

Chapter 13: Customization and Bundling

“Barbie is a brand as experience that will be *magnified* by richer channels of communication.”

Philip Evans and Thomas S. Wurster, *Blown to Bits: How the New Economics of Information Transforms Strategy*, Boston, MA: Harvard Business School Press, 2000, p. 163.

Prologue

In the world of business, Barbie is more than a toy; she is an icon. She made the career of Jill Barad, who became CEO of Mattel on the basis of Barbie’s sales. Philip Evans and Thomas Wurster use Barbie to illustrate the idea of brand as experience, in this case, “a fantasy world for young girls and a collectible for adults.” The image of Barbie, the stories and imaginative play woven around her, constitute the experience of the brand. They help to *differentiate* Barbie from other dolls with similar dimensions and similar accompaniments.

Yet Barbie is not a single product. You can buy her with various clothes, hairstyles, and other aspects of looks. Barbie is actually a range of differentiated products. Some Barbie buyers will prefer her with one set of clothes, other fans with a different collection. The quote from Evans and Wurster at the top emphasizes the fact that Mattel can use the Web to create a richer and more direct brand experience for buyers of Barbie and related products, without relying on a retail intermediary. Evans and Wurster write in the future tense, but already on the Barbie Web site, one can listen to music, watch cartoons, and play interactive games, all centered around Barbie. Mattel is creating a bundle of content that helps to build the brand, and sell more dolls.

Furthermore, Mattel allows you to customize your own “friend of Barbie”, choosing looks, clothes, name and even personality. Thousands of combinations are possible, to get just the doll you want, or at least as close as practical (her basic measurements are still fixed at the traditional impossible values). Dell’s visual configurator (Chapter 11) has reached the heart of American culture!

If physical products can be customized to a greater and greater degree, thanks to the technology of the Internet and information technology that has reshaped the internal working of firms, digital products are even more malleable. Thus customization, or product differentiation in general, seems to become a more powerful strategy for firms. Yet what if every firm can offer such variety? What are the strategic benefits of product differentiation? What are the types of differentiation? How is branding related to changing the nature of the product or service? When does differentiation create value, and when does it help capture value? Read this chapter for some answers.

13.1 Introduction

Gone are the days when Henry Ford could get away with saying that his customers could have any color car they wanted, as long as it was black. People love variety. People love distinctiveness in the things they buy. (Though sometimes they also want to have what everyone else is buying.) Businesses have succeeded by giving their customers what they want. This has led to greater and greater product differentiation, some of it utilitarian, some of it frivolous, but all of it aimed at pleasing customers.

Well before the Internet and e-commerce came about, information technology has been aiding this process of increasing product differentiation. Computer-controlled manufacturing, and computer-based ordering and inventory systems have enabled businesses to handle varied product lines at lower cost, and to produce greater varieties of products and services.

Online commerce aids greater variety in physical products by making it easier for customers to choose and specify what they want. For example, Dell was building computers to order, taking customer orders over the telephone, before the World Wide Web came along. But the Web allows the customer to study all the options, experiment with different combinations to see how much they cost, and submit an order without tying up a salesperson's time at the other end of a telephone. That is an enormous saving for Dell, and the customer also finds it easier than keeping track of a sequence of options over the phone, which serves only as a fallback for nonstandard situations.

Digital products add another dimension to product differentiation in e-commerce. Digital products can be easily, almost instantaneously changed, making personalization or customization possible as a matter of course, rather than something special that is available only at a cost. Anyone can customize their favorite web portal to deliver the news they care most about, unlike newspapers or TV that provide a standardized bundle of news to all their readers or viewers.

We will begin our discussion of product differentiation in Section 13.2, by examining the two basic kinds of product differentiation that are possible. Essentially, products can be differentiated 'horizontally', where which product is considered better depends on the consumer's tastes, or 'vertically', where all consumers agree which product is better. We will consider some of the ways in which products, especially digital products, can be differentiated horizontally and vertically.

We then turn, in Section 13.3, to the general motives and strategies for product differentiation. Essentially, product differentiation helps to blunt price competition, but can also increase welfare by matching consumer tastes. If a firm produces more than one differentiated product, it can also use differentiation as a device for gaining market share, or even keeping out competitors. In discussing strategies, we will touch on pricing and marketing, but treat these in more detail in the next two chapters. Finally, in Section 13.4, we consider bundling as a special kind of product differentiation. The term 'bundling' is used by economists to mean the packaging of two or more products in fixed proportions, with the bundle being sold as a single product.

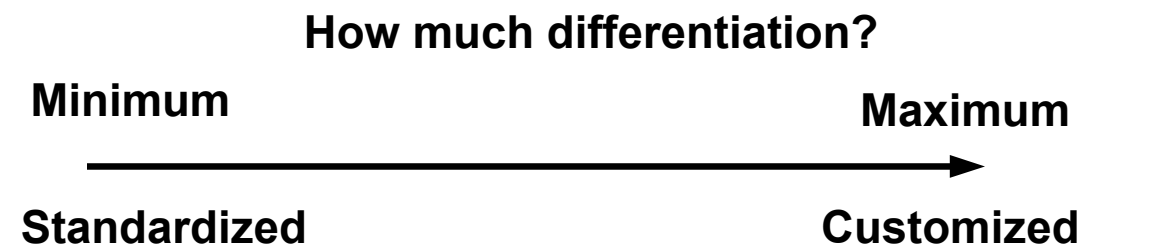
13.2 Basics of Product Differentiation

What constitutes a ‘product’ depends largely on the use to which it can be put. If the use is the same in some essential way, then we can speak of the product being the same. If we adopt this convention, then Windows NT, Windows 98, Mac OS X, Linux, and all the variants of Unix are all different versions of the product (or product group) “operating systems”. They are what economists would call differentiated products. Of course this terminology differs from common usage in many contexts. Marketers, for example, would distinguish their products by brand or designation, even if their features, or characteristics, are very close. In this terminology, Windows NT and Red Hat Linux are different products, produced by different companies. Even Windows NT and Windows 98 are different products, one being a server operating system, and the other for desktop computers.

Having noted this semantic issue, we shall stick to the convention that, if the uses or characteristics are sufficiently similar, the products are “differentiated” but not “different”. So operating systems, word processing packages, internet services, and Web portals are each a different product or service, but within each group there are differentiated products or services available. In most cases, and if the differences are large enough, the distinction is obvious: software and cereal are different products. In other cases, technological change blurs distinctions: one of the most talked-about issues in the Microsoft antitrust trial was whether Microsoft’s browser was a different product, or part of the operating system. Part of the problem here, of course, is the complex nature and functions of a computer operating system. We shall return to this particular example in discussing bundling.

Given that we can agree on the product category, we next discuss the degree and types of product differentiation. While, as we shall see, differentiation can take place in many ways, or along many dimensions, we can simplify somewhat and view the degree of differentiation along a one-dimensional continuum, ranging from no differentiation (a standardized product), to maximal differentiation, where the product is customized to exactly fit a customer’s preferences. This is shown in Figure 13.1

Figure 13.1: Describing Degrees of Differentiation



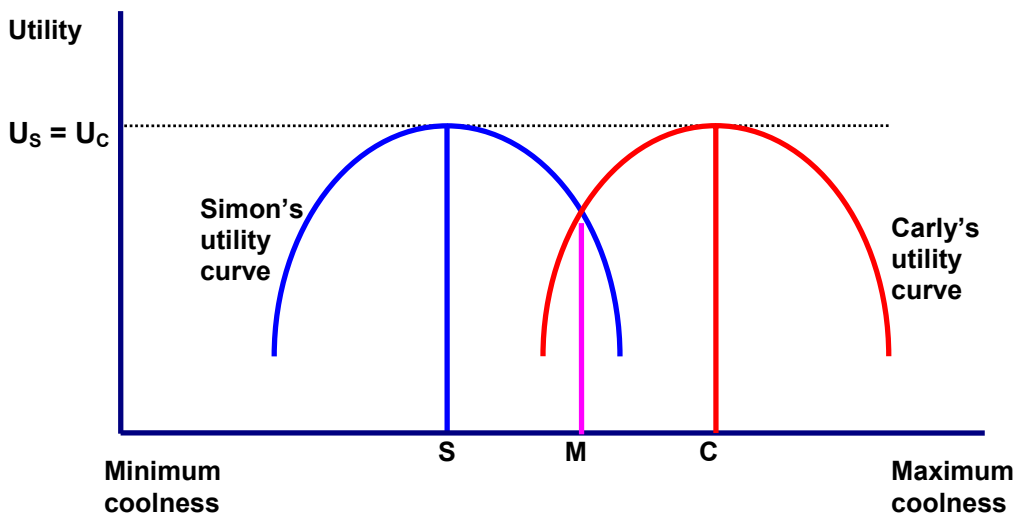
Horizontal Product Differentiation To understand exactly what maximal differentiation or customization means, we must explain and illustrate the idea of **horizontal product differentiation**. Horizontal product differentiation refers to the case where one version

is not unanimously considered to be better than another, but rather the ranking of products depends on the subjective tastes of the customer.

Take the example of a Web portal. We assume for simplicity that each person uses just one such portal. There will be many different features or characteristics that determine the overall ‘look-and-feel’ of the portal, e.g., graphics, layout, and colors (see Figure 9.3 for two examples side-by-side). Suppose that these can be aggregated into a one-dimensional measure, representing how ‘cool’ (or, more objectively, how visually complex) the site looks. Some people may like the site to be maximally cool, others may like it to be more staid in its looks. The key point is that everyone does not have a unanimous ranking of ‘look-and-feel’.

Figure 13.2 shows the preferences of Carly and Simon as coolness (of looks) varies. Each curve shows how the individual’s satisfaction or utility (we use the words interchangeably) varies as coolness varies. Carly is happiest with a very cool look (point C), which gives her utility U_C . Simon, however, most prefers something much more staid, point S, which gives him utility U_S . We have drawn Figure 13.2 so that $U_C = U_S$, but that need not be the case.

Figure 13.2: Horizontal Product Differentiation



The further away from the ideal each one is, the less happy he or she is. For example, at point M, the look of the Web site is too cool for Simon, compared to his ideal look. He perceives the look represented by the point M to be visually too messy or complex. This is illustrated by the fact that Simon’s utility curve has a lower level at M than it does at S. On the other hand, Carly finds the kind of look represented by M to be too boring, and would ideally like something more visually complex: the look represented by point C. If Carly and Simon are the only two customers, then customization would consist of having separate portals (or at least portals differentiated

by look, even if provided by the same company, and with the same name), with visual complexity or coolness measured at C and S. Then Carly and Simon could each have his or her ideal view.

On the other hand, suppose that no differentiation is possible, so that both Carly and Simon have to have the same look and feel available in their Web portal. Then the portal provider might choose the look marked by S, in which case Simon is as happy as possible, but Carly is very unhappy (and may not even want the service at all); or the look marked by C; or something in between, such as M. Of course, Carly and Simon's actual satisfaction will depend on how much they have to pay for the service, so it will depend on the firm's pricing. But customization certainly increases the potential gains for the firm and for its customers. It allows the firm to create more value, and therefore increases the potential value it can capture.

Concept Check:

Suppose that the firm knows Carly and Simon's preferences exactly, and it has no competitors. Furthermore, suppose that it is costless for the firm to differentiate its services to match Carly and Simon's tastes. Why is its optimal strategy, in terms of the services it offers, to provide Carly with a portal with degree of coolness at C, and Simon with a portal with degree of coolness at S? What are the prices the firm should charge to maximize its profit? How might your answer change if it is costly for the firm to differentiate the looks of the portal?

Figure 13.2 illustrates both horizontal differentiation and the ideas of standardization and customization. If there were more than two types of customer preferences, then customization or personalization would mean that as many differentiated products are offered as there are types of preferences. In the physical world this is prohibitively costly, though computer-controlled production has increased the flexibility of mass production enough to permit some degree of customization. We noted in Chapter 11 how Dell allows buyers to customize their desktop computers within certain limits. If there are a dozen components and two choices for each component, then over 4,000 different combinations can be created. If there are three choices for each, then the number of combinations is over half a million!

Digital products, however, afford enormous opportunities for differentiation, as we have discussed in Chapter 9. Even so, complete personalization on every dimension is likely to be an unattainable ideal. To compare degrees of customization, a one-dimensional measure might be useful. We could measure the degree of customization by the something like the reciprocal of the average distance of customers from their ideal points in the product feature space. (That is a hard idea to grasp, but see the Illustration Box for more details). Thus, in Figure 13.2, if Carly and Simon can both choose from points C and S, they will each be at their ideal points (Carly at C and Simon at S), and this would represent maximum customization. If, on the other hand, only M is available (standardization), then the degree of customization would be lower. This idea can easily

be extended to the case of more than two customer types, in which case more intermediate possibilities exist.

Illustration Box **Measuring Customization**

In order to illustrate how one might measure customization, we need to assign some numerical scales to the example of Carly and Simon. If coolness is measured on a scale of 1 to 100, and the points S, M and C are at 40, 60 and 80 respectively, then we have the following two cases discussed in the text:

- Both S and C are offered, and Carly chooses C while Simon chooses S. The distances from the ideal points are zero, their average is zero, and the reciprocal of this is infinity, which seems reasonable for maximum customization!
- If only M is offered, then the distances are $(60 - 40)$ and $(80 - 60)$, or 20 each. The average is 20, and the reciprocal of this is $1/20$, or 0.05, which represents less customization.

As a third example, suppose that both Carly and Simon have to choose C. Then their distances are zero and $(80 - 40)$, with average 20 again. The measure of customization is again 0.05.

A possible problem with this measure is that it does not take account of how much utility Carly or Simon loses by being away from her or his ideal point. To measure that, we need to have a precise measure of utility. We need some mathematical formula that is consistent with the utility curves in Figure 13.2. A quadratic formula fits the bill. Let x be the degree of coolness, and suppose that Carly's utility formula is $1000 - (80 - x)^2$. Thus her maximum utility is 1000, when $x = 80$. When $x = 60$, her utility is 600. Now suppose Simon's utility formula is $1000 - \frac{1}{2}(40 - x)^2$. The half in front of the quadratic part means that Simon's utility is less sensitive to departures from his ideal than is the case for Carly. Now the total utility from offering only 60 is 600 for Carly and 800 for Simon, while offering only 80 gives utilities of 1000 and 200 respectively. A total utility measure of customization now gives different answers. The maximum possible customization is when both $x = 40$ and $x = 80$ are available, and Carly and Simon can each get the highest utility possible.

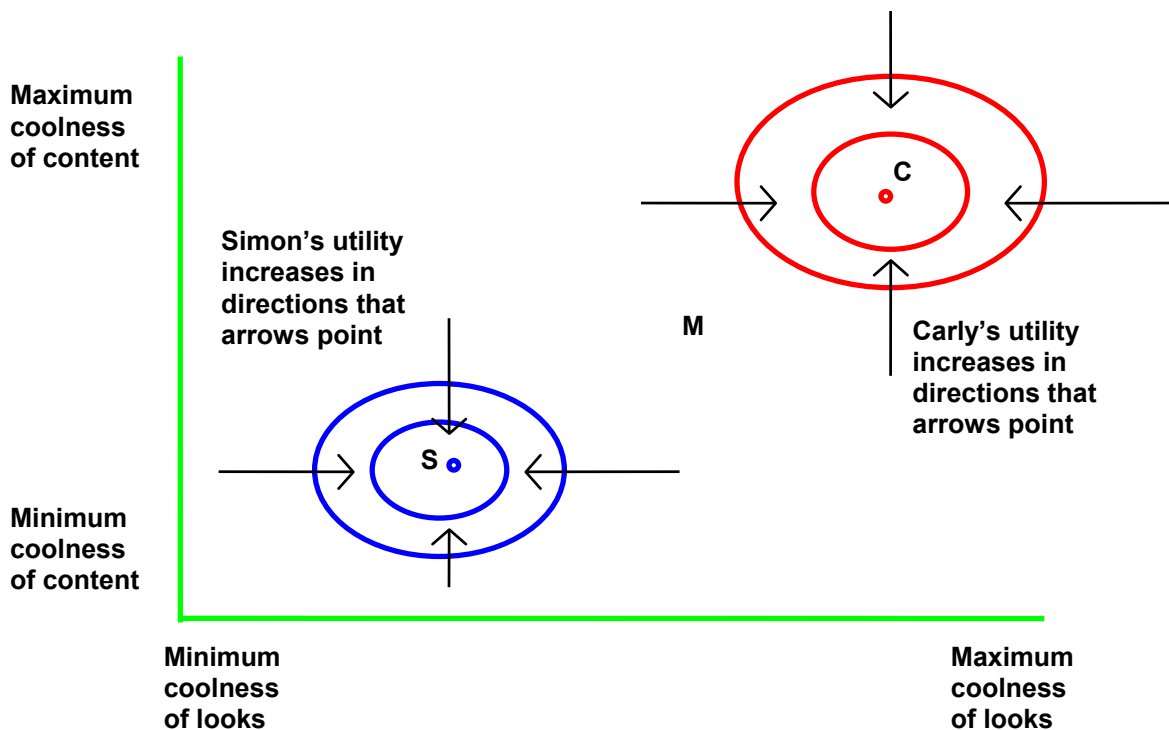
Concept Check:

In Figure 13.2, the height of Carly's utility curve measures how much she is willing to pay for the service provided by the Web portal. Thus, in the illustration, there is no difference between Simon and Carly's willingness to pay, only their preferred 'look and feel'. What if Carly is willing to pay more than Simon, given they are at the same distance from their respective ideal points: how will the figure change? What if Carly is much less sensitive to deviations from her ideal point: how will the figure change?

One great simplification we made in the above discussion was that differentiation was along only one dimension. But the idea can be extended quite easily. For example, in the Web portal case, there can be two dimensions, looks and content. Different customers may have different ideal combinations of looks and content, and the rest of the discussion proceeds as before. Note that, in this example of horizontal differentiation,

content does not increase in quantity along its axis, but merely changes in nature ('coolness', say as defined by Carly – the kinds of news topics that are featured on the portal, for example). While differentiation is measured along two dimensions, the degree of customization can still be reduced to one dimension (as in Figure 13.1), based on average distance from the customers' ideal points. Figure 13.3 illustrates the looks-content example, using contour maps (essentially, indifference curves, as introduced in Chapter 4, but drawn in the space of features/characteristics, rather than of products)¹ to reduce the picture to a two-dimensional representation.

Figure 13.3: Horizontal Product Differentiation with Two Characteristics

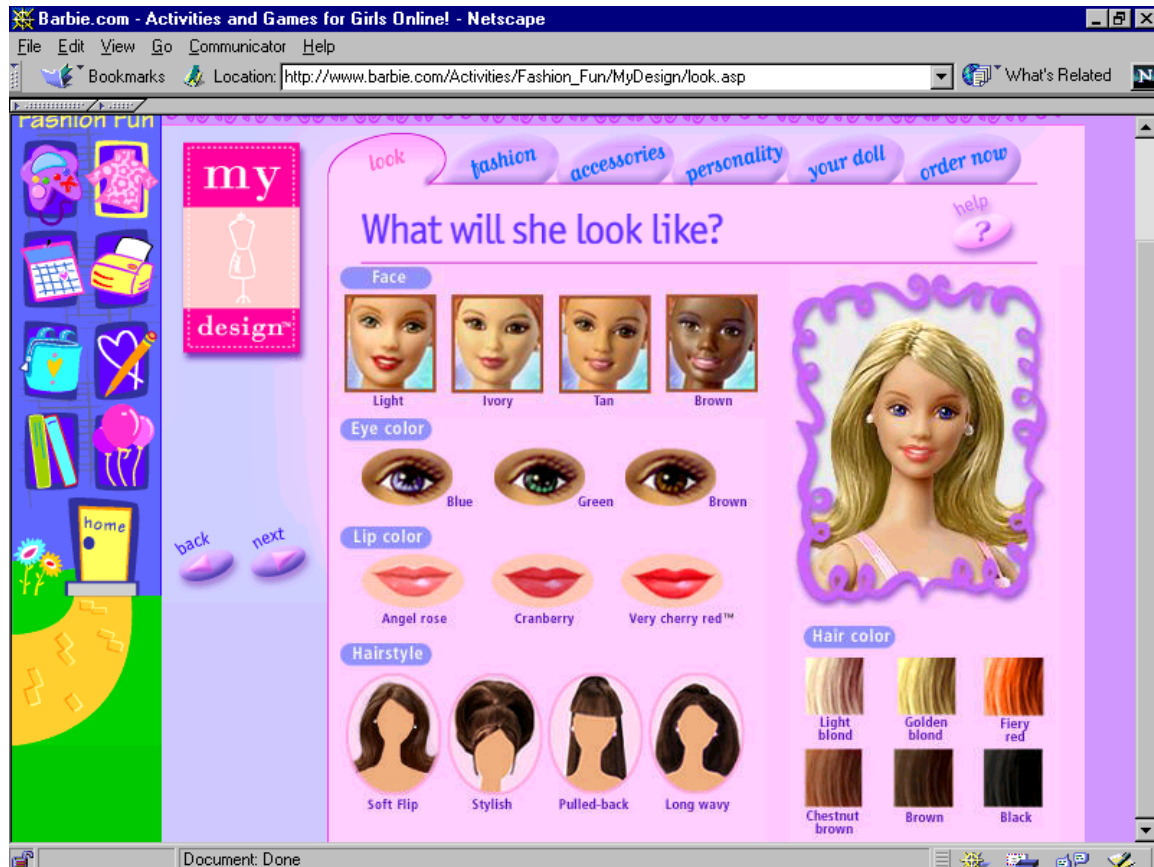


In both examples so far, we have assumed that the product or service characteristics can be measured along one or two continuous axes. In practice, there are many different dimensions of choice, but there are only a few discrete (or separate) choices within each dimension. While we can no longer illustrate this situation on a graph, we can offer an example that is easy to relate to, involving a well-known product, Mattel's Barbie™ doll. On the Web, one can build and order a customized friend of Barbie, choosing the color of the skin, lips, eyes and hair, and the hair style (see Figure 13.4) at the first step. One eye color is not inherently superior to another, but people have different preferences, and so this is another example of horizontal differentiation.

¹ These are exactly the same idea as contour maps in geography, with the sets of circles representing different levels on 'utility hills'.

In this example, there are five dimensions of differentiation, and a total of 864 combinations to choose from in terms of looks. Someone might prefer a hair color or style in between two of the available options, and so that person would not be able to get his or her ideal, but the amount of customization is still impressive. This is just the first step, and one goes on to choose the doll's wardrobe, accessories, and even her personality

Figure 13.4: Horizontally Differentiating Barbie's Friend



The “friend of Barbie” example is different from the Carly and Simon examples in another way. In the way that we characterized horizontal differentiation in Figures 13.2 and 13.3, products or services were more or less differentiated from each other, as measured by distance apart in terms of (approximately) measurable characteristics or features – though not in terms of the central use of the product or service. The distance in these features therefore measures the degree of product differentiation. In the “Barbie’s friend” example, hair color and hair style (and the other dimensions of differentiation) can not necessarily be ordered along an axes, so that two styles are closer together or further apart.

Horizontal Differentiation: An Alternative View In all the examples above, the utility derived by the user depends on the combination of features that the product represents, rather than the product *per se*. An alternative approach that is convenient for modeling, and therefore popular with economists, is to specify the utility function of the consumer in terms of products, and to model differentiation essentially only in terms of substitutability in consumption. In this formulation, each differentiated product is a substitute for any other differentiated product in the group, but differentiated products are not closer or further apart in any sense.

For example, suppose that Carly can choose from three online music services, labeled A, B, and C, that charge only based on usage. Suppose that her willingness to pay for the services is described by linear demand curves:

$$p_A = 10 - 5q_A - 2q_B - 2q_C$$

$$p_B = 10 - 5q_B - 2q_A - 2q_C$$

$$p_C = 10 - 5q_C - 2q_A - 2q_B$$

Here ‘p’ stands for price and ‘q’ for quantity. The negative coefficient of q_A in the first demand equation tells us that Carly’s willingness to pay goes down the more music she listens to online from service A. The negative coefficients of q_B and q_C indicate that these services are substitutes for service A: if Carly buys more music from service B or C, it reduces her willingness to pay for additional music from service A. However, services B and C are imperfect substitutes, because they offer different selections of music. Hence increases in q_B and q_C have smaller effects (the coefficients are only - 2 instead of - 5) on Carly’s willingness to pay for service A’s music than does an increase in q_A .

In this example, while each service is differentiated, so that it is an imperfect substitute for the other two, no two services are closer to each other than to the third. The coefficient 2 in each demand equation measures the substitutability of the services, but without reference to what makes them similar or different (whether actual features or subjective perceptions). This model is convenient for focusing purely on consumers’ tastes for variety (the more brands to choose from, the better), but it has limited applicability to business strategy. The important exception, perhaps, is a world where there are no essential differences in features at all, but products are artificially differentiated, only by brand name. For example, three brands of cornflakes may differ only in their branding and the packaging that accompanies the brand. There may be no objective measure of closeness or distance among the brands.² The issue of brand is discussed further in the context of advertising and marketing, in Chapter 15.

Application Box Customizing Digital Products and Services

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Information products are relatively easy to change, once the appropriate instructions are in place. Browsers can easily be set to open automatically in a Web page of your choice. Web portals offer customization in terms of what news and information is displayed on the main page of the portal (“My Netscape”, “My Yahoo”). Financial information services like CNET allow you to specify your portfolio of stocks (“My Portfolio”), and the prices are updated regularly on the screen. In all these cases, the service provider does not know the customer’s preferences, but the technology allows the customer to perform the personalization or customization, and

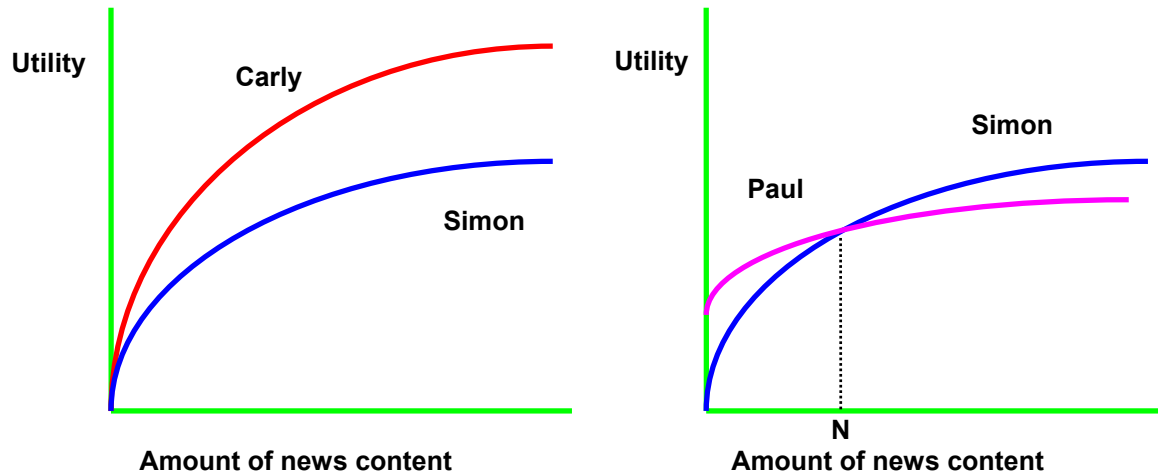
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Vertical Product Differentiation Vertical product differentiation differs from horizontal differentiation in that users are unanimous in their ranking of products or services (absent any considerations of pricing). Other things equal, everyone prefers the Internet Service Provider (ISP) with greater reliability or the online financial news service with more up-to-date (or just more) content. These two examples involve differentiation along some dimension of features or characteristics, but everyone agrees that more is better. Another way of vertically differentiating is to add more features or capabilities. Thus Microsoft offers several versions of its 'productivity software suites'. Works contains a basic bundle of features, Office 2000 Standard adds several more capabilities, and Office 2000 Professional adds still more. If all three were offered at the same price, everyone would presumably prefer the version with more capabilities.

Of course everyone may not value additions equally, and relative valuations may change as the product or service is upgraded: for example, one person may have a higher valuation for the essential news, but less appetite for more detailed stories. Two possibilities are illustrated in Figure 13.5. The horizontal axis in each case measures the amount of news content, in terms of how detailed the stories are. The vertical axis measures the level of utility. Since more is always better in these cases, the curves always slope upward, unlike in Figure 13.2, where each person had an ideal point along the axis.

In the left-hand figure, Carly always values news content more highly than Simon. Thus her utility curve is always above Simon's utility curve. Whatever the level of detail, Carly is willing to pay more than Simon for that level of news. In the right hand figure, on the other hand, Paul has a higher valuation for the headlines than Simon, while Simon has a higher valuation for detailed news. Both Paul and Simon, however, always prefer more news content to less, which is the essence of vertical differentiation.

Figure 13.5: Vertical Differentiation and Relative Valuation



In a sense, the economics of vertical product differentiation are easier than for horizontal differentiation: more is always better, and the only issue is whether the extra value to customers outweighs the cost. Even in the case where the relative ranking of customers changes as the quality level changes, (the Paul-Simon example), more is always better. The only difference in the two examples in Figure 13.5 is that in the left-hand-side case, Simon is always the ‘marginal’ customer. For any level of news content, his willingness to pay determines the maximum price that can be charged by a firm that wishes to serve both customers. In the right-hand-side case, below the level of detail denoted by N , Simon is the marginal customer, but beyond this point Paul has that role. In each case, assuming that the firm wants to serve both customers at the same price, the marginal customer’s additional willingness to pay determines whether the additional feature is worthwhile. In the next chapter, we will consider more sophisticated pricing strategies for the firm.

On the other hand, it may not always be clear what characteristics fall under which category. For example, more content may not always be better for all viewers. Too much detail may be confusing, or take too much time to search through. Or providing more of something that everyone likes results in a loss somewhere else: more content may be desired by all, but come at the cost of visual appeal. In this last example, vertical and horizontal differentiation may be intertwined, and that may be a common characteristic of product differentiation, especially in the case of information products. We will return to these issues in the context of the strategy of product differentiation, after we have provided some examples of vertical differentiation.

We have already given some examples of horizontal differentiation in the context of e-commerce: one of the main ways that information products can be differentiated is in their ‘look and feel’, and in the nature of their content. One of the main ways that physical products such as dolls, cars and computers can be horizontally differentiated is by colors. Personalization of content or other features is an ideal that is close to attainable

for digital products, and one that e-commerce also greatly aids in the case of physical products that can be created on order.

We have already discussed, in Chapter 11, one of the most well-known examples of customization (within limits) for a physical product, that of Dell Computer. Computerized inventory control, parts tracking, shipment tracking, and so on are combined with an easy-to-use customer interface for product specification. Customers can choose the combination of characteristics that they prefer, given knowledge of the marginal prices of all the different features. If you refer back to Figure 11.2, you can see that the dimensions of customization shown in the screen shot involve more or less of various capabilities: processor speed, hard drive size, and RAM capacity. These are all examples of vertical differentiation. Other examples of options (not shown) may involve whether to include a capability or not: a rewritable CD drive, an Ethernet card, and so on. Again these are all cases of vertical differentiation.

Numerous possibilities for vertical differentiation also exist with information products and services. Stock quotes can be provided in real-time or delayed by 15 or 20 minutes, digital photographs can be provided with low or high resolution, deluxe versions of financial management software can do more calculations, after-sales service or free technical support can be provided for more expensive information products, and so on.³ One of the striking things about many of these examples is that the cost of providing some kinds of additional features or functions, or providing them at a higher level, is often negligible. The question then arises as to why the low-quality versions should be provided at all. Competition in vertical product differentiation will certainly tend to drive out lower quality versions. But even then, if the lower quality versions are priced appropriately, they may survive. The essence of some vertical product differentiation is in its role in supporting differential pricing. This pricing issue is taken up in the next chapter.

A more abstract or technical view of differentiation with respect to digital products is also possible. Some of the dimensions of variation are method of delivery, operational usage, and timeliness. Information products, such as news or special offers on physical products, may be delivered by e-mail, for example. Alternatively, the customer may search them out on the World Wide Web. In an intermediate approach, the e-mail may not contain the information itself, but only a link to the web site where the information is available. Certain kinds of information may not be sold as data that is transferred, but instead only access to the data in a limited way is provided. For example, a financial web site may allow me to get information on the current status of my stock portfolio, and do comparisons with other stocks' current performance, at any point in time, without allowing me to easily access raw data on the stocks' performance over the whole day, week or month in a form that would allow me to manipulate and analyze the raw data. Similarly, access to a particular database may not be available, but answers to specific queries can be sold (as in services such as Ask Jeeves). Finally, timeliness, as in

³ For a good discussion of these examples, see *Information Rules*, by Shapiro and Varian.

the case of stock quotes, is another attribute of information products that can be controlled easily.

13.3 Product Differentiation Strategy

There are four key aspects of product differentiation, from a business strategy perspective. These may involve differentiation with respect to competitors' products, as well as differentiation in product offerings to one's own customers. First, product differentiation reduces substitutability with rivals' products, and softens price competition. Second, as we have discussed at length in the previous section, product differentiation creates greater value for customers, and greater potential revenue for businesses, by fulfilling their wants more precisely. Third, the market power created by product differentiation is the key to price discrimination, which allows more effective capture of the value created by differentiation. Finally, multiple versions of a product by same firm occupy more of the product "space", increasing potential market share and profits.

In fact, product differentiation occupies a central place in the dominant paradigm of strategic management thinking. Michael Porter, in the 1980s, identified two generic approaches to competitive strategy: low-cost leadership and differentiation. While various glosses have subsequently been put on this fundamental dichotomy, it remains *the* basic way to view overall strategic approaches. If the economy is viewed as steadily becoming more complex over time, with more and more types and varieties of products becoming available, then the relative importance of standardized, commodity products in the economy is diminishing, and the importance of differentiation as the fundamental strategic approach is increasing. E-commerce is just one aspect of a trend that seems to have been in place for several decades, ever since standardized, assembly line mass-production methods peaked with Henry Ford.

In fact, even standardized products can be differentiated by altering other characteristics of the value chain. Speed and reliability of delivery, in particular, can become a potent dimension of differentiation. This is one of the reasons why business-to-business e-commerce is taking off so rapidly. If many intermediate products are otherwise commodities, using the Internet to achieve quick order fulfillment at a low cost becomes *the* main competitive weapon apart from price. Even for consumer products, commoditization is the ultimate nightmare for a business. Even if just two firms compete only on price in a market for a standardized good, they may make no economic profit, because each has an incentive to undercut the other's price, as long as price is above marginal cost. Perfect substitutability of different sellers' products helps destroy any market power they might hope for. Increasing product differentiation is one way out of this bind.

A caveat is in order before we explore differentiation strategies in more detail. We do not wish to suggest that costs are unimportant. To the contrary, where competition is significant, so that margins are not large, many firms have shown that

keeping costs down is a crucial component of strategy, even if they pursue differentiation. While Microsoft has not had to worry about its costs (its margins are incredibly high), WalMart has certainly made low cost the center of its successful strategic approach, while still using differentiation in terms of customer service and availability of items to overtake established discount retailing rivals such as Kmart. Thus low-cost and differentiation are not necessarily mutually exclusive approaches. Rather, as globalization has intensified competition in industries that were otherwise tight national oligopolies (e.g., the U.S. automobile industry), keeping costs low has been a key defensive competitive weapon, with differentiation being pursued simultaneously.

Finally, we note that, in order to discuss differentiation strategies, we must also discuss pricing to some extent. We do so at a simple level in this chapter, generally assuming that the firm has to charge all its customers the same price. The next chapter focuses on more sophisticated pricing strategies, in particular, the various specific ways in which different customers may be charged different prices, even for the same product or service (what is called price discrimination). In this section, we do discuss briefly the role of product differentiation in supporting price discrimination, but the details are left to Chapter 14.

Fulfilling Wants This aspect of differentiation strategy is independent of the existence of competitors. By differentiating the product or service in a way that customers value, the firm creates greater value, and can potentially capture greater value. We can illustrate this point by returning to the situation illustrated by Figure 13.2. Suppose there is only one portal provider for Carly and Simon, the two potential customers.

We will use a generalized version of the example in the Illustration Box in Section 13.2 (“Measuring Customization”). Therefore, suppose that the measure of coolness is denoted by x , and that Simon’s optimal point (S in the figure) is x_S and Carly’s (point C in the figure) is x_C . In the earlier example, x_S was 40 and x_C was 80. Suppose that Simon’s utility is $U_S - a_S(x - x_S)^2$ and Carly’s is $U_C - a_C(x - x_C)^2$, before the price paid is taken into account, where a_S and a_C are nonnegative numbers. In the earlier example, we assumed $U_S = U_C = 1000$, $a_S = 1/2$, and $a_C = 1$. U_S or U_C is the maximum utility that is obtainable: for example, when $x = x_S$, then Simon’s gross utility is U_S . If the market price is p , then Simon’s net utility in this case is $U_S - p$. In general, Simon’s net utility is $U_S - a_S(x - x_S)^2 - p$. For example, if $x = x_C$, then Simon’s net utility is $U_S - a_S(x_C - x_S)^2 - p$. Table 13.1 summarizes the interpretation of the variables and parameters of the quadratic utility function.

In the case of Simon, if he is being provided with his most-preferred product, the maximum price he is willing to pay is $p = U_S$. If, on the other hand, he has to buy what Carly most prefers, his maximum willingness to pay (and the maximum revenue the portal provider can get from him) is lower: it is only $U_S - a_S(x_C - x_S)^2$. How much lower this is therefore depends on the value of a_S . If a_S is positive but small, then Simon is not very sensitive to departures from his ideal product. If a_S is larger, then Simon cares more about having his optimal product specification.

Table 13.1: Interpreting the Quadratic Utility Function

Variable or Parameter	Interpretation
x	Actual level of product characteristic
x_i	Person i 's ideal characteristic
U_i	Person i 's maximum utility when ideal product is available, before payment is deducted
a_i	Degree of sensitivity of person i to departures from ideal characteristic

Now we can calculate the value of product differentiation for the portal provider. If the firm can not customize, or differentiate its offerings, it can offer Carly and Simon a single 'look and feel', measured by, say x_M . Then, to sell to both of them at the same price, the firm cannot charge a price which is higher than the smaller of the maximum that each of the customers is willing to pay, that is, the utility that each gets from the characteristic x_M . Specifically, therefore, the firm can charge only the smaller amount of $U_S - a_S(x_M - x_S)^2$ and $U_C - a_C(x_M - x_C)^2$. Suppose, for example, that $U_C - a_C(x_M - x_C)^2$ is smaller. Then this determines the maximum price the firm can charge. However, if the firm changes x_M a little, so that Carly's gross utility goes up, but is still lower than Simon's the firm can increase its revenue without any offsetting cost.

The best the firm can do, therefore, in selling to both Carly and Simon, is to choose x_M so that the gross utility each gets is the same:

$$U_S - a_S(x_M - x_S)^2 = U_C - a_C(x_M - x_C)^2$$

This equation determines x_M , which happens to be the point M in Figure 13.2. The total revenue that the portal provider can gain from Carly and Simon in this case is the sum of the two utilities, or $[U_S - a_S(x_M - x_S)^2] + [U_C - a_C(x_M - x_C)^2]$, where both expressions in square brackets have to be equal.

The revenue the firm can get without product differentiation is, of course, less than the maximum revenue possible from customizing perfectly for Carly and Simon, which would be $U_S + U_C$. In this case, we have allowed the portal provider to charge different prices in the customized case, but not in the single 'look and feel' case, but this is not an essential part of the argument.

If the portal provider could charge different prices for the same 'look and feel' portal (see the Concept Check below), the exact determination of x_M would change, but potential revenue would still be lower without customization, since the total willingness to pay of the two customers *has* to be lower. Informally, we can say that value capture

by the firm must be lower when the value created is lower, and all the value created is being captured. The purpose of this example has been to illustrate this point explicitly.

Concept Check:

Suppose the portal provider can charge different prices to Carly and Simon for the same 'look and feel', but cannot differentiate the 'look and feel' across them. Why will the firm choose x_M to make $[U_S - a_S(x_M - x_S)^2] + [U_C - a_C(x_M - x_C)^2]$ as large as possible? How is different from the case where the same price must be charged to both?

Going back to the case of a single price, can it ever be better for the portal firm to choose x_M so that it sells only to one customer? When and why?

Creating value by horizontal differentiation often takes the form of offering different colors. We are used to this in the case of cars, and recently Apple's iMac line of computers broke from tradition by successfully offering computers in a range of colors. The online customized "friend of Barbie" example illustrates the potential for value creation. The "friend of Barbie" customized online costs double the regular price. While manufacturing costs may be somewhat higher for customized products, in general they are a small fraction of the retail price. Much of the higher price therefore reflects Mattel's strategy of capturing the higher value created by customization.

Supporting Price Discrimination We consider this topic in detail in Chapter 14, but here give a preview of the ideas. In the example of the portal, just considered, product differentiation may make it easier to charge different prices to different customers. One reason is that product differentiation vis-à-vis rivals increases market power, which is the basis of price discrimination. Another reason that applies for physical products rather than services such as access to a portal, is that if the same product is being provided to everyone, it is harder to prevent one customer who is offered a low price buying multiple units and reselling to others who are being offered a higher price – this is called arbitrage, and again is examined in detail in Chapter 14. Differentiating the product makes this arbitrage harder to achieve, particularly if the initial buyer (lacking knowledge of buyer preferences or technical tools) is not able to customize or otherwise differentiate the product for resale. The kind of product differentiation that supports price discrimination is often vertical differentiation (Figure 13.5), rather than the horizontal differentiation illustrated in the example above. We return to this topic in the next chapter, where we discuss pricing in general, and price discrimination in particular.

Reducing Substitutability In the algebraic example that we used in examining how product differentiation helps fulfill wants more precisely, the parameters a_C and a_S measure how sensitive Carly and Simon are to departures from their ideal product specifications. In other words, they are measures of substitutability: substitutability is higher the lower is the parameter value. Thus if $a_S = 1$ then Simon is more sensitive to departures from his ideal than if $a_S = 1/2$.

Greater substitutability implies a more competitive structure, even if the number of sellers is the same. For example, suppose that Carly and Simon are being served

ideally by different portal providers, each with a unique look and feel, and suppose that price discrimination is impossible. If neither portal provider competes for the other's customer, then it can charge the maximum willingness to pay, U_C and U_S respectively. But Carly's provider can also get Simon as a customer if its price is below $U_S - a_S(x_C - x_S)^2$, assuming that Simon's provider is charging U_S . This is worthwhile for Carly's provider if $2[U_S - a_S(x_C - x_S)^2] > U_C$. Given the preferences illustrated in Figure 13.2, that is not likely. However, as a_S approaches zero, it becomes more and more likely. As Simon becomes less and less sensitive to departures from his ideal, the price cut that Carly's provider needs to get Simon to switch becomes smaller. The attempt to steal Simon as a customer therefore becomes more attractive. Therefore, as the two portals become more and more substitutable for Simon, the competition for his business becomes fiercer.

We can also relate the value of the sensitivity parameter (a_S for Simon) to the idea of brand preference. In the example so far, differentiation was just along the dimension of 'coolness of looks', measured by some number x . Changing a_S did not change differentiation along this dimension. Yet, as a_S falls, products that are a given distance apart on the x -axis are becoming less differentiated as far as Simon's subjective preferences are concerned. Can a_S be affected by the seller's differentiation strategy? Yes -- this is where advertising and branding come in. Advertising and branding are at least partly designed to affect consumers' subjective preferences, irrespective of the objective characteristics built into the product. We can consider this idea even more starkly if we specify preferences directly in terms of the products.

To consider the role of branding in the context of reducing substitutability, we return to the kind of model considered in the alternative view of horizontal differentiation (Section 13.2). We consider a case where buyers want more than one unit of the product or service. For example, it can be an online music service where the user is charged per song downloaded, or an online information service where the number of queries or the number of articles accessed is monitored and can be charged for. In the latter case, various magazines, newspapers, and financial information services all offer this approach. In any case, if there are two such services, A and B, but they are not perfect substitutes, then Carly's utility function could have the following quadratic form:

$$U(q_A, q_B) = \alpha_A q_A + \alpha_B q_B - \frac{1}{2}\beta(q_A^2 + q_B^2) - \gamma q_A q_B + m,$$

where q_A and q_B are the quantities chosen for the two services, m is the amount of money spent on everything else, and α_A , α_B , β and γ are parameters that determine how sensitive utility is to changes in levels of usage or consumption. We assume that $\beta > 0$, so that the quadratic terms imply diminishing marginal utility. Furthermore, if $\gamma > 0$, then the two services are substitutes, as we explain below. Be aware that in this example, utility depends on quantities of products rather than on the underlying characteristics. It is different from the quadratic utility function described in Table 11.1.

We can show in this example of a quadratic utility function, that Carly's willingness to pay for each service is:

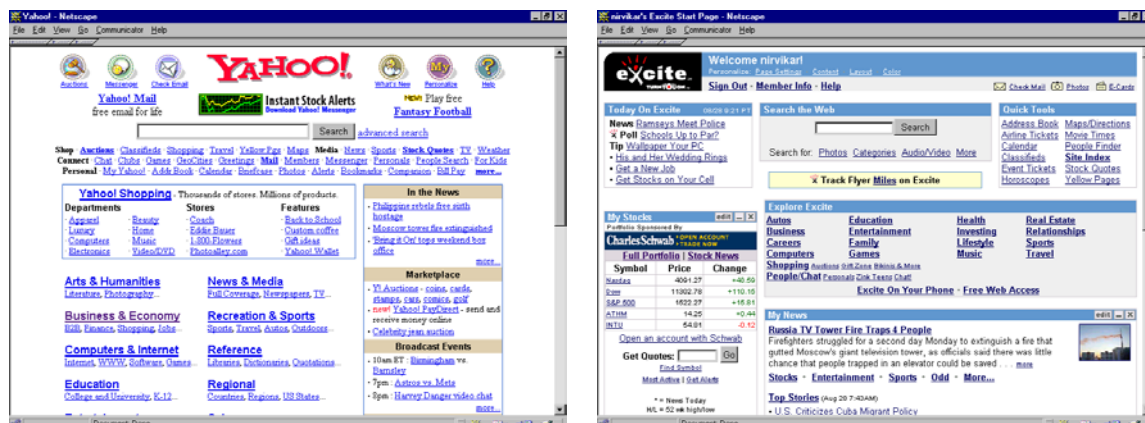
$$p_A = \alpha_A - \beta q_A - \gamma q_B$$

$$p_B = \alpha_B - \beta q_B - \gamma q_A$$

Thus Carly has linear demand curves for the two substitute services if she has a quadratic utility function. We can see now that the parameter γ measures the substitutability of the two services or products, and that this is without reference to what makes them similar or different (whether the difference is in actual features or subjective perceptions). Anything that either firm does to differentiate its services or products (by branding, for example) from the other firm will be captured in a lower γ . If γ is zero, then the two services or products are effectively so different from the buyer's perspective that there is no substitution at all. To illustrate this point with a simple, familiar example, Coke and Pepsi may continue to use exactly the same formulas and packaging, but their expenditure on advertising may cause consumers to view them as less close substitutes than would otherwise be the case.

Clothing, cosmetics, detergents and cereals are all standard examples of branding, where the objective differences in products are less than the perceived differences that arise from the brand differentiation. In e-commerce, it is less clear that branding works in this particular way. Online branding is important for conveying reputation, which can be thought of an aspect of vertical differentiation. It seems to be less significant in creating perceived horizontal differentiation. Thus Amazon, Yahoo! and AOL are well-known e-commerce brands. However, it does not seem that branding directly creates a perception that one portal, say Yahoo!, is different from another, such as Excite (see Figure 13.6).

Figure 13.6: Are Portals Different?



Online firms certainly try to differentiate their products and services, in terms of the content they provide, how it is presented and so on. To continue with the portal example, Yahoo! and Excite may try to provide different content, formats, or access methods. However, these are examples of actual differentiation in characteristics, rather than perceived brand differentiation. Furthermore, the malleability of digital products and services means that, while differentiation of product lines is easier to achieve, differentiation across firms can be hard to sustain, since characteristics are easily

imitated. Detergents and cars may differ in packaging, styling or colors, but it is difficult to identify such clearcut differences in online portals. Even vertical differentiation may be hard to sustain when digital products or services are on offer. Since simple differentiation strategies are less sustainable or valuable in e-commerce, online firms therefore have a greater incentive to focus their efforts on strategies such as bundling (Section 13.4) and the related goal of achieving customer lock-in (Chapter 16).

Gaining Market Share Now let us return once more to the example illustrated in Figure 13.2, and discussed in the contexts of fulfilling wants and reducing substitutability. Thus we return to using quadratic utility functions that are defined over the differentiating characteristic. So far, we have used this example to analyze the case of a single portal provider with differentiated or customized offerings to serve customers better (and increase revenue), and rivalry between two providers, each with a particular ‘look and feel’, where differentiation softened competition.

The final aspect of strategy to consider is multiple differentiated offerings when there is rivalry. In this case differentiation not only meets customers’ wants more closely, but also makes it harder for a potential rival to enter. For example, a portal provider offering a single ‘look and feel’, such as point M in Figure 13.2, to both Carly and Simon, is vulnerable to competition, either from a rival offering point S to Simon, or point C to Carly, or both. In the latter case, the firm offering M loses its market completely, since it cannot compete on price alone: the rival can always price so that Carly prefers the portal positioned at C to the one at M, because the value created for Carly (her gross utility, before subtracting her payment) at C is higher than the value created at M. The best that a firm can do is clearly to offer both Carly and Simon their ideal choices, in which case its rival can capture no better than half the market if the firms price comparably.

Concept Check:

Given that Carly’s gross utility at x_M is $U_C - a_C(x_M - x_C)^2$, we assert that the rival providing x_C can price the firm providing x_M out of the market (as far as Carly is concerned) by choosing a price that is just below $p = a_C(x_M - x_C)^2$. Why is this the case?

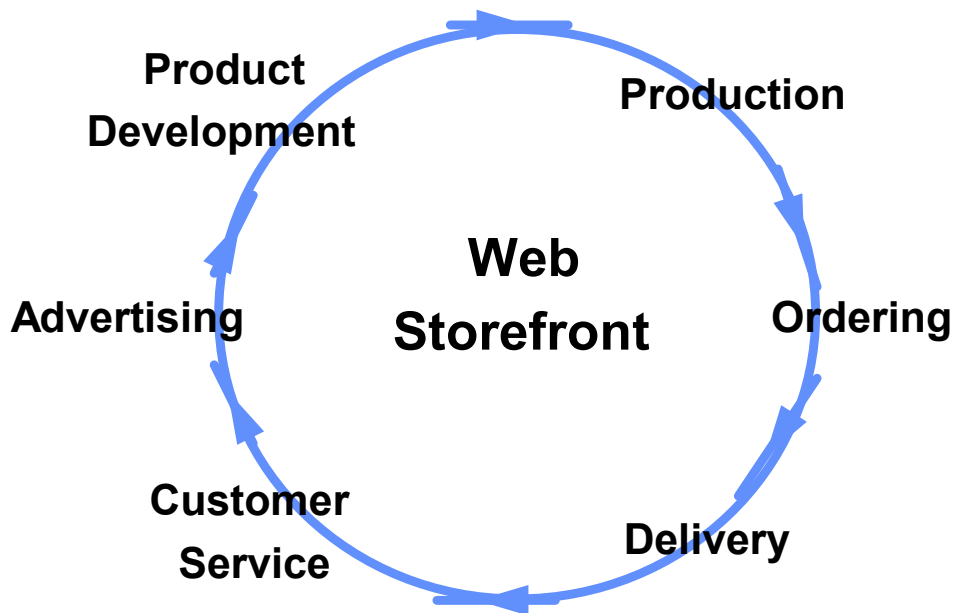
In the example, there are only two buyers, and customization is straightforward. If there are many types of buyers, and if product differentiation is costly, then full customization may not be the profit-maximizing strategy for a single seller. In other words, it may not pay a single firm to meet customer wants perfectly. However, the existence of rivals will lead to greater differentiation (in the sense of product variety within a single firm’s offerings) in this model than a single firm would choose. This is because a firm with rivals has to protect its market share as well as just meeting customer preferences to increase the value it can capture from them.

Other Dimensions of Strategy Product differentiation is an extraordinarily important dimension of competitive strategy, and business strategy in general. Clearly, we have not exhausted the many issues in this domain. One important problem in practice is determining what potential customers prefer, and what they are willing to pay for those

features they want. Gathering information on customer buying patterns is a growing endeavor. Grocery store membership cards and online tracking of what parts of a Web site customers click on, how long they stay there, and they buy, are examples of how firms collect this information.

Much of the problem of ascertaining buyer preferences is the conventional domain of marketing. For some time now, marketing has routinely involved customers in product development wherever this was possible and cost-effective. Online commerce changes this involvement in terms of degree and scope. This is particularly the case for digital products, which may be customized almost on demand, but even true for many physical products, where the use of information technology throughout the process of manufacturing and distribution (such as epitomized by Dell) makes a high level of customization possible. Indeed, the holy grail of marketers in the new environment is the replacement of a linear model that flows from product development through production ordering and delivery to one where customers can initiate the process. This is schematically represented in Figure 13.7.

Figure 13.7: Active Online Marketing



We will consider these issues in greater detail in Chapter 15, after we have considered pricing in more detail, in Chapter 14. We will also examine issues of information gathering in more detail in Chapter 14. Note for now that pricing will itself be an important determinant of the product differentiation strategy. In Figure 13.2, we illustrated a case where U_C and U_S were relatively equal. If, on the other hand, U_S is much lower than U_C , then it may not be worth customizing the service for Simon, unless it is low cost to do so, *and* it can be offered to him for a low price without reducing the price that Carly pays. Online commerce not only allows profiling of individuals in terms

of what they want to buy, but also in terms of what they might be willing to pay. As an example of not customizing for a broad market, consider the online version of the *Wall Street Journal*, which offers interactivity and access to information beyond what is available in its print edition, but which certainly still focuses on a target market that is primarily interested in business and economic news, and not on a broader set of content.

Another dimension of product differentiation that we will consider separately is strategies that work over time. Loyalty programs attempt to make products more different based on the customer's past history of purchases. Hence, before frequent flyer programs, people may have chosen between airlines mostly on price, with some aspects of service also considered. Now, the value of potential frequent flyer miles becomes an important differentiating characteristic. Online commerce in digital products and services allows loyalty programs to be implemented very easily, since information can be captured and processed automatically, as part of the process of use. Thus loyalty programs and other ways of 'locking in' customers have a particularly significant role to play in e-commerce. We consider these issues in Chapter 16.

Finally, note that product differentiation by itself may not be enough for sellers. They may have to inform or convince buyers of this differentiation. In terms of the simple Carly-Simon example, sellers may have to inform Carly and Simon that x_C and x_S are indeed what is available, unless Carly and Simon have chosen these by customizing themselves. Advertising plays one role here, among the many functions it serves. If sellers can increase the perceived differentiation of their products, they can segment the market more effectively, as discussed earlier. We discuss the informational and persuasive roles of advertising further in Chapter 15.

13.4 Bundling

Bundling is a particular kind of product differentiation that is popular because of its ease. It is also an important strategic option in offering digital products and services. Its ease, popularity and growing importance in the online world make it worth analyzing separately. Bundling can be defined as the packaging of two or more products and selling the bundle in fixed proportions. If the products are identical, then the bundle is simply a quantity bundle, and the bundling is simply a way of supporting quantity-dependent pricing, which is discussed in the Chapter 14. We focus here on cases where two different products are bundled.

The essential motive for bundling is value capture. As we shall see in this section, bundling can allow firms to capture a greater proportion of the value created by the products or services that they make and sell. In the case of digital products, it is often argued that there is more to bundling than just value capture. Bundling involves integration of software in ways that create additional value. We can frame the core of the Microsoft antitrust case in these terms. The Justice Department argues that Microsoft's bundling of its browser with its desktop operating system was motivated solely by the desire to capture additional value from buyers (and that this was illegal, given Microsoft's monopoly position in desktop operating systems). Microsoft's response is

that the combination was more than just packaging the two pieces of software together, and that the integration of the browser and operating system created a new product that increased the value created for its users. In reality, there are elements of truth to both positions!

The Microsoft case is not an isolated example. One of the most common examples of bundling is with software: MSWord, Excel, and other ‘productivity’ applications may be purchased separately, or bundled together in the MS Office suite. In another example, several different computer games may be sold together in an ‘entertainment’ or ‘education pack’ (depending on the nature of the games). Yet other examples are the bundling of a group of an artist’s songs on a music CD, and the bundling of a year’s supply of magazines in a subscription. Digital products and services readily lend themselves to bundling. Information, news, music and entertainment can all be packaged and sold in different bundles. Subscriptions are also easy to offer online. Online access can be bundled with online content, as AOL does (see Illustration Box).

Illustration Box
AOL as a bundler

AOL began as a provider of proprietary online content. Access was bundled with this, though AOL did not directly provide the infrastructure for access. As customer demand grew, the company had to invest in its own infrastructure to make sure that access was provided at an acceptable level. This became more important as the World Wide Web took off as a source of free content. AOL has to emphasize not just content, but an easy to use interface, keywords, and so on. Thus its bundle is now access and a better organized interface, rather than access and content, since huge quantities of the latter are available for free to anyone who just pays for access to the Internet (and not membership in AOL) through, say Earthlink. On the other hand, membership in AOL and access to whatever resources it offers, cannot be obtained independently of basic Internet access: the price is for the bundle only.

Pure bundling refers to a situation where only the bundle of products or services is sold. For example, AOL does not offer its content without the purchase of a membership that includes Internet access. Mixed bundling allows individual components to be sold as well as the bundle. Theoretically, mixed bundling is the most general case, since the components in mixed bundling can always be priced so that only the bundle itself is purchased by customers. Bundling is somewhat different from the related idea of product tie-ins: there, buying one product requires another, but not in fixed proportions. In a bygone era of computing (though not quite as long ago as Henry Ford’s glory days), IBM used to tie the sales of its punch cards (used for data entry) with the sales of its mainframe computers, but the two were not sold in fixed proportions.

One motivation for bundling is to have a broadly-defined enough product that, combined with customization makes it hard for a customer to switch. This is increasingly important, especially since (as we have suggested in the last section) lasting differentiation in terms of characteristics is hard to achieve for digital products. Content providers, and portals more generally, all attempt to offer bundles of services such as search, content, access to e-tailers, market information, interaction and collaboration, and more. We discuss this motivation further in Chapter 16. Another important possibility is that bundling reduces selling costs (packaging, advertising, etc.).

Finally, as we consider in this section, bundling works by increasing revenue when the willingness to pay for bundles is less dispersed than the willingness to pay for components. The simplest case of this is when the willingnesses to pay for different components are negatively correlated. We will use this case to illustrate.

Suppose that BOL (Britain Online) provides online access and content. It has two customers, Charles and Camilla. Charles is willing to pay up to £10 per month for access and £8 per month for content. Camilla is willing to pay £8 per month for access and £12 per month for content. By offering access and content separately, BOL must charge £8 per month for each component (the highest that the *marginal* customer is willing to pay in each case), if it cannot charge the two customers different prices, and if it wants to sell to both Charles and Camilla. (It will certainly want to sell to both if its marginal cost of service provision is low enough). This gives it a revenue of £32 per month.

On the other hand, if BOL offers only the bundle of content and access, it can charge each of its customers £18, increasing its revenue to £36. This is because £18 is the the willingness to pay of the marginal customer (in this case Charles) for the bundled service. The driving force here is that the dispersion of the total willingness to pay (£18 and £20) is less than the dispersion of the willingness to pay for the individual components (£10 and £8 for access, £8 and £12 for content).

Concept Check:

Suppose that Camilla is willing to pay £11 per month for access. Does bundling pay? Does bundling hurt?

While e-commerce often makes bundling more feasible, and allows for greater variety in bundling (for example, half a CD's worth of a singer's songs may be downloaded, rather than choosing between the CD 'album' and the CD single) it also permits unbundling or microbundling, thanks to the ease with which digital products can be changed. Information which, in print form, has been available only in a limited range of bundles (the available set of newspapers and magazines) may now be purchased by article, or even by snippet. Thus, e-commerce is seeing a move toward more and more mixed bundling, where both the bundle and components are offered to potential buyers. Microproducts were discussed in Chapter 9, and electronic payments for microproducts in Chapter 12.

Competition is important in this online world. Content providers who offer smaller bundles for low prices make it harder for others who would prefer to aggregate larger bundles and capture more value. The existence of low-cost Internet Service Providers (ISPs) and an enormous amount of free content on the Web places a limit on how much AOL can charge for its bundle. AOL must therefore seek to include and protect components of its bundle that have greater value because of AOL's size. In particular, AOL has tried to prevent other firms from allowing AOL non-members from connecting to its Instant Messaging service. The ease and power of offering larger and larger bundles of digital content, driven by the low marginal costs of provision (Section 9.4), will make bundling a significant strategy online (see Illustration Box).

Illustration Box **Giant online content bundles**

Yannis Bakos and Erik Brynjolfsson are two of the foremost researchers on the economics of e-commerce. In several papers, they have analyzed the economics of bundling, particularly in the context of digital products, and emphasized how the very low marginal costs of content make large online bundles possible and profitable. They give the example of the Electric Library, a service of Infonautics Corporation, which offers a subscription service for \$9.95 a month or \$59.95 a year, in which an individual has access to (quoting from their web site, www.elibrary.com):

- More than 150 full-text newspapers
 - Hundreds of full-text magazines
 - National and international news wires
 - complete works of literature
 - Over 28,000 photos, images and maps
 - Television, radio and government transcripts
 - Book, movie and software reviews
 - Complete encyclopedia
 - Plus, a dictionary, thesaurus, and almanac, fact books, and more.
- This service has more than 85,000 paid subscribers – a more solid revenue source than advertising!

Internet infrastructure provision for businesses is one area where bundling may increase. Infrastructure providers may find economies of scope in combining physical facilities, machines, network connectivity, and set-up and management services into a single service bundle. Thus value creation may be a strong motive in this case. However, the bundling of services also creates room for value capture, just as in cases where households are the buyers.

13.5 Conclusion

Product differentiation is a critical component of business strategy. It is important for increasing customer value, capturing that value, and competing against rivals in the same industry. The importance of product differentiation has been growing over time as the economy has become more complex, and as technology, particularly information technology, has enhanced the available possibilities. E-commerce, particularly in digital products, is an exemplar of this trend, and many of the key aspects

of e-commerce strategy can be understood in terms of the economics of product differentiation, whether horizontal or vertical. E-commerce makes product differentiation easier, richer and more flexible, as we shall illustrate further in Chapters 18-20, which look at specific industries.

Summary

- Customization and bundling are examples of product differentiation, a perennial key aspect of business strategy.
- Customization refers to product differentiation which is closely tailored to individual customer preferences. Standardization is the other extreme, of no product differentiation.
- Product differentiation can be of two abstract types, termed horizontal and vertical differentiation.
- Horizontal product differentiation refers to the case where one version is not unanimously considered to be better than another, but rather the ranking of products depends on the subjective tastes of the customer.
- Horizontal product differentiation may be formally modeled by treating products as combinations of characteristics, or simply by specifying directly how substitutable products are in terms of the subjective views of customers.
- Vertical product differentiation differs from horizontal differentiation in that users are unanimous in their ranking of products or services (absent any considerations of pricing).
- Product differentiation strategy for a firm without rivals focuses on creating value by meeting customer wants more precisely, and capturing that value by supporting richer pricing strategies.
- Product differentiation strategy also has dimensions that focus on rivalry: softening price competition, and protecting or increasing market share.
- Bundling can be defined as the packaging of two or more products and selling the bundle in fixed proportions. It increases revenue when the willingness to pay for bundles is less dispersed than the willingness to pay for components.

Questions

1. In their book, *Blown to Bits*, Philip Evans and Thomas Wurster emphasize how what they call “the new economics of information” involves blowing up the trade-off between “richness” of information (see Illustration Box, Chapter 10) and “reach”, which is simply the number of people receiving or exchanging information. Referring back to the Illustration Box in Chapter 10, can you identify which of the dimensions of “richness” involve vertical differentiation? Can you give examples in each case?

2. The usual economic theory of firm behavior says that a firm maximizes its profits when it sets marginal revenue equal to marginal cost ($MR = MC$: see Chapter 4). This equation can be rewritten in the “markup” form, $(P - MC)/P = 1/|\epsilon|$, where ϵ is the elasticity of demand. Since this tells us that profit maximization means a higher markup when demand is more inelastic, how would you relate this to the discussion of product differentiation strategy in the chapter? In particular, how do you think that the elasticity of demand relates to the degree of substitutability of products, or to how sensitive consumers are to changes in product characteristics?
3. Again turning to *Blown to Bits*, the authors state “Almost all companies who have offered configurator-type navigators [such as Dell uses to allow customers to choose product specifications] have found that people tend to select more features than they would otherwise.” (p. 154). We have illustrated this process in Chapter 11, and discussed it again in this chapter, in the context of vertical differentiation. Why do you think people select more features than when they can not choose? Could this phenomenon fit into the discussion of product differentiation in the chapter?