test the goods offered. **Shareware and trial products** are the customary means of achieving this.

Since the basic information underlying a product is often available to everyone and can easily be copied, many suppliers try to earn money via **value-added services**.

The absence of wear and tear of digital products has the effect that the products of a company compete with its own past sales. Frequently, flourishing secondary markets are established for these products. This problem can be avoided by **frequent updates**. At the same time, this makes it possible to benefit from a locked-in customer-base.

3 Pricing Strategies

The above remarks already suggest that the pricing of information products is not a static problem, rather, the key factor is to react flexibly to rapidly changing market conditions. Competitors can quickly penetrate into a market as natural market entry barriers do generally not exist. Equally, substitute products can be developed that at least partially make the own product dispensable. Market activity is very dynamic and, accordingly, pricing strategies should also be viewed in this context, i.e. not merely adjusted to the

[3] Choi et al. (1998), p. 65

[4] Compare, for example, Skiera/Garczorz (2000)

present situation, but always with an eye to the future.

3.1 Price Discrimination

As outlined above, one generally finds different levels of individual appreciation of information products. This means the willingness to pay varies among consumers. In the sense of value-based pricing, it would therefore be useful to demand different prices from different users. A small example may serve to illustrate this approach:

> Let's assume two persons are interested in a stock market tip. The tip is worth DEM 10.00 to Person A, but only DEM 8.00 to Person B. The fixed "production" costs are DEM 15.00. The optimum price per user in this case is DEM 8.00. Both buy the tip for DEM 8.00, and the seller makes a profit of DEM 1.00.
>
> However, he could achieve a profit of DEM 3.00 if he demanded DEM 10.00 from Customer A and DEM 8.00 from Customer B. He would then have exploited the so-called consumer surplus, i.e. the difference between the customer's appreciation of a product and its actual price. Exhibit 1 illustrates the general case of price discrimination.

This strategy is used successfully in many sectors. Hardcovers and paperbacks are a common example. Here, basically the same product is sold at different prices. Other examples are flight fares (Business Class, Economy, Early Bookings, Last Minute, ...) or any form of discount, e.g. for students or senior citizens.

Normally, these strategies can only be implemented to a certain extent as customers have the possibility to arbitrage different prices (e.g. through resale of goods or demand shifts between different products) and, on the other hand, suppliers rarely have precise knowledge of the various levels of appreciation.

The Internet changes this situation. When selling digital information products, there are some conditions that at least facilitate price differentiation. On the one hand, the Internet is a **point-to-point technology**, in other words, it is possible to communicate directly with a customer in a form that is not visible to other customers. It is quite possible for a shop to state a different price vis-à-vis Customer A (after identifying him thanks to Cookies) than Customer B. An even more elegant solution is to send discount coupons of various amounts via e-mail. Both would ultimately lead to the same result: different prices for different users.

The second advantage offered by the Internet is the far greater ease of collecting **customer data**. After just a few purchases, an online CD shop has a comparatively clear picture of its customer's taste and the prices he is prepared to pay. A simple evaluation of the purchase history, the click stream and a questionnaire filled out in return for a special offer are generally enough to gain a relatively clear picture. It is not even necessary to purchase additional information. Auctions may also serve as a means of appraising a customer's willingness to pay[5]. A traditional dealer would need a rather sophisticated customer card system to obtain the same information.

A third opportunity opened up by the sale of information products is the already mentioned pressure to **customize**. If each customer receives a slightly different product, it is not difficult to determine different prices. At the same time, prices and products can be modified very quickly and adapted to new demand requirements.

So far, we have discussed the possibility of demanding a different price from each customer. But even if this perfect price discrimination (also called first-degree price discrimination) cannot be implemented, there are nonetheless possibilities to at least partly benefit from different levels of appreciation. In this case, one can speak of second- or third-degree price discrimination also known as self-selection and group pricing.

Profit Situation with Price Discrimination

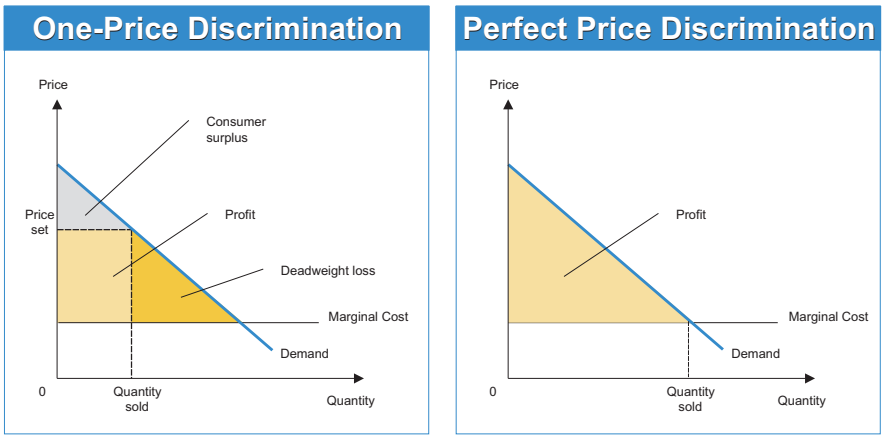

Exhibit 1

[5] Compare Skiera/Inkendorff (1999)

The self-selection process involves offering consumers a number of product variations from which they select the most suitable product-price bundle. This has the advantage that no information is required regarding the individual customer's appreciation (however, knowledge of the preferences of the overall consumer group). The above example of hardcover and paperbacks would fall within this category. Readers must decide for themselves whether they want to read a book as soon as it comes on the market by buying the more expensive hardcover, or whether they have the patience to wait for the cheaper paperback edition.

In the context of e-commerce, Shapiro and Varian have coined the term 'versioning' for this strategy[6]. They have identified a number of dimensions according to which information products can be differentiated:

- **Delay**
  Generally reduces the value of information (e.g. stock market prices, which are either provided real-time or with a 15-minute delay)

- **Flexibility of Use**
  This refers to the ability to manipulate information, e.g. save, duplicate or print information. This service is often used by database suppliers.

- **Performance**
  Programs can provide a different depth of data or information, e.g. number of terms in a dictionary.

- **User Interface**
  Through the design of the user interface, one can appeal to different consumer segments. Professional users generally favour direct access to all important functions, whereas inexperienced users place greater emphasis on ease of use and are glad if they do not have to struggle with a complex user interface.

- **Resolution**
  Via the resolution of image, sound and video, one can influence the quality and hence further areas of application.

- **Speed of Operation**
  The speed at which a product runs is a key indicator of its quality. Examples in the real world are Intel x86SX chip sets, which were artificially slowed, or the application software Mathematica, where the co-processor for floating-point settlements was deactivated in the student edition.

- **Comprehensiveness**
  In many applications, it is essential that the information provided is complete. A shareholder, for example, requires share price information maybe once a day, whereas a broker relies on a continuous data stream.

- **Functionality and Features**
  For low-price market segments, it may be useful to deactivate sophisticated functions and features.

- **Community and Support**
  These typical value-added services serve to segment user groups. Those who want access to support or community functions have to pay more.

- **Annoyance**
  The benefit to customers can be reduced if there are constant references to other products which have to be clicked away. This is standard practice in the shareware sector.

- **Convenience**
  One possibility to restrict the customer's convenience, and thus his benefit, could be to only allow certain usage locations or times.

This list is, of course, incomplete and only designed to give an idea of the possibility to segment customers of information products. Each company should analyze its product and market in depth to find out whether there are natural market segmentations. To allow the production of different variants, this should ideally be done during product development.

Lernout & Hauspie, the speech recognition software company, is an example of the application of this strategy (see Exhibit 2). The individual products differ mainly in the size of their vocabulary and a few additional functions.

Price Discrimination at Lernout & Hauspie [7]

Version	Preis
Voice Xpress Standard	$49,99
Voice Xpress Advanced	$79,99
Voice Xpress Professional	$149,99
Voice Xpress Mobile Professional	$229,99
Voice Xpress For Medicine	$499,00
Voice Xpress For Medicine Mental Health Edition	$599,00
Voice Xpress For Legal	$799,00
Voice Xpress For Safety	$799,00

Exhibit 2

The third form of price discrimination is largely based on the observation of certain signals (e.g. age, place of residence, occupation) from which conclusions can be drawn regarding

[6] Shapiro/Varian (1998)

[7] Source: http://www.lhsl.com/voicexpress/ referring to Shapiro / Varian (1998), p. 113.

consumer preferences. Based on these signals, consumers can be divided into various groups with different levels of appreciation for a product. For example, one can assume that children only have marginal financial means. Therefore, they are often granted price reductions – for example at the cinema. Here, children give rise to exactly the same costs as grownups, but must generally only pay half of the admission price.

The condition for this type of price differentiation is that the division into groups is clear according to the signals, and that these groups actually have a homogeneous willingness to pay. This is generally the case if different groups have systematically different price sensitivities, as in the above case of the children. Another standard example is based on geographical differences. For example, books in India only cost a fraction of the price charged in Germany as Indians cannot generally pay German prices, i.e. have a different price sensitivity. This example also illustrates the problem of consumer arbitrage: thanks to the Internet, German users might now be able to order books cheaply in India. Suppliers can only avoid this problem via localization, i.e. by adapting the product to local conditions (language, etc.) to make it unattractive to other customer groups.

Other circumstances which favour group prices are the emergence of network or lock-in effects. This frequently occurs in organizations and in both cases leads to standardization efforts and the need to uphold a standard. This, in turn, can be used via site licences. Microsoft, with its Office applications, is one obvious example of this behaviour.

3.2 Bundling

Bundling can be defined as offering a package of individual products at one price. In the widest sense, it is also a form of second-degree price differentiation as the consumer can generally choose for himself whether he would like to buy the package or the individual products. Examples of this strategy are Microsoft's Office package, but also newspapers which are basically a bundle of individual articles and contributions, or subscriptions, which again are a bundle of newspapers.

Traditionally, cost reasons play a key role in the benefits of bundling strategies. Economies of scale and scope in production or distribution mean that bundled goods can be offered more cheaply (e.g. newspapers). When information is sold, however, this plays an increasingly minor role. Here, the reasons tend to be on the demand side. The logic behind this is illustrated in the following example:

> Customer A is very interested in sports and is prepared to pay DEM 10.00 for a newspaper article. He is less interested in business and would only pay DEM 6.00 for an article of this area. Customer B has the opposite preference: he is more interested in business than in sports, and therefore his willingness to pay is just the opposite. If the supplier were to sell the articles separately, the optimum price would obviously be DEM 6.00, which would give a total revenue of DEM 24.00. However, for the seller, it is more profitable to bundle the articles and sell the package for DEM 16.00 and achieve total revenues of DEM 32.00 (this would correspond to the value that would be achieved with price discrimination).

In general (as in the present example), the use of bundling arises from the narrower spread of levels of appreciation for the bundle compared to the spread regarding the individual products. In general, negative demand correlations favour bundling strategies.

A rather general form of bundling is the non-linear pricing of individually formed bundling. This type of customizing can be found in personalized CDs. The customer can compile various tracks from his music database on his personal CD and have it burned. A similar system exists for personalized newspapers or newsletters. If these product packages are priced in a non-linear fashion (where the first component costs more than the following), one achieves an effect similar to bundling. As a variant of the above example, one would demand DEM 10.00 for the first article chosen and DEM 6.00 for each additional article. This form of volume discount is a general form of bundling (however, it must not be confused with the volume discount granted when one buys several items of the same good).

Scientific studies have shown that mixed bundling (a combination of product packages and individual products) is almost always superior to either pure bundling and pure unbundling (selling only individual products)[8]. This has major implications for providers of information products. For them, it would be worth considering whether to supplement their mostly subscription-based services with pay-per-use services. At present, a lack of suitable payment mechanisms (micro-payments) still

[8] Compare, for example, Chuang/Sirbu (1999)

present an obstacle, but might be more profitable.

4 Conclusion

The special characteristics of information products make their pricing rather difficult. Cost-based pricing can be excluded from the outset. The only alternative is a pricing that takes account of different levels of appreciation by individual customers. Price differentiation strategies can be very successful in the e-commerce environment as they take advantage of the special characteristics of information products.

The use of price differentiation strategies requires, on the one hand, an understanding of the basic economic principles and, on the other, an in-depth understanding of the market and its customers. And, last but not least, it demands a high level of creativity by those responsible for price management.

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