Vertical Restraints and the Distribution Chain: 
An Economic Analysis with Special Reference to Personal Computer Marketing

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Executive Summary

The accompanying report presents the results of an extensive investigation of the way in which the availability and effectiveness of vertical restraints—devices by which manufacturers control the actions of their dealers and distributors—affect the way in which distribution is structured. The discussion focuses on the personal computer market, which due to its rapid pace of change presents an ideal laboratory for testing the effects of various distribution restraints. In addition, it is a market with substantial importance to small business, both small business distributors and small business users of computer products.

The importance of this market to small business is easily established. There are currently about 4000 specialty computer retail stores in the U. S. with a majority of these being operated either as independent businesses or as franchised locations of computer retail chains. The number of such operations has grown rapidly and will likely continue to increase in the near term at a pace matching the rapid growth of the personal computer market itself. In addition, personal computers are sold by a similar number of value-added remarketers (also known as systems houses or OEM's), most of which are small business. Other small business components of the distribution system include many of the roughly 200 wholesale distributors of personal computer products, the 6000 or more office equipment dealers, the 200 mail order operations selling personal computer gear, and the 3500 software publishers. Even some of the 1300 hardware vendors are small businesses, though given the nature of the market, the successful vendors do not stay small for long.

The small business component of personal computer distribution is beset on all sides by challenges from alternative distribution channels. At the high end of the market, manufacturers have been successful in selling directly to consumers, thereby dispensing with small business intermediaries. At the low end, specialty retailers face challenges from discount retail chains such as K-Mart, Service Merchandise and similar mass merchants. Each of the alternative distribution channels contains a smaller proportion of small business representation than the specialty retail channel, and each is less suitable as marketing channel for small business manufacturers of computer products. Hence, actions that make the specialty retail and value added dealer channels more efficient will increase the attractiveness of the channels in comparison to alternatives much less favorable.
to small business.

The focus of this report is thus on the way in which the use of vertical restraints affect competition among distribution channels. This focus differs from the more normal approach to analysing conflicts between distributors within a distribution channel. The latter approach is exemplified by consideration of competition between full-service and discount or mail-order specialty computer dealers. Competition from the latter retailers leads to downward pressure on retail margins at the full service retailers. This report emphasizes that this downward pressure will lead full-service retailers to provide less information to prospective buyers than they and the manufacturers wish to have provided. As a result, manufacturers of personal computer products will divert their marketing to channels which inform consumers in a more acceptable fashion, and the specialty retail channel will lose sales not so much to discount retailers specializing in computer products as to direct sales by manufacturers and sales by mass merchants.

Given our focus on competition between channels, one of the best way to summarize the results is to consider the prospects for the various channels:

- **Specialty retailers**
  - Existing strains on this channel will be magnified as multiuser systems become more common and affordable.
  - Manufacturers of more complex products will be forced to greater efforts to control the "gray market," and complaints from mail order distributors will increase.

- **Mail-order distributors**
  - As noted above, these firms will find it difficult to obtain products from large manufacturers. They will argue that they provide post-sale service as good as that available from the specialty retailers, a claim that may well be true in some cases. But the relevant service is pre-sale service, primarily assistance in selecting packages of equipment.

- **Wholesalers**
  - Large manufacturers will try to retain control over distribution by bypassing wholesaler distributors. This trend will contribute to the continuing success of computer store chains relative to independent stores.

- **Value-added remarketers**
  - This is one small business group that is likely to benefit from industry trends. They are experienced in the distribution of multiuser systems and are not particularly sensitive to free-riding.
Small business computer users.

- Specialised markets will continue to be serviced by value-added resellers, but general purpose users may be harmed relative to larger firms if manufacturers of computer equipment choose to concentrate on their own sales forces rather than on the specialty retailers.

The ability of manufacturers to control distribution will affect the kinds of products which those manufacturers will choose to offer. Manufacturers of complex products such as integrated software will be most anxious to exert distribution control, while other manufacturers will attempt to take the function of making choices out of the hands of consumers by bundling products together into packages. This latter approach will limit the flexibility of the resulting products, but will reduce the informational demands placed on distribution, and will thereby make marketing through mass merchandisers more feasible.

This report analyses a number of distribution restraints which have been imposed in an effort to control the specialty retail channel. These restraints include vertical integration by manufacturers into wholesale distribution, and to a lesser extent, to retail distribution. They also include refusals to deal with classes of distributors and refusals to market portions of their product lines through their established retail channels. These non-price vertical restraints are designed to have the same effect as resale price maintenance—they are intended to place a floor on distributor margins. The minimum margins are intended, in turn, to elicit an acceptable level of pre-sale services. This result is the same that would be anticipated if the manufacturers were to adopt resale price maintenance to protect their full service distributors. The only major difference between the non-price restraint employed currently and resale price maintenance is that RPM would be a more effective means to the same end.

Effective control over distribution is an important contributor to the welfare of small businesses in the personal computer market. The failure of manufacturer control over wholesale distributors has lead the manufacturers to integrate around such distributors. This hurts not only the distributors, but also start-up manufacturers of personal computer gear that initially have little in the way of alternatives to using the wholesalers. The distributor case could be mirrored in a decline in the fortunes of independent retailers if vertical control at that level does not become more effective. This report argues that the informational demands on the distribution system and conflicts between distribution channels will become even more intense as today's personal computers come increasingly to be linked through local area networks and other multiuser systems. Hence the specialty retail problems identified here will become more severe in the near future.

This report contains both a summary of recent work on the theory of vertical restraints as it applies to the personal computer market and a series of examples of the importance of information and pre-sale services in the distribution process. A general conclusion might be that the vertical restraints now adopted are
not working particularly well, so that there will be attempts to move closer to resale price maintenance and to control distribution more tightly. The success of this effort will have an important bearing on the future of the existing small business component of personal computer distribution. The importance and increasing use of vertical restraints in this marketplace will almost certainly lead to demands that policy-makers take action against such restraints. The purpose of this report is to analyse the use and effects of existing restraints in order that the consequences of policy actions in this area may be predicted accurately.
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Introduction

This study is concerned with issues in the distribution of microcomputers and associated products. The approach taken here is one of explaining how the microcomputer distribution system is organized based on an economic model of the information needs of potential consumers of these products and the relative efficiency of various distribution channels in satisfying such informational requirements.¹ The principal policy questions to be addressed in this study concern the effects on distribution of various legal restrictions governing relations between distributors and their suppliers. The economic analysis of vertical restraints predicts that considerable pressure for the imposition of such restraints will arise in the microcomputer distribution system. The ability of manufacturers to impose restraints which both they and their dealers might desire is, however, severely constrained by legal requirements, both formal and understood. Chief among these is the court-mandated prohibition on resale price

¹The terminology of this section refers to microcomputers, as opposed to the more common usage, personal computers. The term microcomputer is, in fact, more broadly applicable, and more appropriate for the marketing questions to be addressed in this report. A personal computer is a device which provides an individual microprocessor dedicated to that individual's personal computing needs. Such personal computers are indeed microcomputers, but there are also microcomputers which include at their heart processing chips with power sufficient to support a number of users simultaneously. These microcomputers are simply new implementations of minicomputers, differing only in their use of a microprocessor rather than a collection of processors working together. (See the glossary for more details on the terminology used throughout this report.)

The reason that this distinction matters is that the next wave of personal computer development will likely involve linking personal computers together so that their users can share both peripherals such as tape drives and laser printers, and files consisting of both data and programs. One way to do this is through use of a local area network linking the individual personal computers with a very high speed information transmission system. An alternative is simply to provide a multiuser microcomputer system with all the requisite devices and files accessible through the bus architecture of the central microcomputer. The rapidly declining prices of microprocessors and the increasing number of functions that can now be accomplished "on-chip" suggests that linked personal computers will eventually predominate. The multiuser approach is nevertheless instructive because the requirements for distributing such products are very similar to those for networked personal computers. Since multiuser microcomputers are currently much more common than local area networks, there is an opportunity to make inferences about the way in which personal computer distribution will evolve.
maintenance (RPM). The use of such practices as exclusive dealing and dual distribution arrangements is also limited. The existence of such legal barriers to the use of some vertical restraints does not rule out all manufacturer control of distribution, but rather leads the manufacturers to seek alternative methods of structuring their distribution arrangements. This study considers the suitability of the alternative restraints, and thereby reaches conclusions about the extent to which legal controls on manufacturer-dealer relations have altered the attractiveness of various distribution channels.

In the course of this analysis, it will become clear that these legal restrictions have significant small business consequences. We will document the central role that small business plays in microcomputer distribution and the way that its role has evolved in concert with the rapid pace of change in this market generally. We will focus particularly, but not exclusively, on specialty computer retailers. One major finding of this study is that the movement observed away from independent retailers in favor of chain affiliation is likely due in considerable measure to the inability of manufacturers to impose their most preferred bundles of vertical restraints. In addition, we will show that limits on the use of vertical restraints can affect not only the organisation of the specialty retail distribution channel, but also the attractiveness of this channel in comparison to alternative distribution methods available to manufacturers.

Much of the complexity of the analysis to follow stems from the large number of distribution channels which are available to manufacturers. The alternatives vary greatly in terms of small business involvement. At one extreme are channels which need not involve small business distribution at all. One such channel involves direct sales by manufacturers to final consumers through their company-controlled sales efforts. Another consists of embedded microprocessors, computers which are designed into other products, and whose functions are transparent to the final consumer. In both cases, distribution need not involve any small businesses, though of course, the manufacturers may be small firms and the products in which the microprocessors are embedded may themselves be sold through distribution systems in which small businesses predominate.

The other channels through which microcomputers are distributed typically include both small businesses and larger corporate participants. For example, some microcomputers, typically those targeted at the home user market, are marketed through mass merchandisers. This channel includes both small and large businesses, ranging from single-store enterprises to chains such as K-Mart. Another channel, that consisting of so-called value-added remarketers, consists of firms ranging in size from very small systems houses selling turn-key systems in narrow market segments to large corporations such as Dun and Bradstreet and Merrill, Lynch, companies that offer packaged microcomputer products to their established client bases. But of all the channels through which microcomputers move to market, the most important in volume terms as well as in terms of small business involvement is that which consists of specialty microcomputer dealers. As with the other channels available to microcomputer marketers, this
channel is characterized by a considerable dispersion in the size of its business participants. These range from individual outlets through franchised dealer members of chains of varying sizes to dealer outlets controlled by Sears and IBM.

Within each of these channels considerable competition between small and larger business occurs. But from the perspective of small business distributors, a more significant form of competition is that between alternative distribution channels. While small businesses are represented in the direct sales and mass merchandiser channels, their relative importance is greatest in the specialty retailer channel. Therefore, one central goal of this study is to outline the vertical restraints issues governing the performance of this channel in comparison with other options. In so doing, the analysis will permit an assessment of the issues which are likely to be salient to the largest number of small business participants in personal computer distribution.

There are, however, other small business issues raised by microcomputer distribution. One of the most important of these is that of how small business microcomputer customers acquire the equipment that they need in order to carry on their own businesses effectively. We shall see that several of the marketing channels available to microcomputer manufacturers will tend to favor larger customers, so that small firms that are interested in purchasing microcomputers are adversely affected. One important side effect of actions which impact either specialty retailers or value-added remarketers is that their customer bases, weighted toward small business users, will thereby be disadvantaged. Hence the small business implications of controls on microcomputer distribution go beyond microcomputer retailing to include small business computer users.

One additional small business consideration which arises in connection with microcomputer distribution is the issue of access to distribution for small manufacturers of both hardware and software. The availability of retail distribution not controlled by the major manufacturers will tend to open opportunities for such manufacturers. An effective specialty retail channel is essential to manufacturers with products that will not themselves support direct-to-user marketing operations. The availability of specialty retailers skilled in providing pre-sale services to consumers is especially important to manufacturers of truly novel products that require capabilities which are difficult to summarize in advertising messages. As one example, we will see below that developers of integrated software have gone to exceptional lengths to protect the margins of specialty retailers from erosion by mail-order retailers. These efforts, while apparently unsuccessful, appear necessary if the characteristics of these products are to be

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2The extent of small business participation in the various distribution channels is described in detail in Section 1.4 below. The numbers presented there make it clear that while both small and large firms inhabit the specialty retail channel, small businesses are relatively more important in this channel than in alternative distribution systems. Hence policies which affect specialty retailers adversely will tend to have comparatively large negative repercussions for small business interests.
communicated to potential customers. It is apparent that alternative means of informing potential users of the capabilities of these products are grossly inadequate. As one example, Business Week points out the inability of advertising for one leading integrated product, Ashton-Tate's Framework, to convey to consumers what its advantages are supposed to be. Advertising for Framework's chief rival, Lotus Development Corporation's Symphony, emphasizes the inadequacy of direct efforts by manufacturers to inform consumers of their software. The Symphony advertisements make no attempt to describe the product, but instead focus on name recognition. These products simply must be sold through distribution channels capable of conveying considerable pre-sale information to consumers.

Before proceeding with an outline of the analysis to come, it will be useful to sketch the channels of distribution by characterizing each according to its typical consumer's view of microcomputer applications and, correspondingly, the way in which the channel transmits information to consumers about computer capabilities. Table I.1 below considers the channels, associated marketers, and customer bases. This table is a considerable simplification, and in practice, there will be substantial channel overlap. The differences in channels in the applications provided and the customers served stem primarily from differences in the amount of information required for each application and customer group.

A customer using an embedded microprocessor is unlikely to need much information as to how that processor can best be configured to meet the customer's particular needs. Ideally, the operation of the processor will be transparent to the user. There are, nevertheless, examples of very sophisticated processors used in this way. For example, the Ford Motor Company is one of the largest customers for the Intel 80186 microprocessor, a chip which is more powerful than the Intel 8088, the heart of the ubiquitous IBM Personal Computer. Many computers are used primarily as devices to store and retrieve information, often from magnetic media. But a compact disk player performs much the same function in much the same way, and requires no knowledge of the functioning of its internal computer for effective use. The point is that if the processor is sufficiently embedded in its intended application, there is no need for the consumer to make choices as to its use, or even to understand what it is that the processor is doing.

The situation changes markedly when a microprocessor is no longer dedicated to a specific task. When it is instead to be put to several uses the consumer will generally need to be informed about the range of possible applications and the additional equipment, whether hardware or software, which is required if these applications are to be served properly. More precisely, she or he needs to be convinced that an appropriately chosen configuration can serve effectively the particular needs of that customer. Here the demands placed on the distribution channel become greater in proportion to the number of deci-
TABLE I.1

CHANNEL CHARACTERISTICS OF MICROCOMPUTER HARDWARE DISTRIBUTION

<table>
<thead>
<tr>
<th>Channel</th>
<th>Consumer's View of Application</th>
<th>Typical Customer Base</th>
<th>Representative Vendors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embedded</td>
<td>Transparent</td>
<td>Extremely Varied</td>
<td>Automobile, audio component manufacturers</td>
</tr>
<tr>
<td>Mass Merchandiser</td>
<td>Bundled by Manufacturer</td>
<td>Home users, some small businesses, computer hobbyists</td>
<td>Atari, Commodore (formerly Coleco)</td>
</tr>
<tr>
<td>Specialty Retailers</td>
<td>Tailored to particular application</td>
<td>Small to medium sized businesses</td>
<td>Apple, IBM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(some bundling of products sold through less sophisticated dealers)</td>
</tr>
<tr>
<td>Direct Sales</td>
<td>Tailored, centrally delivered</td>
<td>Fortune 2000</td>
<td>IBM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(this is the most common sales channel for mainframe computers)</td>
<td></td>
</tr>
<tr>
<td>Niche Marketers</td>
<td>Bundled by Dealers</td>
<td>Professionals</td>
<td>Vector, Altos</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(this form of distribution is also common for minicomputers)</td>
<td></td>
</tr>
</tbody>
</table>

Note:
A number of types of retailers do not fit easily into any of these categories. For example, off-price outlets and mail order firms offer product lines similar to those available at the (full-service) specialty retailers, but provide little in the way of pre-sale support for these products. They typically sell to well-informed customers, including both hobbyists and computer professionals as well as non-specialists that have made their selections with the assistance of the full-line stores.
sions which a consumer must make. The increased role of dealers in comparison to the case of dedicated microprocessors is a consequence of the flexibility and adaptability of personal computer systems. One way to limit the informational demands on the distribution system is for the manufacturer to make as many of the choices as possible. The most extreme example of this approach is, of course, the dedicated microprocessor. But if the microprocessor is to be packaged in the form of a conventional personal computer, less extreme forms of manufacturer choice are possible. One technique involves bundling of products. A bundled system will often combine hardware, software, and peripherals appropriate to the applications desired by a "typical" user. The difficulty of this approach is, of course, that it limits significantly the flexibility of the package which is delivered. As a result, bundling which is accomplished by the manufacturer tends to result in products which are sold by mass merchants or by relatively unsophisticated dealers that sell at low margins and typically do not offer much in the way of expertise to their potential customers. It is worth noting that the leading exponents of the bundling approach have been Osborne Computer Corporation and Coleco. Neither of these companies proved successful.

The niche marketing channel is the other extreme in terms of services provided by dealers to their consumers. When the manufacturer bundles the product, the result is a compromise which approximates the needs of a variety of users. In the case of the niche marketers, the product is also bundled, in the sense that the consumer buys a combination of hardware, software, and associated equipment. In contrast to products bundled by the manufacturer, the bundle is put together by the niche marketer, and can therefore be tailored to the particular needs of the customer. It is not surprising, therefore, that the manufacturers of computer products that distribute primarily to niche markets are little known. The marketer serves as the consumer's agent and serves to make the actual equipment chosen transparent to the consumer in use. The prime informational difficulty faced by this channel is conveying to consumers the range of applications available without simultaneously providing the consumer with information about how those applications can be met with existing equipment. That is, the niche marketer must convince the consumer that he is a trustworthy agent without giving away the information that he is employed to provide. It is perhaps not surprising that niche marketers have proven most successful with relatively sophisticated systems aimed at narrow markets. The sophistication of the system means that potential customers will generally have an incentive to spend substantial effort in seeking out the resellers, rather than the other way around, and that the reseller's package will include significant customization that the customer will find difficult to duplicate. Such sellers will tend to go well beyond simply assembling off-the-shelf systems.

The most popular distribution channel lies between these two polar cases of bundling and niche marketing. The specialty computer retailers inform consumers of the characteristics of various possible components of a completed computer system. The retailer maintains an expert staff which is conversant
with the capabilities of various applications software packages and the hardware requirements for such packages. A consumer can use this information to tailor a system to that consumer's particular needs. The components of the package can be well-known brands that attract the consumer in to the retailer in the first place, but the branded manufacturers will not in general be in a position to duplicate the information provided by the dealers. Hence the dealers and the manufacturers depend on each other to present the consumer with a system that is configured to that consumer's intended application.

The problem with this form of distribution is that it is difficult to guarantee the dealer or distributor a return on the investment made in knowledge of component capabilities. Ordinarily, one would expect that dealers could charge customers directly for the information provided. Certainly there are computer consultants who do charge fees for their expertise, and the approach of the niche marketers is similar. The difficulty for the specialty retailers is that they are often in a position of informing a consumer of what a computer system can accomplish for that consumer, but neither the retailer nor the consumer can be assured prior to the provision of the information that it will prove valuable. As a result, there is an opportunity for free-riding on the information provision. Consumers will not pay in advance for information. If the charge for the information is incorporated into the price of the computer products offered by the specialty retailer, they need not pay for it at all. This is because they can avail themselves of alternative, no-service retailers who are correspondingly able to offer the products at lower cost. But it is obvious that if service-providing retailers are unable to recover the costs of providing information, such information will not long be provided.

The solution to this problem is for the manufacturer to create a property right in this information for the specialty retailer. It is in the manufacturer's interest to do so only if the higher retailer margins induced by the retailer's ability to charge for services are more than offset by the increases sales which those services generate. The creation of the property right takes the form of denying the product in question to dealers who fail to provide the appropriate services. An alternative method of guaranteeing retailers a return on their sales efforts is provided by resale price maintenance (RPM). Through the use of RPM, the manufacturer can specify a minimum retail margin applying to its products. One interpretation of its desire to do so is that it could thereby induce service competition in place of the price competition which RPM prohibits. Since RPM is illegal, the process of creating a property right must instead take the form of restricted distribution and refusals to deal. This report considers a number of instances in which such alternatives have been used, and concludes that controlled distribution arrangements have proven difficult to enforce. The consequences of "gray market" distribution—sales by no-frills discounters and

4 The manufacturer customarily specifies a minimum price at which its products may be resold. Since the manufacturer also specifies a wholesale price, this is equivalent to setting dealer margins.
mail order outlets—have included eroded margins and corresponding changes in the organization of distribution. This report will consider these changes in some detail in order to shed light on the future of specialty computer retailers and of the customers and producers who frequent such outlets.

It is important to emphasize at this point that the legal ban on RPM does not mean that manufacturers abandon attempts to set dealer margins. It instead means that they adopt substitute devices in order to do so. Many of these substitutes have been found acceptable by the courts. Recent vertical restraints guidelines provided by the Justice Department provide manufacturers considerable leeway in the use of various non-price restraints. Since these restraints may have effects similar to those expected of RPM, it is important to assess whether these alternatives are likely to be as effective as RPM in enhancing distributional efficiency, and whether they are less susceptible to the undesirable consequences that have lead to the legal strictures on RPM.

Our focus will be on the way in which distribution channels compete in the provision of information to microcomputer consumers. The channel competition will be affected most directly by the ease with which the property rights discussed above can be defined and enforced. The success of the specialty retailers will be determined almost completely by the effectiveness of their information rights, and to the extent that the rights erode, the channel will lose ground relative to the alternatives available. One particular form of channel competition that deserves particular attention is that between specialty retailers and the direct marketing arms of the leading manufacturers, companies such as IBM, Digital, Data General and Wang on the hardware side, and Lotus Development Corp. and Ashton-Tate in software. The issue here is whose property rights are protected. In some instances, it may be more efficient for a manufacturer to provide information to a large user directly, rather than through the use of dealers. The problem with this approach is that the specialty retailers who provide services to smaller customers may compete for larger, informed users on the basis of price alone, and may thereby undercut the ability of the manufacturers to charge for the information they have provided. The problems of dual distribution systems are discussed in some detail, since this form of channel competition pits small-business-dominated specialty retailing directly against the marketing arms of much larger computer manufacturers. The outcome of this competition will affect the range of products offered to specialty retailers and hence to their small business customers. Moreover, technological improvements, particularly the development of workable local area networks, will exacerbate this particular form of channel conflict.

It is worth noting that this focus on channel competition is quite different than conventional vertical restraints analysis. It is customary to focus on the competition between classes of firms that are either in the same channel or, alternatively, compete in very closely related channels. Thus, in the analysis of resale price maintenance, one customarily compares the effects of RPM on full-service dealers with the higher prices which result at the previously off-
price outlets. The point of this analysis is that such a focus is far too limited. If full-service dealers prove ineffective in informing potential customers due to discounter-induced low margins, the result will not simply be lower prices in the dealer channel, but a substitution of other channels for both specialty dealers and discounters. In this instance, the success of the discounters may prove much less substantial in the long run than their profits from price cutting in the short run would suggest.

This report is organized as follows. First, the markets in question are described in some detail. The sources of data for this description are primarily estimates computed by private research organizations which have been published in trade publications. This material serves to describe the marketplace as it currently stands and to outline some of the recent trends in market evolution. A number of the sources consulted also included projections concerning both consumer demand and changes in the organization of distribution. The assumptions underlying these projections are generally proprietary, and in any case, many appear to be little more that simple extrapolations of current trends. Such estimates have therefore been discarded as not particularly useful or relevant. There is nevertheless a need to project future developments in microcomputer technology, for the type of equipment and software to be sold affects the relative efficacy of the various distribution channels. Indeed, a manufacturer's choice of a hardware/software package and of a distribution scheme are in important respects simultaneous. As a result, some attention will be paid to likely developments in microcomputer technology with the goal of inferring the demands the new technology will place on distribution. The projections will be based primarily on an evaluation of existing minicomputer technology and distribution. This is because much of what is on the horizon appears to link personal computer users together, much as minicomputers already do.

Following our outline of the current characteristics and likely evolution of the marketplace for microcomputers, a summary of the economics of vertical restraints is provided. This brief survey is heavily weighted towards the services argument used to explain such restraints. This focus is adopted because the personal computer market provides an archetypal example of pre-sale services. The services argument has the implication that most vertical restraints adopted willingly by manufacturer will prove to be efficiency-enhancing. Some attention is given to the possibility that the restraints adopted could be anticompetitive in effect. There are two ways in which vertical restraints could prove anticompetitive. One is that dealers could force manufacturers to adopt such restraints even though the manufacturer recognized that the resultant higher margins harmed its interests. The second, and somewhat more plausible possibility, is that manufacturers could use restraints to enhance their own positions by suppressing competition from their own rivals. The general conclusion of this section is that adverse effects of vertical restraints are likely to occur only in relatively rare cases.

Several recent contributions to the economic analysis of vertical restraints
I have argued that a showing that vertical restraints enhance distributional efficiency from the manufacturer's point of view is insufficient to show that such restraints are desirable. The issue raised involves distributional questions—vertical restraints may benefit some consumers who might not otherwise have purchased the products in question, but may harm those customers who would have purchased in any event. The research which underlies the preparation of this report has focused heavily on assessing the consequences of RPM and other distribution restraints on various classes of customers for the products in question. The question is whether in their quest to inform relatively unsophisticated customers, the manufacturers that adopt vertical restraints penalize more sophisticated users by loading service charges onto all users, irrespective of whether the services in question are desired or not. Much of this research is technical in character, and is therefore confined to papers prepared for professional journals. The results are summarized within the body of the report. They suggest that this possibility of higher prices to cover service costs is perhaps not so serious as it might at first appear. The reason is that manufacturers have an incentive to absorb the costs of service provision directly, through lowered wholesale prices for their products. We show that the price comparisons which have been employed to demonstrate that resale price maintenance raises prices substantially are very misleading, and will overstate greatly the impact of RPM successfully implemented across the board. This report summarizes the intuition behind this line of reasoning, leaving the formal presentation to other forums.

Notice that the services argument requires that manufacturers establish and maintain property rights for their dealers. It is the dealers, often small businesses, that are required to make investments in providing information to consumers. The role of vertical restraints is simply to ensure that dealers receive the fruits of such investments. Without manufacturer intervention, the returns to investments in dealer services could be attenuated by free-riding, thereby impairing the ability of the service-providing small business retailers to survive.

When we turn back to specific instances of the use of vertical restraints in personal computer marketing, we shall see that there were cases of distribution restrictions which were motivated by a desire to suppress competition. In these instances, the restraints proved ineffective for this purpose. Nevertheless, the report will outline conditions under which some forms of vertical restraints could have the undesirable effect of making entry by new computer manufacturers prohibitively expensive. Such possibilities are most likely for exclusive dealing or similar arrangements. Finally, this portion of the report considers the ways in which vertical restraints may be defeated. Restraints which are adopted not to limit competition, but rather to improve efficiency may prove ineffective in attaining their object. To the extent that they fail, distribution channels which rely on these restraints will suffer in comparison to the alternatives available. The conclusion of the analysis is that a permissive attitude toward manufacturer use of vertical restraints will enhance the competitive prospects of the specialty
retail channel, but may lead to some loss of manufacturer competition. Current public policy appears to retain the danger of reduced manufacturer competition without correspondingly placing specialty computer retailers in a strong position.

The discussion of the specifics of personal computer marketing is generally oriented around sets of vertical restraints used to define informational property rights, restraints such as resale price maintenance, exclusive dealing, bundling and territorial restrictions. There are three major exceptions to this organization. Some of the material consists of an historical discussion of personal computer marketing, one which considers anticompetitive possibilities. A second topic which deviates from the organization by vertical restraints concerns the marketing of integrated software. This topic involves many of the same issues which arise in hardware marketing, but places them in a very contemporary context, one of considerable near-term importance. The third exception is the detailed discussion of dual distribution. Here, as mentioned above, the issue is whether property rights overlap can be inhibited.

To summarize, this report is primarily concerned with the relation between personal computer manufacturers and the predominantly small business specialty computer dealers that are the primary outlet for their products. In particular, we are concerned with the restraints that manufacturers place on the actions of such dealers. We shall find it necessary, however, to take a much broader perspective on the computer marketplace. Computer capability can be provided to users in a number of substitute forms ranging from terminals on powerful mainframes to home computers that are little more than game machines. Similarly, such power may be sold in a variety of ways. Just as the various types of computer hardware and software can be substituted, so can the method of distributing computer capability. Our goal here is to evaluate the prospects of specialty retailers by considering not only the efficiency of such retailers but also the capabilities of rival channels.

In so doing, this report will provide a much broader perspective on computer marketing than is possible with conventional vertical restraints analyses. The conclusions reached below may be summarized as suggesting that if the existing small-business character of personal computer distribution is to be maintained in the face of increasing hardware and software complexity, distribution restraints will need to be at least as effective as they currently are. Indeed, the continuing health of the personal computer dealers may require even more manufacturer intervention than is currently employed. This argues for a permissive stance on vertical restraints issues in this market. Indeed, without changes in the treatment of vertical restraints, the movements within specialty retailing away from independent dealers toward chains and overall away from specialty retailers will likely accelerate.

One may expect to observe more arguments for limitations on vertical control by manufacturers. As microcomputers become more sophisticated and come increasingly to be linked together, competition between distribution channels will
intensify. Dealers may be expected to argue that some distribution restraints, primarily those restricting the ability of dealers to compete with manufacturer-direct sales, are excessive. Our analysis suggests that limitations on the ability of manufacturers to restrain distribution may improve dealer well-being in the short run, but will not, in the longer term, contribute to dealer survival.

The other leading area of channel competition will likely involve the home computer market, where traditional dealers and mass merchandisers will be pitted against each other. Here it is fairly apparent that products which are commonly sold in mass merchandiser outlets will be dropped by the specialty retailers. Particularly for more sophisticated products such as the low ends of the Apple and IBM lines, this is apt to lead to manufacturer attempts to deny products to mass merchants by constricting the gray market for their products. Such activities will almost certainly result in numerous complaints from the mass merchandising channel. To the extent that these complaints result in limitations on manufacturer control over distribution, the results will be considerable weakening of the specialty retail channel and product redesign with an emphasis on providing computers which are specialised to particular uses and which are sold as relatively complete systems.

The focus in this report is on how the availability of vertical restraints will affect the structure of retailing and the form in which manufacturers choose to offer their products. The assessment of whether policy-induced changes in retail and product structure are desirable is, by and large, left to the reader.
Chapter 1

The Personal Computer Marketplace

1.1 Introduction

The personal computer market is among the most dynamic and fluid components of the U.S. economy. Even in comparison to the rapidly expanding world of information processing, the growth of the personal computer segment has been spectacular. Figure 1.1 provides a clear illustration of this point. The estimates in this figure, compiled by International Data Corporation, a market research firm, show that the share of shipments accounted for by desktop computers rose from virtually nothing in 1977 to overtake the long-dominant mainframe sector in 1984. The development of the microprocessor with its ability to provide each user with processing power equivalent to that available previously on much larger systems has meant that users could be freed from dependence on centralized data processing facilities for the first time. This change has had profound implications for the information processing industry generally. Much of the work that is now done on personal computer was previously not a part of the computer world. The financial analysis done with spreadsheets was formerly accomplished with pencil and paper, if at all. Word processing was done either on dedicated machines or on typewriters. Only the third major component of personal computer use, database management, was a central component (perhaps the central component) of the mainframe world, but as this function migrated to personal computers, the nature of the data processed and the reports written also changed.

Perhaps the most significant change that occurred as part of the personal computer revolution was the change in type of software offered to users, a change that was a direct consequence of the change in the users themselves. Because the personal computer was sold directly to the end user, and thereby circumvented
Figure 1.1: U.S. Computer Shipment Value by Type

Source: International Data Corporation, as reported in *Electronics News*, August 27, 1984, p. 4
data processing professionals, the software had to be easier to use than that which was available on larger systems. But even with this easier-to-use software, the system of distributing personal computers had to be organized differently than that for larger systems. This change was required by the changing nature of the customers attracted by the new microcomputer technology. Potential customers were suddenly more interested in the applications available on such systems than in their hardware specifications or the characteristics of their operating systems or programming languages. Indeed, these new customers were unlikely to be able to write a program in even so simple a language as BASIC. Sales channels for larger systems could concentrate on informing only the potential customer's professional central site manager about system characteristics. With the advent of the personal computer, each individual user needed to be sold separately. As a result of this change in the customer base for computer products, manufacturers had to find new ways to market their products to these new consumers. This report deals primarily with the new forms of distribution which resulted from the need to sell to non-computer-specialist customers and on the additional changes which are likely to occur as distribution continues to evolve.

The purpose of this section of the report is to document the changes that have occurred in computers as well as the current state of the personal computer market. The sections that follow consider first the outlines of personal computer products and then turn to describing the way in which these products are distributed. As noted in the introduction, the available data are almost entirely based on estimates from private consulting firms which have been published in the trade press. None of the actual figures should be taken too seriously, and projections into the future are extremely speculative. Nevertheless, the various sources agree substantially in the broad outlines of the markets in question. The trends that are perhaps most noteworthy are the initial dominance of Apple computer, the recent emergence of IBM as the dominant force in the marketplace, particularly the business component of the market, the rise of chain retailers for microcomputer hardware with an attendant decline in the fortunes of traditional electronics distributors, and the continuing importance and rapid growth of the specialty computer retailers that are the chief focus of this study. These trends are well underway, but little in the personal computer market is stable for long, so that one can reliably expect some of them to moderate while new movements emerge. Each of these trends is detailed below, as are other emerging technologies that do not show up in the data, but which will likely affect the structure of the computer market in a fundamental way. These trends include the movement toward multiuser applications, either through networking or shared logic, and the increased use of either integrated or integrating software. We begin with a discussion of personal computer hardware.
CHAPTER 1. THE PERSONAL COMPUTER MARKETPLACE

1.2 Personal Computer Hardware

The market for personal computer hardware has experienced explosive growth in the past few years. The market first emerged in the mid-1970's and by 1984 had grown to an estimated level of total worldwide shipments of 7.61 million units generating sales revenues of 22.92 billion dollars. Though the sales growth of personal computers appears to have slowed recently, this appears merely to be a transient halt as consumers consolidate their resources and await a new generation of machines offering more powerful processors, increased storage, and the sophisticated software that such hardware advances will permit. When one considers that this market was basically nonexistent until the late 1970's, its current size appears nothing short of phenomenal.

The rapid growth of the personal computer market has been accompanied by explosive growth on the part of its most successful participants. Success stories abound. Apple Computer, started in a California garage, rode to success on its Apple II series of computers, and has augmented that series with its highly regarded Macintosh. Despite being announced only in late January 1984, Macintosh shipments for the year totaled 275,000 units. Other success stories are easy to find, including Tandy Corporation with its series of 8-bit TRS-80 computers and Compaq, a start-up manufacturer of IBM-compatible portable computers. Other successes were scored by manufacturers of enhancement products and software. It is ironic that these start-up manufacturers managed to thrive in the new market, even while existing computer firms either ignored the market or failed in their attempts to participate in its growth. Notable failures included the second largest computer company, Digital Equipment Corporation, and Texas Instruments, a large semiconductor manufacturer with experience in the consumer market obtained through its successful calculator business. Each of these companies, as well as a number of other established firms, appeared to possess both the technological knowledge and marketing prowess to succeed in the personal computer market. Their failures can be attributed to a tendency on the part of established computer manufacturers to rely too closely on their experience with more sophisticated products sold to very well-informed customers. The start-ups did not possess the experience of these firms, but neither were they burdened with preconceptions about the way in which to market these new products.

The one exception to this lack of success on the part of established companies was, of course, IBM, the company that has now come to dominate the personal computer market. It is noteworthy, however, that IBM's success was due in good part to the company's decision to set up its personal computer operation as an...

1Source: Dataquest, as reported in Ira Sager, "Major Suppliers Find Incompatibility with IBM, Distribution Are Big Challenges to Marketing Success," Electronics News, 30, no. 1486 (May 21, 1984), page 32. The data apply to computers priced from $1000 to $10,000, and therefore exclude home computers.

independent business unit outside the company's existing organisation. In so doing, it gave its personal computer division the advantage of being able to write its own rules for the new market, and thereby to break with existing company practices. These deviations will be of particular interest to us, both because many of involved distribution and because the growth of personal computer capabilities suggests that these marketing efforts will soon need to be reconciled with IBM's traditional sales practices for larger machines.

The growth of the personal computer market has been fueled primarily by demand from a single source, that of business users. Estimates of the share of the personal computer market devoted to consumer, educational, and business uses are shown in Figure 1.2. These estimates show that the educational and home markets have grown, but not nearly so fast as the business sector. The consequences of comparatively slow growth are most apparent in the home computer market, which has been rife with failures of major players as firms have jockeyed for position with aggressive price-cutting strategies. The costly failure of the Texas Instruments 99/4 home computer, the enormous losses and eventual sale of the Atari Division of Warner Communications, the failures of
home computers offered by Mattel, Timex/Sinclair, and, recently, Coleco, and, at the high end of the market, the disappointing initial sales performance and eventual production shutdown of IBM's PCjr model all suggest that the home market awaits a demonstration of the utility of these machines in a home setting. In the business market, however, the usefulness of personal computers is undeniable, as spreadsheet software has served to automate a number of laborious tasks which were previously carried out with pencil and paper. In addition, the newer generation of personal computers are permitting software vendors to write word-processing programs which are the equal of those available in dedicated systems. Using these programs one obtains a capable word processor which can also be used in the firm's financial planning and accounting decisions. Finally, new software is becoming available which extends the personal computer into areas beyond the customary big three applications of spreadsheets, database management, and word processing. This new software includes project scheduling packages, enhanced communications packages to permit access to data resident on much larger computers, and programs to prepare graphics suitable for presentation as part of sales efforts and company management decisions. As a result of this growth in the availability and power of software, the demand for personal computers in business is likely to continue to grow rapidly.

In addition to the home and business markets, the educational market represents a major source of demand for computer products, one which possesses the potential to rival the rapid growth in the business market in the upcoming decade. As one example, IBM's recent announcement of upgrades in its PCjr model was accompanied by the announcement of its Writing-to-Read program, an educational program targeted at the lower grades of elementary schools. This announcement, coupled with the announcement of a PCjr cartridge version of the popular business program, Lotus 1-2-3, suggests IBM decided to shift its focus away from its initial home market target prior to giving up on the machine altogether. IBM's interest in educational users, a market which has proven to be very significant for IBM's rival, Apple Computer, should be especially troubling to that company. But the main lesson from this experience is that computers that do not compete successfully for business customers are unlikely to experience long term success, absent some major advance in home computer applications. Apple's recent office introductions and the new business-oriented computers announced by traditional home computer vendors Atari and Commodore show that this lesson has been taken to heart by the industry.

The focus of this report will be on business users, the purchasers of more expensive microcomputer systems. The choice of emphasis is due in part to the importance of business use of personal computers shown in figure 1.2. More importantly for our purposes, sales to business users, especially small business purchasers, often occur through retail stores, many of which can themselves be classified as small businesses. In contrast, many, though certainly not all of the sales to the educational market are made directly by the manufacturers, while sales to the home sector have been dominated by mass merchandisers. From
a small business distribution perspective, the business sector is clearly the one of greatest interest. These characteristics of distribution are surveyed in much more detail below.

Turning once again to the characteristics of the personal computer hardware market, by far the most dramatic change that has occurred in this market is the growth of IBM from new entrant to dominant player in a very short time. The first IBM Personal Computer was introduced on August 12, 1981, four years after the first useable microcomputers from Apple, Commodore, and Tandy/Radio Shack. IBM thus had to overcome the lead of those other machines in terms of software. IBM’s machine was incompatible with those earlier machines. Each of its three leading rivals offered proprietary operating systems that IBM could not copy. It could have employed the CP/M operating system, the standard on virtually all other 8-bit systems apart from those of the three leaders, but it chose not to do so. Instead, IBM introduced a 16-bit computer and a new operating system written for it by MicroSoft, a small Seattle software vendor. IBM’s computer used a non-standard “bus” to handle communications between the Intel 8088 microprocessor it employed and the other components of the computer with which that microprocessor needed to communicate. The new computer employed something less than frontier technology, but did possess the ability to address (access) much more memory and hence support larger programs than its earlier rivals. At the time of the IBM PC’s introduction, many commentators expressed disappointment that the new machine did not go farther in introducing new technology. It seemed that the new machine was not sufficiently advanced in comparison to its existing rivals to offset the disadvantages caused by its incompatibility with existing software.

If the technology at the heart of the IBM PC was not considered particularly innovative, the way in which that technology was packaged and sold represented a remarkable break from IBM’s past. First, the operating system could have been made proprietary. It was not. The package marketed by IBM as PC-DOS was offered in almost identical form by MicroSoft as MS-DOS. This was in marked contrast to IBM’s careful, control of its various mainframe operating systems. Even more remarkable was its decision to publish the complete specifications of its ROM (read-only memory) service routines. Knowing how the PC handled the input and output of data made it easier for software designers to write programs for the computer, but also made it easier for rival computer manufacturers to emulate the IBM machine. This decision made possible the large number of IBM compatible machines that were soon offered for sale. But of all the surprising decisions made by IBM as part of its PC introduction, none was more radical than its decision to pursue a variety of marketing channels, as opposed to selling through IBM’s established and highly regarded sales force. IBM’s strength in the corporate sector had long been attributed to its

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9The IBM PC introduction is chronicled in many sources. See, for example, Chris Devoney and Richard Summe, IBM’s Personal Computer, Indianapolis: Que Corporation, 1982, page 1ff.
considerable marketing prowess. Though it would sell its PC through its existing salesforce, IBM suddenly broadened its marketing to include not only other large outside firms such as Sears, but also a large number of existing, but quite small specialty retailers.

The success of IBM's decisions is readily apparent. When the PC was introduced, Apple Computer purchased advertising welcoming IBM and treating its entry as certifying the personal computer as having arrived as a serious business tool. Tandy Corporation treated IBM's entry as nothing more than another entrant to an already crowded market. But just two years later, Business Week ran a feature story entitled "Personal Computers: And the Winner Is IBM." The accompanying charts give ample evidence to support that assessment.

Figure 1.3 illustrates estimates of IBM's share of the office personal computer market for both 1982 and 1984. IBM's ability not only to overtake the previous leader, Apple, but to leave that rival far in its wake is simply remarkable. A measure the domination of IBM is provided by the estimate that IBM-compatible Compaq was able to obtain a market share of almost half of that of Apple simply by providing a well-designed product that fit with the IBM family. Data from a separate source are shown in figure 1.4. These Infocorp estimates display the same pattern of a computer market divided between Apple and IBM, with IBM rather decisively in the lead. Again, the only other major survivor was Compaq, which survives because it was able to offer several advancements over IBM's products at a competitive price. Most other compatibles have not proven so adept—or so successful. The important point from Figure 1.4 is that the IBM-set standard now apparently accounts for over one-half of the microcomputer marketplace.

Figure 1.5 presents one additional view of how the marketplace is divided. This chart refers to 1983, and so therefore understates the extent of IBM's current market success. In contrast to the earlier figures which apply to the U. S. market, Figure 1.5 covers worldwide sales. The picture at that level is, however, much the same. IBM leads with Apple as its principal competitor. This figure indicates that the Japanese have become a force in world markets, but as we shall see, their success is less than might have been anticipated, given their success in other manufactures. Victor ranked fourth on the strength

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6Apart from Compaq, significant compatibles manufacturers include Columbia, Corona Data Systems, Zenith, and, recently Tandy/Radio Shack. Columbia and Corona machines have become less common in computer retail stores both because IBM has widened its distribution network to include many outlets that had previously had to rely on compatibles and because these firms have entered into alliances with manufacturers of larger computers such as Honeywell and Phillips. Zenith has chosen to compete by offering attractive prices to government and university computer users.
Figure 1.3: Office Personal Computer Market Shares (Future Computing)

U. S. market only.
CHAPTER 1. THE PERSONAL COMPUTER MARKETPLACE

Figure 1.4: Office Personal Computer Market Shares (Infocorp)

Source: Infocorp, as reported in the New York Times, August 15, 1984, p. 29.
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Figure 1.5: Worldwide Personal Computer Market Shares

- Apple 18.4%
- IBM 20.6%
- NEC 6.8%
- Victor 3.9%
- Tandy 3.7%
- DEC 3.6%
- HP 2.9%
- Fujitsu 2.5%
- Sharp 2.4%
- Sord 2.1%
- Olivetti 1.8%
- Compaq 1.7%

Worldwide sales: $10.1 Billion

Source: Dataquest, as reported in Electronics News, May 21, 1984, p. 39
of a machine similar in capability to the IBM PC that achieved considerable success in Europe. The company has since faltered, however. Of the remaining competitors, only Hewlett-Packard and Olivetti have shown staying power, the latter through its strong presence in Europe and its alliance with A.T.& T. The lack of market penetration by Japanese manufacturers is also noteworthy, although these firms may be able to enter through marketing arrangements with U.S. manufacturers of larger systems, such as the BUNCH (Burroughs, Univac (now Sperry), NCR, Control Data, and Honeywell) Sperry is already offering a microcomputer manufactured for it by Mitsubishi.

The market shares shown in Figures 1.3–1.5 are based on computers sold primarily to business. IBM’s penetration into the home and education markets has not been as impressive, in part because of the lack of an established reputation in those markets and in part because those markets require very different forms of distribution. Some measure of the variations of IBM’s success in these various markets is provided by the distribution of its personal computer sales by product line. This distribution is illustrated in Figure 1.6. Clearly, IBM’s sales are now dominated by the PC and PC/XT; its machines directed at the business
market. The PC/AT is a new model directed at relatively sophisticated personal computer users, primarily business users. The PC 3270 and the XT/370 are both machines which need to be linked to IBM mainframes in order to be useful. The portable is not particularly successful, primarily because Compaq offers a very compatible and greatly superior product. Only the PC jr is directed at non-business markets, and even in the case of this machine, its success was very limited until IBM increased its ability to run business programs written for the PC and XT.

Within the business market, IBM's dominance is far from uniform across classes of users. The business sector exhibits a considerable amount of diversity. Customers range in size from individuals and very small businesses to the Fortune 1000. The manufacturers of personal computers have experienced very different degrees of success in selling to these different classes of businesses. The market for computers at the largest concerns has come increasingly to be dominated by IBM. This dominance is illustrated in Figure 1.7. The rise of IBM and the corresponding fall of Tandy and Apple can be attributed in part to the superiority of the IBM product, as is indicated by the concurrent success of Compaq, the IBM compatible portable computer manufacturer. But much of the reason for IBM's success must be attributed to the manner in which IBM computers are sold. The initial penetration of Apple and Tandy machines occurred primarily on a single machine basis. Users discovered that they could perform their jobs more effectively if they had at their disposal computing power that broke their dependence on a central data processing operation. But as corporations moved to rationalize the microcomputer purchasing process, it was natural for the DP shops to participate more actively in the selection process, and there IBM's influence was pervasive.

It is nevertheless true that access to the DP manager was not a sufficient condition for success. The Digital Equipment Corporation is the second largest computer manufacturer and has a very large installed base of PDP-11 and VAX-11 minicomputers. DEC was nonetheless unsuccessful in its efforts to market a microcomputer. Its Rainbow line was well received by critics but failed to will the attention of retailers. It has since been dropped from production. Given that DEC's access to DP managers did not guarantee its success, one might well concluded that IBM's much better experience was a combination of its natural advantage in large corporations combined with its successful use of independent dealers to reach a larger market.

One final aspect of IBM's dominance of the personal computer market is shown in Figure 1.8. This figure illustrates what has been termed IBM's pincers attack on its rivals in the minicomputer market. IBM's long-term dominance in the mainframe market is now accompanied by its new-found domination of the personal computer segment. In between these segments is the minicomputer.

1The Rainbow was noted in Popular Computing magazine's "Most Underrated Computer" category. See also the Rainbow review in Byte magazine, April 1984, p. 170.
Figure 1.7: Percent of Fortune 1300 Companies Using Micros from Major Manufacturers

Figure 1.8: IBM Market Share by Type of Computer

Source: International Data Corporation, reported in *New York Times*, January 20, 1985, p. 8F.
segment. Here rivals such as DEC, Data General, Prime, Wang, and other have been able to carve out substantial amounts of business selling multiuser systems that were easier to use, install, and supervise than IBM mainframes, but which permitted considerably more flexibility in applications than personal computers. This segment is under pressure both from above and below as IBM introduces less expensive versions of its mainframe VM systems and as personal computers become more powerful. We will argue below that new personal computers will provide functions much like those currently offered by minicomputers. Hence much of the battle for market share in the future may involve competition between the marketing methods employed for personal computers and those employed by the minicomputer vendors.
Figure 1.9: Sales of Personal Computer Hardware and Software

1.3 Personal Computer Software

Most computer users have little reason to be concerned with the personal computer hardware that they acquire apart from questions of whether that hardware will run software suitable for their planned application. As a result, while software is less expensive than hardware, the availability of capable, easy-to-use software is perhaps more important to the success of a computer manufacturer than the manufacturer's own design decisions regarding hardware. It is surely true that very sophisticated, yet reasonably priced systems have failed to penetrate the market simply because they failed to attract the attention of enough software designers. Hence, software production and marketing plays a role in the computer market that is out of proportion to its share of personal computer-related expenditures.

The importance of software relative to hardware in dollar terms is illustrated in Figure 1.9. According to the Future Computing estimates in this figure, software sales have been growing more rapidly than hardware sales, both in the business and in the home markets. This can be explained in part by the
increased capability of personal computer systems. The more capable systems require more elaborate, more expensive software to access that capability. In addition, sales of software are rising as additional applications are developed. A third factor contributing to the increasing share of software in personal computer expenditures is the comparatively slower progress of the technology of software production. Newer hardware means that software need not be so carefully crafted as previously to fit within memory constraints and advances have been made in software development tools. These advances, while significant, still fall far short of progress in hardware.

Figures 1.10 and 1.11 provide two views of the relative importance of various applications in the business software market. There is a rather large disparity in these estimates. They nevertheless point out quite clearly the various tasks at which personal computers have proven most adept. One of these, word processing, was previously accomplished either with nothing more than a typewriter or, alternatively, with a dedicated word processing system. The availability of powerful word processing packages for general purpose personal computers has lead to a decline in the importance of traditional word processing vendors.
Figure 1.11: Business Software Sales by Type of Software

such as Lanier and A. B. Dick which has been accompanied by lost business for their typical distributors, often office equipment dealers. The second major task, spreadsheeting (now done primarily with integrated graphics, database, and, occasionally, word processing and communications functions) was done manually prior to the personal computer revolution. The third, database management, is a migrant from larger computer systems. Each of these tasks brought a different set of customers to the microcomputer market, and accordingly each placed a different set of demands on microcomputer distribution.

We will consider new developments in software and software marketing below in the section devoted to integrated software. For the time being, it suffices to outline the shape of the software market. Table 1.1 provides a guide to the current state of the market in the form of the ten best-selling programs as compiled by a leading software distributor, Softsel.

This list is a bit misleading, since it does not include products which are sold directly to dealers, products such as PC-DOS, the operating system for the IBM PC. The list is nevertheless a good guide to applications software.

Two of the top three items are products based on spreadsheets. The Lotus Development Corporation products, Lotus 1-2-3 and Symphony, are runaway success stories, but they illustrate the highly competitive nature of the software market. These products are successors to the original spreadsheet product, VisiCalc. A product of Software Arts, VisiCalc was marketed by VisiCorp, a company which experience enormous success with the product but which could not follow it with a more capable version. Given the lead which VisiCalc had established in the marketplace, it is surprising that it was so rapidly and totally eclipsed by Lotus 1-2-3. But this experience does offer hope to firms which would like to overtake Lotus' current leading position.

The second package on the list, Sidekick, is a program that makes the IBM PC appear able to do more than one thing at once. It provides a notepad, calculator, calendar, and other functions which are easily accessed from within a program that the PC is currently running. Sidekick’s popularity is an indication that consumers will respond favorably to multitasking operating systems soon to be available in the personal computer marketplace.

With the exception of a tax program, the remaining programs on the list are either word processing programs (Word Perfect, Word, pfs:Write, and MultiMate) or database managers (dBase III, pfs:File). The word processing programs also illustrate the fleeting nature of success in the personal computer software market. The long-time leader, Wordstar, has disappeared from the list. Only in the database category is the current leader, Ashton- Tate, a long-term leader in its category. The word processing results also illustrate the power of the personal computer. The leading program, MultiMate, achieved its status by copying the functioning of a popular dedicated word processor offered by Wang Laboritories.

The programs on the list differ in the amount of support necessary for successful use by end customers. The Software Publishing pfs series has achieved
Table 1.1: Best-selling Business Software Titles, December 1984

<table>
<thead>
<tr>
<th>Rank</th>
<th>Program Title</th>
<th>Manufacturer</th>
<th>Software Classification</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Lotus 1-2-3</td>
<td>Lotus Development</td>
<td>Integrated Spreadsheet</td>
</tr>
<tr>
<td>2</td>
<td>Sidekick</td>
<td>Borland International</td>
<td>Desk Organizer</td>
</tr>
<tr>
<td>3</td>
<td>Symphony</td>
<td>Lotus Development</td>
<td>Integrated Spreadsheet</td>
</tr>
<tr>
<td>4</td>
<td>dBase III</td>
<td>Ashton-Tate</td>
<td>Database Manager</td>
</tr>
<tr>
<td>5</td>
<td>MultiMate</td>
<td>MultiMate International</td>
<td>Word Processing</td>
</tr>
<tr>
<td>6</td>
<td>pfs:Write</td>
<td>Software Publishing</td>
<td>Word Processing</td>
</tr>
<tr>
<td>7</td>
<td>Tax Preparer '85</td>
<td>Howardsoft</td>
<td>Tax Preparation</td>
</tr>
<tr>
<td>8</td>
<td>pfs:File</td>
<td>Software Publishing</td>
<td>Database Manager</td>
</tr>
<tr>
<td>9</td>
<td>Word Perfect</td>
<td>Satellite Software</td>
<td>Word Processing</td>
</tr>
<tr>
<td>10</td>
<td>Microsoft Word</td>
<td>Microsoft</td>
<td>Word Processing</td>
</tr>
</tbody>
</table>


Note: These figures are based on Softsel's product shipments. As a result, packages such as the PC-DOS/MS-DOS operating system are not included, as these packages are bundled with shipped directly to dealers by personal computer manufacturers. Products such as Sidekick that have significant direct sales may have shipments understated.
its success in good part because of the ease of use of these programs. None is particularly capable in comparison to rivals, but all offer a consistent and easily mastered user interface. In contrast, dBase III is extremely difficult to master, and is ordinarily purchased by consultants who adapt the program to particular applications. The Lotus programs are also fairly hard to use and have generated a lively aftermarket in training items and templates to guide their use. For most of these items, one can suspect that a consumer will be unable to make an intelligent choice without sampling the products extensively and receiving guidance from trained sales personnel.

In summary, the software market is at least as dynamic and unstable as the market for personal computer hardware. Software distribution has had to cope with the problem of explaining to consumers the ability of software packages to help in applications such as spreadsheeting which were not even imagined prior to the development of personal computers. In the case of word processing, the distribution channels have had to attract customers away from office equipment vendors accustomed to providing services to their customers. In the case of database management, the distribution system has had to cope with the need to customize off-the-shelf packages for particular needs. Added to all of these tasks is that of linking the various applications together, or at least ensuring that applications programs did not interfere with one another. Personal computers will one day be very easy to use, almost like common household appliances. The current state of software falls far short of this ideal, however, with the result that informational demands placed on the software distribution system are very substantial.
1.4 An Overview of Distribution in the Personal Computer Market

Within the market research community there is little agreement about even the broad characteristics of distribution of the personal computer market. The reason for this disagreement is suggested by a table heading in a story appearing in *Mini-Micro Systems*, "Everyone Wants to Sell Computers." The number of channels used for personal computer sales is so large and the relative success of these channels so variable that an accurate assessment of the personal computer distribution system is not available from any source. The broad outlines of personal computer distribution are nevertheless sketched by the rough census provided in the *Mini-Micro Systems* table, reproduced below as Table 1.2.

---

### Table 1.2: Computer Distribution Channels

<table>
<thead>
<tr>
<th>Sellers</th>
<th>Number of Companies</th>
<th>Number of Products</th>
<th>Notes, Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer system manufacturers</td>
<td>600</td>
<td>2064</td>
<td></td>
</tr>
<tr>
<td>Mainframes</td>
<td>21</td>
<td>174</td>
<td><em>Data Source,</em> January 1984</td>
</tr>
<tr>
<td>Minicomputers</td>
<td>79</td>
<td>280</td>
<td>(some firms may offer</td>
</tr>
<tr>
<td>Microcomputers</td>
<td>311</td>
<td>666</td>
<td>more than one operating</td>
</tr>
<tr>
<td>Others</td>
<td>372</td>
<td>944</td>
<td>system)</td>
</tr>
<tr>
<td>Software Manufacturers and</td>
<td>3500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publishers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating/development/</td>
<td></td>
<td>4135</td>
<td></td>
</tr>
<tr>
<td>DBMS/utilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Applications</td>
<td></td>
<td>14363</td>
<td></td>
</tr>
<tr>
<td>Wholesale distributors</td>
<td>150-200</td>
<td></td>
<td><em>Mini/Micro Systems</em></td>
</tr>
<tr>
<td>Specialty Computer Dealers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturer-owned locations</td>
<td>633</td>
<td></td>
<td><em>Future Computing,</em></td>
</tr>
<tr>
<td>Retail-chain locations</td>
<td>383</td>
<td></td>
<td>Jan. 23, 1984</td>
</tr>
<tr>
<td>Franchised locations</td>
<td>797</td>
<td></td>
<td>(excludes Radio Shack stores)</td>
</tr>
<tr>
<td>Independent computer stores</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple-location stores</td>
<td>599</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-location dealers</td>
<td>740</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass Merchandisers</td>
<td>25000-30000</td>
<td></td>
<td><em>Future Computing,</em></td>
</tr>
<tr>
<td>Department and discount store sites</td>
<td></td>
<td></td>
<td>July 1983</td>
</tr>
<tr>
<td>Office-equipment Dealers</td>
<td>6000-10000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value-added resellers</td>
<td>3000-6000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systems houses, OEM's</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mail-order operations</td>
<td>150-200</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Table from *Mini/Micro Systems*, June 1984, p. 158.
These figures can be taken as no more than rough approximations of the actual numbers of participants in the various segments. To illustrate the uncertainty associated with these figures, consider the large divergence in estimates of numbers of participants computed by several of the market research firms that specialize in tracking the personal computer market. Future Computing, Inc. (Future) estimates that there are 97 hardware distributors and 23 software distributors. Creative Strategies, Inc. (CS) places the total number of distributors (hardware and software) at 400, while International Resource Development, Inc. (IRD) puts the figure at 1000. Future counts a total of 3152 personal computer retailers. In contrast, IRD counts 4000 personal computer sellers in the $1000 and up segment of the market alone. CS counts 7000 firms in that same segment. To these figures must be added the under $1000 market segment, estimating as containing 8,000 participants by CS and 18,000 by IRD. Some of the disparity in these estimates comes from category definitions. It is apparent that Future’s estimates would more closely track the others if value-added resellers and mass merchandisers were included. Even were such adjustments made, substantial disagreement would remain.

The disparity in these estimates makes it clear that the available market research data are likely to do no more than illuminate the broad outlines of personal computer distribution. In the remainder of this section, we will take the data at face value, so that this caveat should be kept in mind. What is clear is that the participants in the distribution of personal computer products are many and varied, and range from operations controlled by very large firms to small dealers, distributors and systems houses. Due to the number of layers of distribution in the marketplace, layers which often overlap, there is no unambiguous way in which to characterize the relative importance of the various channels employed. Figure 1.12 illustrates the division of manufacturer shipments by distribution channel. Clearly, the largest share of these shipments passes through the hands of distributors on the way to further remarketers, but just as clearly, there are more direct channels available should the wholesale distributors prove inadequate in the manufacturer’s view.

These alternatives differ dramatically in the amount of services provided by the channel’s participants. Nearly one-eighth of the shipments of manufacturers go directly to end users. In some cases, these sales may be made by manufacturer-operated retail outlets which mimic the functions and services provided by independent dealers (generally small businesses), while in other instances, the end-user is expected to provide all of the necessary support. In the latter case, the manufacturer provides nothing more than its product together with appropriate documentation, and the user is left to integrate the product with other available computer resources. Some manufacturers employ both of these distribution techniques simultaneously for different parts of their product.
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Figure 1.12: Manufacturer Shipments of Personal Computer Equipment by Distribution Channel

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lines. For example, IBM markets its personal computer lines through company-operated product centers, outlets essentially identical in structure and function to conventional computer retailers. In contrast, the IBM 3270-PC is marketed directly to end-users by the IBM National Accounts Division, and end-users, primarily sophisticated data processing managers with access to IBM mainframe computers, are expected to handle any problems of interfacing the equipment with their systems.

Another alternative distribution method available to manufacturers is the channel known alternatively as OEM (original equipment marketers), systems houses, value-added remarketers, and value-added resellers. Although there are significant differences within this channel, the general characteristic of these firms is that they package the manufacturer's products with appropriate peripherals and software and target the resulting packages at particular classes of applications. The differences in these firms are primarily in the degree of customisation they undertake. At the low end of the spectrum, these firms merely package off-the-shelf products in a convenient fashion, and thereby vary little from conventional dealers. More sophisticated marketers engage in extensive software development for the particular application at hand. In some instances, the manufacturer's brand name may be superceded by that of the OEM, so that the manufacturer's role is simply the design and production of hardware to serve as an efficient platform for the software to run on it. The value-added resellers (VAR's) channel is currently the preferred channel for sales of small multiuser computer systems. According to estimates computed by Applied Digital Data Services, VAR's in 1983 accounted for 60% of sales of multiuser systems in the $15,000-30,000 range. The remaining 40% of such systems were accounted for by direct sales by manufacturers.10 This is an important segment not so much in dollar terms as in its significance for personal computer retailing in the future. As personal computers are linked in future systems involving local area networks and file servers, they will come more closely to resemble the multiuser systems that VAR's have been so successful at selling. It is therefore important to consider what factors have led to this success. We return to this point below in the section on multiuser systems.

More is known about the focus of this study, the personal computer specialty retailers. The growth of such retailers has paralleled that of the personal computer industry generally. In other words, it has been nothing short of spectacular, as illustrated in Figure 1.13. These retailers have become the most important distribution channel both for hardware and for software. As Figures 1.14 and 1.15 illustrate, these retailers account for approximately half of both hardware and software sales to final consumers. But while the specialty retailers have experienced very similar success in these two market segments, their competition comes from different sources. In hardware, the principal alternative

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Figure 1.13: U.S. Computer Specialty Retail Stores

Figure 1.14: Personal Computer Sales by Distribution Channel—Hardware

Figure 1.15: Personal Computer Sales by Distribution Channel—Software

channels are manufacturer-direct sales and value-added resellers. In software, both software stores and mail-order firms are more important than these two channels. These differences will be interpreted below as arising from different pre-sale information problems in these two segments. The manufacturer-direct and VAR channels represent alternative methods of conveying information to potential consumers, methods which may be more informationally efficient, especially for relatively high-end systems. The situation in software is different. Mail-order retailers provide no-frills service. Their software customers cannot test the software prior to purchase and so must have investigated it elsewhere, either by trying the packages of other users or by sampling the software at specialty retailers before placing their orders. Thus, mail-order outlets represent a classic case of the free-rider problem. Software stores are similar in that they do not generally offer facilities for demonstrating software.

The specialty retail sector is by no means homogeneous. Specialty retailers were initially either independent businesses or members of the Radio Shack chain of stores owned by Tandy Corporation. Soon, however, there were moves to consolidate product selection and support duties that were previously handled independently by each outlet or by wholesale distributors by instead organizing the specialty retailers into chains. In addition, a number of manufacturers, observing the success of Tandy and the nascent state of the rest of microcomputer distribution, decided to open outlets of their own. In general, one can conclude that the movement towards chain retailing has been very successful, but that the manufacturer-owned stores have fared less well. It thus appears that while specialty retailers are finding it difficult to survive as independent entities, the marketplace nonetheless requires that store managers be able to act independently and to incur responsibility for their actions.

Table 1.3 displays Fortune estimates of the number of chain franchisees and manufacturer-controlled retailers for the leading 10 multioutlet retailers.

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See Section 1.4.1 and 1.4.2 below for a more detailed discussion of the difficulties of selling through manufacturer-operated retail stores.
### Table 1.3: Leading Computer Retail Chains

<table>
<thead>
<tr>
<th>Store Name</th>
<th>Number of Stores</th>
<th>Parent Company</th>
<th>Principal Brands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio Shack</td>
<td>1114</td>
<td>Tandy Corp.</td>
<td>Tandy/Radio Shack</td>
</tr>
<tr>
<td>ComputerLand</td>
<td>0 509</td>
<td>ComputerLand Corp.</td>
<td>Compaq, DEC, IBM, Texas Instruments</td>
</tr>
<tr>
<td>Entré</td>
<td>1 150</td>
<td>Entré Computer Centers</td>
<td>Compaq, Grid, IBM, Televideo</td>
</tr>
<tr>
<td>Valcom</td>
<td>50 72</td>
<td>Valmont Industries</td>
<td>Compaq, IBM</td>
</tr>
<tr>
<td>Team Electronics</td>
<td>9 83</td>
<td>Team Central</td>
<td>Apple, Columbia</td>
</tr>
<tr>
<td>IBM Product Center</td>
<td>79 0</td>
<td>IBM Corp.</td>
<td>IBM</td>
</tr>
<tr>
<td>Control Data Bus. Ctr</td>
<td>55 0</td>
<td>Control Data Corp.</td>
<td>Hewlett-Packard, Wang, Zenith</td>
</tr>
</tbody>
</table>


**CHAPTER 1. THE PERSONAL COMPUTER MARKETPLACE**

Table 1.2, continued

<table>
<thead>
<tr>
<th>Store Name</th>
<th>Number of Stores</th>
<th>Principal Brands</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parent Company</strong></td>
<td><strong>Company Owned</strong></td>
<td><strong>Franchised</strong></td>
</tr>
<tr>
<td>MicroAge</td>
<td>1</td>
<td>53</td>
</tr>
<tr>
<td>MicroAge Computer Stores</td>
<td></td>
<td>Altos, Apple, Compaq, DEC, IBM, Corona, Hewlett-Packard TeleVideo</td>
</tr>
<tr>
<td>Digital Business Ctrs</td>
<td>52</td>
<td>0</td>
</tr>
<tr>
<td>Digital Equipment Corp.</td>
<td></td>
<td>DEC</td>
</tr>
<tr>
<td>Sears Business Systems</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compaq, IBM</td>
</tr>
</tbody>
</table>


Note:
The Radio Shack total includes electronics stores that sell a full line of Tandy/Radio Shack computers. These data are for March 1984 and include all chains with fifty or more locations as of that time. Several changes in this information have occurred since that time. Apple computer has reestablished its central purchasing arrangement with ComputerLand and is also sold by Sears Business Systems Centers. Several of these chains have agreed to market computers manufactured or marketed by A. T. & T., thereby providing an alternative business computer system to IBM. Control Data has joined Xerox in abandoning its company-owned distribution. Finally, a number of mergers and ownership changes have occurred. There are almost certainly more large chains than those reported in these data.
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Figure 1.16 presents Future Computing estimates that correspond closely to the Fortune numbers with the exception that Future apparently requires a higher degree of computer involvement before it will count a Radio Shack store as a computer store. It is apparent that ComputerLand is by far the most successful chain. ComputerLand’s growth as well as that of other newer and aggressive rivals (Inacomp, Entre, MicroAge, Businessland) has been spectacular.

One might ask whether it matters if retailers are organized as chains or as independent retailers. It does matter, for several reasons. First, one of the roles of the chain is to provide what is basically a wholesale distribution function for its franchisees. Thus ComputerLand has central purchasing agreements with many manufacturers of both hardware and software. ComputerLand does not require that its franchisees purchase from the chain, but its financial terms make it attractive for them to do so. This means that the success of the chains results not only in a change at retail, but also in a corresponding decrease in the importance of more traditional independent electronics distributors. This has been particularly true in hardware, where manufacturers have generally preferred to deal directly with dealers or their franchisors. Manufacturers who have dealt with distributors appear to have been less successful in arranging acceptable distribution. A primary case in point is Digital Equipment (DEC). DEC chose to distribute its Rainbow personal computer primarily through an agreement with hardware distributor Hamilton/Avnet, but eventually found it had to abandon retail distribution altogether. Certainly a part of DEC’s poor performance can be attributed to design misconceptions, but a portion must be laid to the dealer dissatisfaction with this distribution mode. Indeed, as noted above, reviews of the DEC machines accorded them a fair amount of praise. Given the size and sophistication of DEC, its failure to penetrate the microcomputer marketplace must be attributed as much to distribution shortcomings as to shortcomings of the products themselves. The DEC experience suggests that the success of chains may well be due to shortcomings of the hardware distributors as an alternate method of distribution.

The second reason that the increasing success of retail computer chains is of importance is that manufacturers differ significantly in their reliance on independent retailers. When IBM first introduced its Personal Computer, it relied heavily on ComputerLand and its own Product Centers for distribution. While IBM has expanded its distribution greatly, it still remains a mainstay of the chain retailers. In contrast, Apple Computer depends much more heavily on independent stores. Figure 1.17 illustrates this dependence for Apple’s relatively sophisticated Macintosh line. Though there is considerable simultaneity between the success of the chains and that of IBM, it is nonetheless important to consider if there are other factors which have contributed to chain success independent of their ties with IBM. We shall see that other factors of importance appear tied to the ability of the chains to exercise tighter distribution controls that those possible with the combination of hardware distributors and independent dealers.
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Figure 1.16: Computer Specialty Chains

- Computerland: 509
- Radio Shack Computer Ctr.: 430
- Enter Computer Center: 151
- Valcom Computer Center: 108
- Team Electronics: 84
- IBM Product Center: 83
- Heathkit Electronic: 65
- Sears Business Systems: 60
- Control Data Business Ctr.: 80
- MicroAge: 53

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Figure 1.17: Macintosh Store Sales Mix

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One more illustration of the difference in importance of the chains and independent retailers to various manufacturers is shown in Figures 1.18 and 1.19. These figures show that while Apple is the mainstay of independent stores, IBM-manufactured computers dominate at the franchised outlets of the chains. These estimates should be treated with particular caution, since IBM has widened its distribution coverage by authorizing a number of new independent outlets. IBM introduced its personal computers primarily by using ComputerLand, the leading specialty retail franchisor as well as large retailers such as Sears. It used a limited number of independent stores early on, but more recently has sold some of its products through outlets which would not previously have qualified under IBM-established authorized dealer standards.

One final way of viewing the personal computer distribution system is to consider the relative importance of various classes of customers to the competing distribution channels. Figure 1.20 illustrates customer-class shares for three of the most significant distribution channels. The left-hand bar in this chart shows that the bulk of the sales of the distributors are channeled through computer retailers including both independents and franchisees of the chains. A small share of sales of distributors is accounted for by OEM's. In most cases, the products moving in this manner would be hardware manufactured by small firms with little brand-name recognition in the user community. Their products are intended to be resold by the OEM/systems house under the label of the remarketer. Other OEM sales consist of more well-known products, but such sales will often be handled directly by the manufacturer as, for example, under the IBM value added reseller program.

The estimates of dealer-retailer shares for distributors include sales both to specialty retailers and sales to mass marketers and mail-order firms. In general, one can expect that the products sold directly to dealers by manufacturers are less likely to be offered in alternative lower-margin distribution channels than are those items which are handled by the distributors. Thus, it is likely that manufacturers of relatively sophisticated products with brand recognition will increasingly eschew distributors.

The center bar in Figure 1.20 illustrates that computer dealers are a particularly important outlet for small and medium sized businesses. These businesses constitute an important market for computer equipment, but in general do not possess the technical sophistication and data processing personnel necessary for them to deal directly with the manufacturers. The larger firms in the Fortune 1000 do operate large data processing centers of their own, and have often tended to control microcomputer acquisitions through these operations. Sales of specialty dealers to Fortune 1000 firms are often sales to individuals within those firms who have become disenchanted with the ability of their data processing departments to address the user's particular applications needs. The customers are therefore much like the small and medium business users who the specialty dealers have successfully addressed.

The final bar in Figure 1.20 shows that the markets of consumers electron-
Figure 1.18: Leading Personal Computers Sold by Independent Stores

Figure 1.19: Leading Personal Computers Sold by Franchised Stores

<table>
<thead>
<tr>
<th>Model</th>
<th>Average Units Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM PC (59)</td>
<td></td>
</tr>
<tr>
<td>Apple IIe (82)</td>
<td></td>
</tr>
<tr>
<td>IBM PC-XT (55)</td>
<td></td>
</tr>
<tr>
<td>Kaypro 11/4 (5)</td>
<td></td>
</tr>
<tr>
<td>Compaq (80)</td>
<td></td>
</tr>
<tr>
<td>Eagle PC (7)</td>
<td></td>
</tr>
<tr>
<td>Franklin 1000/1200 (11)</td>
<td></td>
</tr>
<tr>
<td>HP 150 (16)</td>
<td></td>
</tr>
<tr>
<td>Epson QX-10 (28)</td>
<td></td>
</tr>
<tr>
<td>Corona PC (4)</td>
<td></td>
</tr>
<tr>
<td>TI Pro (31)</td>
<td></td>
</tr>
<tr>
<td>DEC Rainbow 100 (44)</td>
<td></td>
</tr>
<tr>
<td>AppleLisa (4)</td>
<td></td>
</tr>
<tr>
<td>IBM PCjr (59)</td>
<td></td>
</tr>
<tr>
<td>Columbia MPC/VP (22)</td>
<td></td>
</tr>
</tbody>
</table>

CHAPTER 1. THE PERSONAL COMPUTER MARKETPLACE

Figure 1.20: Customer Shares by Distribution Channel

ice stores and mass merchandisers differ significantly from those served by the
specialty retailers. The primary target of these firms is the home market, and
the products they offer are therefore relatively unsophisticated, requiring little
explanation for use. There is some overlap in the small business sector, but it
is slight in that most small business users will require assistance in formulating
purchase decisions beyond that offered by the mass merchandiser channel.

This completes the overview of distribution channels. In the remaining sec-
tions of this chapter, we consider selected distribution channels in considerably
more detail. Our attention is focused on two cases of manufacturer-operated
distribution systems. These systems have been generally conceded to be fail-
ures. The point of discussing them is to show that at least within the specialty
retail distribution channels, the choice for manufacturers is between chains and
independents—the company-controlled distribution so characteristic of other
types of computer equipment does not appear to be effective in reaching poten-
tial purchasers of small business and home personal computers.

1.4.1 IBM Product Centers

The introduction of the IBM Personal Computer was accompanied by a good
bit of marketing experimentation on the part of IBM. The company was, of
course, rightfully celebrated as a master marketer of its mainframe computer
products, but the PC was a very different kind of product, requiring different
marketing strategies than the company had previously employed.

IBM's response to the need to develop new marketing methods was to adopt
a wide variety of marketing techniques. Its own national sales force was given
the PC with the mandate of selling it to IBM's entrenched customer base. IBM
also pursued sophisticated software firms to serve as value added remarketers of
the PC. These firms bundled the PC with considerable quantities of software de-
digned for carefully targeted applications and sold the resulting bundle on their
own. IBM also developed a large representation in high-quality retail com-
puter dealer operations. Its products were sold initially by the well-established
ComputerLand chain, and later by other chains such as Entré, MicroAge, and
Businessland. IBM also offered the PC to single location dealers, provided that
they met standards for product support. In addition to these specialty retailers,
IBM agreed to market the PC and related office products through outlets to
be established by Sears, the Sears Business Systems Centers. Finally, if all this
were not enough, the company established its own line of retail stores, the IBM
Product Centers. These stores were operated neither through franchisees nor
through authorising independent dealers (though as noted above, each of these
alternative chains was used) but rather by the company's own employees.

It should not be surprising that IBM chose to open its own line of company-
controlled retail outlets. When IBM entered the market, one of its most success-
ful competitors was Tandy, with its Radio Shack stores, and the temptation to
imitate that example must have been strong. In addition, IBM had previously
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retained all of its marketing in house, and the tendency to follow this precedent must also have been powerful. Finally, IBM's new computer was at least in principle more powerful than its competition. Using the Intel 8088 processor, a mixture of 16-bit internal data manipulation with eight-bit communications with peripherals, in comparison to the eight bit standard, the PC offered the possibility of more complex, more powerful software than had been available in the previously generation of personal computers. In order to explain the benefits the use of this more powerful system could bring, IBM needed more than simply its own considerable brand recognition. It needed sophisticated salespeople familiar with the needs of business and the way that the PC could meet those needs. What better way to provide this sales sophistication than to offer it directly through the company's own retail operations?

When the PC was introduced in 1981, IBM already had three Product Centers in operation selling typewriters and small computers. The number soon grew, so that by the middle of 1984, there were 81 in operation. But this number was well short of what the trade press had been predicting, and apparently, poor performance of the Centers led IBM to abandon its plans to expand the number of Centers to 100 by the end of 1984. This slow growth is especially surprising in view of the frequency with which industry pundits had been predicting the number of Product Centers to expand to 600 and beyond. IBM's decision is reported to have been based on performance which was disappointing in comparison both with IBM's expectations and with the results obtained through alternative distribution channels: "Burdened with start-up costs and high overhead, the stores have been making less than the 20% per year that IBM has been accustomed to earning on invested capital." 12

There are a number of possible mistakes that one could point to in the way that IBM chose to operate its retail operations, but the principal problems for the company resulted from unfamiliarity with the marketplace. IBM's expertise lies elsewhere, and its product line, though quite broad, nevertheless fails to span the needs of prospective customers. Just as Tandy limited the attractiveness of its computer products by making customers go elsewhere for third party enhancements, IBM has offered only a small subset of the products available to enhance the performance of the PC. The success of the PC is often attributed to its open architecture, the availability of information making it easier for third parties to design enhancements. But when those enhancements are superior to IBM's own products, as is often the case, the IBM Product Center is not in a position to bring those products to customers.

Just as with Tandy, the IBM Product Centers present the company with the ability to control distribution in order to prevent free-riding, but at the same time constrain the retail outlets in ways which make them markedly inferior to independent rivals. The IBM experience is no different than that of other computer manufacturers who have tried to enter the retail market. Xerox and

Control Data each chose to establish computer and business equipment product retail chains, but both of these companies have since conceded that their efforts failed. The experience of these companies taken together with that of IBM makes it apparent that the computer companies are simply not as well suited to market at retail the range of products offered by computer specialty stores as are the specialty stores themselves. The question for the specialty stores is not whether they can currently survive direct competition from manufacturers of personal computers, but rather whether they will continue to be a distribution channel of choice as the array of computer products shifts with advances in technology. Instead of a direct threat from computer stores operated by manufacturers, the dealers must cope with the threat of competition from very dissimilar distribution channels, the direct salesforces of the manufacturers on the one hand, and the mass merchandisers on the other.

1.4.2 Tandy/Radio Shack

At the start of the microcomputer revolution, one company was particularly well positioned to market microcomputers to sophisticated electronics hobbyists and other knowledgeable targets for the new products. Tandy Corporation operated a chain of electronics stores under the Radio Shack brand, and it seemed reasonable to suppose that those stores could be used to sell computers as well as their existing lines of electronic parts, home entertainment equipment, and C.B. radios, telephones, and intercoms. The first Radio Shack computer, the TRS-80, was introduced in August 1977. It was an immediate success, with sales of 10,000 in its first two months, compared with projected annual sales of 3,000 units. The TRS Model 1 was succeeded by increasingly more capable machines, so that by the end of 1980, the company offered a full line of state-of-the-art eight bit computers for which a substantial number of applications software packages were available. These products were sold both in its Radio Shack outlets and in newly established Radio Shack Computer Centers. The company proved successful at selling both to its traditional customer base of hobbyists and to newer customers from small business. It offered a version of VisiCalc on its machines early on, and also offered software for word processing and accounting applications. Its integrated manufacturing and marketing seemed to provide a model for a successful alternative to the use of separate dealer channels for distribution. Tandy was able to control distribution in order to keep discounting in bounds, and since it provided pre-sale services directly, it did not need to concern itself with free-rider problems. Tandy may well have served as a model to other manufacturers that have chosen to distribute through company-controlled marketing channels.

Recent evidence suggests that the Tandy model is not as attractive as it once was. Tandy's original success was based in good part on the company's ability to

offer its Radio Shack clientele, a sophisticated group of hobbyists and electronics professionals, a capable computer at an aggressively low price. Though Radio Shack did establish separate computer centers in order better to provide support to business users, its overall support levels could be kept low simply because it was selling fairly simple machines to users who had taken upon themselves the burden of learning about what the machines could do for them. Tandy's burden of providing pre-sale services was also lessened by the company's unwillingness to stock enhancements offered by competing manufacturers. Indeed, until the Fall 1983 introduction of the Model 2000, the company refused to offer software from sources outside the company unless that software was reissued bearing the Tandy brand.

The Tandy strategy of close control of distribution has not proven successful in maintaining the company's market share. Computers have proven important to Tandy. The share of Tandy revenue from personal computers and related products rose from 1.8% in 1978 to 9.5% in 1979, and by 1983, it had reached 34.6%. But this growth did not match that of the industry, so that Tandy's market share of the American personal computer market declined from 21% in 1979 to 11% in 1983. This failure to hold share does not appear to have derived from the characteristics of the computers it offered for sale. Tandy's mainstay TRS-80 line is broader than that of Apple, and offers similar performance to the Apple eight bit computers. Tandy was somewhat late to introduce a 16-bit machine to compete with IBM, but its lack of ability to hold share cannot be attributed to that delay. The primary reason for Tandy's inability to hold market share appears to have been related to what appeared to be its greatest strength, the marketing channel that it had at its disposal.

Tandy's marketing problems stemmed from two sources, the changing nature of the typical computer customer from hobbyist to business oriented and the vast expansion of the computer marketplace. The change in the nature of the clientele meant that more and more business users were in search of computers, and Tandy salespeople, in the habit of selling packaged systems to sophisticated users, were not well prepared to cope with an influx of new consumers with little idea of what a computer could do for them. That is, the emerging business market for computers required that the products be demonstrated for consumers, rather than simply being made available for sale. Tandy's sales personnel were not used to the additional demands on their expertise made by consumers, nor were they trained to meet such demands. The New York Times points out that while Sears Business Systems requires that its Business Center personnel complete five weeks of training prior to going on the showroom floor, Tandy requires only 100 hours of training, training which need not be completed until the employee has been in the company's service for three months.

15Barnes, id., p. 20F.
Clearly, the Tandy employees cannot be expected to have mastered the intricacies of programs designed for business use in such a short period. While many of the Tandy employees may be electronics hobbyists, knowledge of the details of the workings of computer hardware is of limited value in the applications-driven software market. There is little reason to suppose that an electronics expert would have any interest or familiarity in such programs as spreadsheets or database managers.

Tandy's second marketing problem was related to a partial solution to the first. By restricting its offerings to private labeled products, Tandy limited the number of items with which its salespersonnel needed to be familiar. The company could offer a limited number of preconfigured bundles of computer, peripheral equipment such as printers, and software. This kept the information which Radio Shack salespeople needed to master within manageable bounds, but it also limited the range of applications which Tandy's products could address. The explosion of the microcomputer marketplace meant that the number of applications which software developers could address increased apace. Tandy's restriction of its line to a few standard applications meant that it failed to address many of the uses to which its potential customers wished to place their equipment. The bundled solution worked only as long as the appropriate software for a wide array of uses was contained in the bundle. When new uses emerged, or older software, such as VisiCalc, was overtaken by improved products, Tandy was not in a position to move rapidly to offer the improved products. Even had it wished to adopt newer products, such as Lotus 1-2-3, its salespersonnel were not well suited to master the intricacies of the newer products.

Tandy's loss of marketshare illustrates the problems facing integrated marketing operations of manufacturers. First, if the manufacturer's marketing arm restricts itself to the manufacturer's own products, it will end up offering consumers less flexible product packages than would be possible were products of other manufacturers also available. Even if Tandy had chosen to broaden its product offerings by mixing in products from competing manufacturers, there would remain the question of whether Radio Shack stores would serve as honest brokers for consumers, offering superior products of rivals when a Tandy product could also serve the consumer's desired application to a lesser degree. Second, as product offerings become more complex and varied, the need for well-trained salesforces increases, and the requirements imposed on the marketing arm for monitoring performance of its employees grow apace. When Radio Shack stores merely sold equipment that consumers were expected to understand on their own, the problem of monitoring performance was not terribly severe. But when less sophisticated customers requiring more help arrived on the scene, it became much more difficult to tell if Tandy salespeople were informing themselves sufficiently and performing adequately. Since considerable effort had to be devoted to customers both before and after the sale, it was difficult to devise compensation schemes that led to good service. Finally, Tandy's very large market
penetration made it difficult for the company to move with the flexibility necessary to offer solutions to a wide variety of customers. In the end, it appears that the availability of an extensive marketing organization which was well developed for other products gave Tandy no more than a significant head start in microcomputer retailing. To consolidate its advantage, the company would have had to exhibit much more flexibility in its marketing approach that it was apparently able to muster. Tandy's experience is testimony to the fact that it is not enough to possess a marketing system that is immune to free rider problems, if that marketing system proves unable to deliver the services that free-rider problems tend to defeat.

1.5 Concluding Remarks on the Personal Computer Market

This chapter has merely scratched the surface of the institutional structure of the personal computer market. Nevertheless, a number of conclusions can be drawn. The first is that IBM's success stems not simply from its huge size and resources, but rather from the flexible manner in which it designed and marketed its PC. The second conclusion is that its marketing depended heavily on specialty retailers, and that the alternative of providing the specialty retailing function internally has been proven to be a much inferior substitute. This leads to a third conclusion. The specialty retail channel is likely to continue to consist either of independent business or franchise affiliates of chain operations such as Computerland. We shall see that the latter alternative may prevail due to difficulties in maintaining an effective wholesale distribution to serve the needs of the independent stores. But whatever the structure of the specialty retail sector, it is clear that the major challenge to this channel will come not from large firms entering with their own retail stores, but rather from alternative channels of distribution.

The remainder of this report is concerned with the factors that affect the relative efficiency of the various distribution channels. In particular, we will be concerned with the way in which the availability and use of vertical restraints affects the specialty retail channel. These restraints can make that channel either more or less effective as an alternative to the other distribution options facing a manufacturer. In order to motivate this discussion, we turn in the next chapter to a discussion of the economic theory of vertical restraints.
Chapter 2

The Economics of Vertical Restraints

2.1 Introduction

The material presented thus far in this report has consisted of data gleaned from the trade press and market research reports. This material has not included significant amounts of economic analysis and has therefore avoided predictions about the future course of the personal computer market. This chapter lays the groundwork for a more analytical treatment of the current state and future prospects for the personal computer market by presenting a brief summary of research by economists on the purpose and competitive effects of vertical restraints. In succeeding chapters, this analysis is applied to a number of specific components of personal computer distribution.

This chapter provides no more than a brief, nontechnical overview of the economics of vertical restraints. This material is intended to extract from the literature only the theories which are relevant to the assessment of vertical restraints in the personal computer market. For a reasonably current and much more extensive discussion of these theories applied to the most controversial of vertical restraints, resale price maintenance (RPM), see Overstreet's exhaustive survey.¹

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In this chapter, we first consider theories of vertical restraints generally. Once this general survey is in hand, we turn to the applicability of several of the theories to the personal computer market. This discussion allows us to conclude that the anticompetitive theories of vertical restraints are unlikely to apply to personal computer distribution. We are then left with efficiency theories of vertical restraints. The chapter concludes with a brief discussion of recent treatments of vertical restraints which suggest that they may reduce welfare even if they increase efficiency from the manufacturers point of view.

2.2 General Survey

The available explanations for the use of vertical restraints fall into three major categories. The first and most popular is the dealer cartel theory. This theory is at the heart of the opposition to permitting manufacturers to adopt vertical restraints. Put simply, this theory holds that vertical restraints are nothing more than devices designed to enforce horizontal agreements among retailers. Retailers will obviously wish to stifle price competition in order to be able to command monopoly rents, just as manufacturers will also wish to suppress competition among themselves. The retailers, however, are generally a rather diffused group, with no particular store operator commanding a large share of the market. Retailers will therefore experience considerable difficulty in coordinating their actions to maintain a cartel agreement. In the absence of manufacturer intervention, retailers will be forced to monitor each other's pricing decisions in order to ensure compliance with a cartel arrangement. This will require monitoring of the prices of a wide number of products and renegotiation of retail prices whenever wholesale prices are altered. In general, one would expect these difficulties of coordination to present an insurmountable obstacle to an effective retailer cartel. The only exception would be when retailers handled a small number of fairly homogeneous products, and where retail markets were relatively small and well defined.

A retailer cartel could emerge, however, if an enforcement mechanism could be defined that would be responsive to changes in wholesale prices and which would also avoid the requirement that retailers monitor the actions of their rivals. Vertical restraints are capable of providing such an enforcement mechanism. Devices such as territorial restrictions clearly limit competition among retailers and thereby afford each individual retailers some insulation from price-cutting by rivals. Resale price maintenance also possesses the ability to short circuit retail competition. RPM is sensitive to changes in wholesale prices, since

1988)(unpublished manuscript, Ohio State University). One additional and very valuable source of theoretical analyses of vertical restraints can be found in a series of papers by G. F. Mathewson and R. A. Winter. See particularly "An Economic Theory of Vertical Restraints," Rand Journal of Economics 15 (Spring 1984): 27-38, and the papers cited there. These papers are difficult to follow, but the effort of doing so will be well rewarded.
each manufacturer sets its own prices at retail, and the manufacturer assumes
the burden of enforcing the cartel agreement as it applies to its own products.
Hence it would appear that vertical restraints could surely serve as a substitute
for direct retailer intervention to suppress competition among retailers.

Support for this view is provided by consideration of the sources of political
pressure for the passage of RPM laws. The fair trade movement of the
1930's received vocal support from the National Association of Retail Druggists
(NARD), support which is chronicled at length in an FTC report on resale price
maintenance. The FTC study makes it clear that retailers were in the fore-
front of the legislative movement for fair trade laws. This movement succeeded
in obtaining support for fair trade in 45 state legislatures. More importantly,
the dealers demonstrated their ability to exert concerted pressure on manufac-
turers to adopt RPM. This pressure was exerted by means of group boycotts on
products whose manufacturers were lax in RPM enforcement. Price surveys of
drug products showed that RPM was quite effective in raising chain store prices
of drug products to manufacturer-supported price levels.

For our purposes, the possibility that vertical restraints in the personal com-
puter market are motivated by a dealer cartel seems remote indeed. Several of
the manufacturers participating in the market have access to alternative dis-
tribution systems. IBM has product centers of its own as well as its vaunted
sales force. Apple is more reliant on dealers, but still possesses the ability and
willingness to deny its products to important portions of the retail distribution
system, as it demonstrated in its unwillingness to deal with the ComputerLand
chain. The dealers themselves are not well organised, with dealer groups such
as the Association of Better Computer Dealers being very young and far from
universal in coverage. Irrespective of whether one believes that past instances
of vertical restraints can be explained by organised dealer pressure, such an
explanation appears totally implausible for the microcomputer marketplace.

A second anticompetitive explanation that has been offered for the use of
vertical restraint is that manufacturers wish to use such restraints to suppress
competition among themselves. This explanation is due to Telser who uses it to
analyse the use of resale price maintenance by manufacturers of light bulbs. The
advantage of RPM is that it can make wholesale prices transparent to members
of a cartel. Ordinarily, a cartel member who chose to shade the prices set by
the cartel could allege to rivals that the lower retail prices resulting from the
shading were due instead to margin cutting by retailers. By setting minimum
margins, the cartel members could rule out such arguments, thereby increasing
the effectiveness of cartel enforcement. This explanation may apply to uses of
RPM in other markets such as those for sanitary ironware and sugar, where the
products in question are relatively homogeneous. It appears unlikely to apply

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3Lester G. Telser, "Why Should Manufacturers Want Fair Trade?" Journal of Law & Economics
3 (October 1960): 86-105.
in the computer market, however, since competition among the various vendors appears to be intense. Even if the rival personal computer manufacturers desired to fix jointly the prices of their products, the task of agreeing on a price structure for such heterogeneous offerings would be staggering. The manufacturer cartel explanation thus appears inapplicable to the personal computer marketplace.

If the dealer and manufacturer cartel explanations for RPM and other vertical restraints in the personal computer market can be ruled out, one is left with efficiency explanations for these practices. The most famous of such efficiency explanations is the services argument offered by Telser. This explanation attributes the use of vertical restraints to a manufacturer's desire to ensure that sufficient pre-sale information about its products will be provided to potential consumers. The problem with providing such information is that it is difficult to guarantee a return to those dealers who incur the information-provision cost. Assume that a customer enters a specialty computer retail store with a general idea of the applications for which a computer might be suited, but with little idea of the appropriate equipment (computer, peripherals, interfaces, software) required for the consumer's intended applications. The consumer could hire an agent to shop for him/her, but this requires a fairly substantial knowledge of how computers could help that consumer and the choice of a agent presents problems of its own. Hence the consumer may simply choose to visit a number of retailers to obtain suggestions as to how an appropriate system might be configured. But once that information has been obtained, the consumer has no obligation to purchase at the dealers that provided the information and presumably charge for said information as part of their retail prices of the computer equipment in question. Other dealers may choose to free-ride on the information provided by the full-service dealers, offering lower prices but little support. If a significant number of customers obtain information from the full-service dealers but then purchase from no-frills rivals, the ability of the full-service dealers to recover their service-provision investments will be impaired and the quantity of pre-sale services offered will be reduced correspondingly. Manufacturers benefit from having their products explained and demonstrated to consumers and hence take steps to create property rights in such services for dealers that choose to engage in service provision. In general, such steps involve vertical restraints designed to insulate service-providing dealers from the competition offered by no-frills dealers. The services that matter for vertical restraints include only those provided prior to a sale. In the personal computer market, many of the low-priced, low-margin outlets are mail order firms. Some of these firms provide extensive support services for their customers and are therefore indignant about charges that they are able to undercut conventional specialty computer retailers by free-riding on the services of such retailers. But post-sale services are not the issue. Such services can clearly be charged for, since a customer will not be
eligible for such help without having purchased at the dealer in question. The services in question must be separated from the actual purchase of computer equipment, for otherwise the dealer providing the service could easily demand compensation. Only pre-sale services are relevant.

The services in question do not need to be particularly sophisticated. For example, a potential purchaser of word processing software might only wish to have access to a number of packages and tutorials for each. Actual demonstrations by sales personnel need not occur. But hands on experience with a package is surely difficult to obtain through mail-order outlets. In most mail order purchases, a consumer will have had to make a decision on which package to buy without a recommendation from the mail-order house, and will often rely on the assistance of a specialty retail firm in making that judgment. Thus mail-order purchases will limit the ability of specialty retailers to recover their investments in demonstration systems, packages, and program expertise.

It is important to recognize here that whatever the vertical restraints employed, the goal of the restraints will be to guarantee the full-service dealers a return on their investments in pre-sale services as part of the retail price they receive for the products they sell. Apart from discriminating in prices charged to full-service and no-frills dealers, the only way a manufacturer has of providing this return is to protect full-service dealer margins. Thus, any non-price restraints employed to protect dealer margins will need to mimic resale price maintenance in order to be effective. The courts and the Justice Department have generally favored the use of non-price restraints while continuing to condemn resale price maintenance. From the standpoint of economic analysis, this distinction has little merit. Indeed, since many of the alternative vertical restraints available to manufacturers limit dealer competition even more stringently that does RPM, the RPM ban makes little sense from an efficiency standpoint. For instance, the use of exclusive territories provides each retailer with a degree of monopoly power and will thus require the manufacturer employing territories to use other restraints such as sales quotas to limit the exercise of that power. The point is that a ban on RPM is likely to result in more complex and less efficient restraints being employed in RPM’s place. Nevertheless, there appears little chance that RPM will be legalized soon, so that manufacturers will need to continue to explore alternatives in the form of a variety of non-price restraints on their distribution systems.

See, for example, the recently released Justice Department Vertical Restraints Guidelines. The Supreme Court explicitly adopted the services argument for non-price vertical restraints in Continental TV, Inc. v. GTE Sylvania, Inc., 433 U. S. 36 (1977).
CHAPTER 2. THE ECONOMICS OF VERTICAL RESTRAINTS

2.3 Who Pays for Services?

The implausibility of the dealer and manufacturer cartel arguments for vertical control exercised by manufacturers in the personal computer market combined with the need to provide a considerable amount of pre-sale information to personal computer customers suggests that the Telser special services argument is likely to play an important role in the understanding of this marketplace. As we shall see, manufacturers of personal computers, enhancements such as modems and add-on boards, and software products have all gone to considerable lengths to protect specialty retailer margins by attempting to deny their products to discounters. In this section, we assume that these efforts have been successful in increasing margins, so that the vertical restraints employed have been at least in part successful in obtaining results equivalent to resale price maintenance. The question such success raises is who pays for these services.

The answer to the question would seem apparent. If higher margins are added to the wholesale price of a computer product, the result will be a higher price at retail. This analysis holds, however, only if the wholesale price remains constant. In a technical paper entitled "The Political Economy of Resale Price Maintenance," Howard Marvel and Stephen McCafferty show that the wholesale price will instead fall, thereby absorbing at least part of the higher margin. The extent to which the margin increase is offset by a wholesale price decline is determined by the elasticity of demand for the manufacturer's product, but under reasonable assumptions, the entire amount of the margin increase can be offset.

The logic behind this result is based on two observations about a manufacturer's profit maximizing behavior. First, the price set at retail should be that which maximizes the joint profits of the manufacturer and retailers given the marginal costs of production and distribution. This means that a change in distribution margins will be accompanied by a change in retail prices only if either marginal cost changes or if the elasticity of demand for the product is altered. The second observation is that actions designed to protect services are unlikely to raise marginal cost. The reason is that services requiring protection are almost by definition not associated with marginal cost. A marginal cost is one which is incurred when an additional unit is sold. But a customer who obtains services from one store causes that store to incur costs irrespective of whether s/he finally purchases at that store. Free-riding requires that service costs be incurred when a sale is not made. Hence, free-rideable services do not increase marginal cost, and therefore do not lead to increases in the optimal retail price of the products with which the services are provided, apart from their impact on demand elasticity.

Who pays for services, if not the customer? The manufacturer chooses to absorb the service costs through lower wholesale prices than would otherwise be

7 Supra n. 1.
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charged. Service provision increases sales, and the manufacturer can therefore make up on volume what is lost in lower wholesale prices. This result certainly reduces the possibility that vertical restraints can have an adverse effect on consumer welfare.

It is true that computers provided with services will cost more than those which are sold purely as hardware through discount channels. Such a price comparison is not particularly valid, however, since the products in question will be very different. The products sold through the discount channels will be designed with the informational limitations of those channels in mind, so that they will tend to limit choices that consumers must make. Comparing these products to those sold through specialty retailers is equivalent to comparing apples and oranges. The point of this analysis is not that the specialty retail channel is superior to the discount channel—it provides better information, but at a cost. The point of the analysis is that permitting manufacturers that sell through the specialty retailers to control their distribution is not likely to increase substantially the costs of those products.

2.4 Types of Vertical Restraints

Within the personal computer market, a number of restraints have been employed to control distribution. The major manufacturers have tried to limit their distribution by eschewing distributors in order to better be able to track "gray market" shipments to discounters. This is possible only when the volume of shipments to individual dealers is large. In the case of peripherals and software, manufacturers have been forced to continue to rely on distributors, but have been limiting the number of such distributors with which they deal, again in an attempt to enforce minimum margins through refusals to deal with discount distribution channels. In this section we consider some illustrative attempts at enforcing such refusals to deal.

2.4.1 Hayes Microcomputer

Hayes Microcomputer is the leading producer of personal computer modems. A modem (modulator/demodulator) is a device which converts the digital signals used by computers into analog signals capable of being transmitted over conventional telephone systems. Thus modems are essential to slow-speed data transmission over long distances. While Hayes is the market leader, it is apparent that the market for modems is quite competitive. A number of manufacturers offer products that emulate the dialing protocols of Hayes products, and there are, in addition, many more firms that manufacture industrial modems that are capable of offering products in the retail marketplace. Microchips necessary to produce modems are offered to the general market by companies such as Rockwell, and other modem makers, e. g., U. S. Robotics, manufacture their
own chip supplies. Hence there is little reason to fear that Hayes could successfully monopolize the modem or deny modems (other than its own products) to mail-order firms.

Hayes is nevertheless attempting to deny supplies of its products to the mail-order market. It is doing so by setting volume discount schedules with dealers and distributors, discounts that are supposed to be denied to mail-order firms. In addition, it is offering rebates to holders of existing modems. This latter strategy is a mix of price discrimination (owners of existing modems may be less willing to purchase new, high-speed models than users without modems) and preferential treatment for retailers who will administer the rebates by collecting the old modems. Hayes also announced its intention to "implement an authorized-dealer program and eventually restrict sales only to Hayes-authorized resellers." This strategy represents a reasonably typical attempt to impose the equivalent of RPM by means of refusals to deal. It apparent that Hayes' goal is nothing short of eliminating discounters to protect margins at full-service retailers. As a Hayes spokesperson notes, the new program has been adopted because "(p)eople are drastically discounting our products, and we have to respond to that...mail order is just discount without the support and service."

2.4.2 Osborne Computer

The Osborne Computer Company was a very idiosyncratic and briefly very successful personal computer marketer. Osborne offered the first "transportable" personal computer, a thirty pound suitcase incorporating a Z-80 microprocessor, a tiny video screen, two disk drives, and appropriate interfaces. Unlike other computers of its day, it was sold with bundled software, including Wordstar, Basic, and SuperCalc. The package was offered for a list price of only $1795, below even the retail price of the bundled software. It was an immediate hit both with dealers and consumers.

Osborne was soon overtaken by rivals and made a number of strategic blunders, including announcing successor machines prior to clearing its existing inventories. This led to cash-flow problems and eventually Chapter 11 proceedings. The transportable idea caught on with Kaypro and, later, Compaq. The bundled software approach was used again by companies such as Kaypro, Columbia, Morrow Decisions and others, but never again with such success. Others of Osborne's innovations received less attention, but contributed nonetheless to the company's ability to build a very strong dealer organization, one that was perhaps the company's most valuable asset.

Osborne built its strong dealer loyalty by keeping its machine out of the hands of discounters. It did so by controlling distribution very closely and by

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9 Id., p. 116.
10 Id., p. 116.
an interesting warranty validation strategy. In order to qualify for an Osborne warranty a customer had to answer a number of questions on a survey that was then forwarded to Osborne by the dealer. Upon receipt of the warranty card, the dealer was sent a substantial sum of money. The scheme had the effect of paying a rebate to those retailers that had face-to-face contacts with customers enabling them to obtain the desired responses. Customers in mail-order sales would have been less likely to provide the necessary information, so that Osborne was able through this device to pay dealers directly for the services they provided. The warranty device was an awkward and expensive way in which to make such payments, but it did work effectively to assist Osborne in penetrating the dealer distribution channel in a very effective fashion.

2.5 Conclusions

This chapter outlines the efficiency and anticompetitive explanations for vertical restraints and concludes that the personal computer market is a likely candidate for vertical restraints to increase distributional efficiency. In the remainder of this report, we analyse a number of characteristic factors of personal computer distribution that can best be understood through use of the information/services perspective presented here. It is important to recognize that constraints on vertical restraints designed to protect distribution channels from free riding are likely to make those channels less attractive to manufacturers. In particular, limits on the ability of manufacturers to control resale of their products to mass merchandisers and discount outlets will increase the likelihood that non-small business channels such as direct distribution.
Chapter 3

Vertical Restraints in the Personal Computer Market

3.1 Introduction

This chapter applies the economic analysis of vertical restraints begun in the last chapter to additional examples from the microcomputer marketplace. We consider first examples drawn from the early history of the personal computer market in section 3.2. This section shows that attempts to employ vertical restraints in an anticompetitive manner in the personal computer market were counterproductive. Next we turn, in section 3.3, to the questions of why established electronics distributors have not been successful in distributing personal computers and why manufacturers have chosen to handle distribution internally. Finally in section 3.4 we consider the effect on distribution of a movement to more powerful computers linked together in multiuser environments. This change in the computer market will increase the pressure placed on the now dominant specialty computer retailer channel by value added remarketers. In the remainder of this report we present additional examples of competition among distribution channels in separate chapters. These examples include competition with manufacturer-direct sales (Chapter 4), competition in the home market with mass merchandisers (Chapter 5), and marketing integrated software (Chapter 6).
3.2 Early Uses of Vertical Restraints in Microcomputer Marketing

3.2.1 MITS

In order to understand the evolution of personal computer distribution, it is necessary to survey briefly the history of the microcomputer and the manner in which early microcomputers were sold. The earliest widely available microcomputers were manufactured by very small firms and were sold by mail to hobby users. These computers were extremely limited in capability, given the absence of convenient methods of data entry and the total absence of software for applications development. Among the early computer companies, MITS, with its Altair computer was the first to achieve wide success. The Altair was sold primarily by means of advertising and favorable coverage in the hobbyist journal, Popular Electronics. There was little need for retail services provided with these machines, as only a very capable and very committed hobbyist could make such a machine do anything. Communication of skills useful for programming these machines was transmitted either through clubs or in newsletters and columns in the hobby magazines.

As the capabilities of the Altair grew, principally through the availability of peripherals such as display terminals and increased memory capacity, the computer could address a wider audience, so that the mail order route became less attractive. This was both because users desired help in case their machines did not run properly as delivered (a common problem) and were unwilling to learn complicated procedures to get their machines up and running simply from documentation provided by the manufacturer. This led to the establishment of the first specialty computer retail stores. With these new stores came the first vertical restraints. MITS, initially the only source of microcomputers, attempted to impose several such restraints, including exclusive dealing for franchisees and tying arrangements for various of the components which the company offered. These restraints apparently were adopted for anticompetitive reasons. MITS held the marketing rights to an early version of the BASIC language interpreter. Use of this interpreter required more memory than that present in the standard Altair machine, so that BASIC users required memory boards for their systems. Such boards were marketed both by MITS and by third-party suppliers, but the boards of the third-party suppliers had a considerable advantage—they occasionally worked. In order to sell its own memory boards, MITS tied the sale of BASIC to purchase of a board. In a broader effort to prevent third-party suppliers from tapping into what it viewed as its own markets, MITS also required that the dealers permitted to sell its products not offer enhancements from rival companies.¹

¹Notice that the vertical restraint in this case was exclusive dealing, not resale price maintenance or one of its equivalents. Exclusive dealing is designed to create and protect
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It is apparent that these activities were designed to protect the MITS lead in microcomputers, and in so doing, limit competition in the marketplace. It is equally apparent, and completely in keeping with the economic analysis of vertical restraints, that the restraints failed to attain their intended goal. MITS failed to hold the lead that the Altair had given it, and not because the market was entered by much larger, more powerful competitors. The company which achieved the greatest success as the microcomputer revolution moved into its next stage was Apple Computer, a firm with origins every bit as humble as MITS. But Apple differed from MITS in a very important way. Rather than attempting to force customers to buy an entire microcomputer package from one company, Apple offered its machines with expansion slots that were capable of accepting "cards" (enhancements) from a variety of vendors. Apple's open system represented the exact opposite of the MITS approach, and its importance was merely reemphasized when IBM broke from its mainframe tradition and offered its personal computer with similar open architecture.

The economic analysis of the closed system approach is based on a simple but powerful observation due to Aaron Director. Director had analysed tying practices similar to those employed by MITS which had been challenged in a much earlier case involving IBM. As a condition for the use of its Hollerith card tabulating equipment, IBM had required its customers to purchase their supplies of tabulating cards from IBM only. The company argued that the control of card supplies was necessary in order to assure the quality of the computation service provided, but the fact that IBM itself purchased cards for resale from some of the same suppliers that it refused to allow its customers to deal with called this explanation into question. The courts adopted a different explanation, one based on leverage. The argument was that IBM had tried to extend its legal (patent-protected) monopoly on tabulating equipment into an illegal one over cards. Director observed that this explanation was unlikely, for IBM did not stand to gain from the addition of a second, related monopoly. The reason was that IBM's customers demanded neither tabulating machinery nor cards in their own right. The customer's interest was obviously in the tabulating services that such equipment could provide. Hence, an increase in the price of cards, holding the cost of tabulating equipment constant, would simply increase the cost of tabulating services. But since the company could presumably set the price of the tabulating machinery so as to maximise the monopoly profits from the sale of tabulating services, the price increase resulting from card control would raise the price of computing services above the profit-maximising level. In other words, the control of computing service provision offered by the patent monopoly over cards was sufficient to obviate the need for a second monopoly obtained through tying. IBM's interests would best be served by having the cards offered at the competitive price, hence as cheaply as possible.

IBM nevertheless did choose to tie, and its practice obviously required an explanation. Director’s answer was that the tying permitted price discrimination through a metering arrangement. Customers for IBM’s machines were likely to value those machines in relation to the tabulating services they provided. Those services could be metered through card use. Hence, the tying arrangement allowed IBM to charge more for its machines when customers put them to greater use.

In the case of MITS, there is less need to provide an explanation of how the tying and exclusive dealing requirements of the company resulted in higher profits for the company, since its policies did not in the long run prove successful. It is more likely that MITS simply erred in its business judgment, perhaps mistaking the effect of similar restraints imposed by mainframe computer makers. The effect of forcing consumers to purchase inferior memory cards was to make the MITS system less attractive, and so to increase the ease with which rival microcomputer manufacturers could enter the marketplace. This is indeed ironic, since the intent of the policy was apparently to hinder competition, but it is instructive for vertical restraints policy. There may be instances in which such restraints are adopted to limit competition, as well as other instances of efficiency-enhancing restraints. These possibilities would seem to require a balancing in the policy development process. The need for such trade-offs is reduced, however, if the anticompetitive uses of restraints prove ineffective.

### 3.2.2 The Advent of the Chains

The specialty computer retailers required considerable expertise in order to make the products they sold function. The services provided by these retailers were not subject to free-riding, since they were primarily post-sale services. Unlike other electronic items, such as stereo equipment and televisions, for which the consumer could assume with some assurance that the product would work, the fledgling microcomputers made by MITS, IMSAI, and other competitors often required considerable diagnostic efforts by skilled personnel before they would function at all. Hence the dealer was an important resource for computer purchasers, and was in position to charge for the services provided. The important question in the organisation of the retail market for personal computer distribution was not whether sophisticated specialist retailers would be required, but whether such retailers would be independent or controlled by larger business entities. While the first retailers were generally independents, a movement soon emerged towards grouping retailers together in chains, either as part of existing retail networks, as for example, Radio Shack, or as part of new franchise organisations typified by ComputerLand.

The reason for the grouping was that despite MITS’ attempt to serve as a single source for computer supplies, it was soon apparent that the products of a number of manufacturers could be combined efficiently and, for the retailer, profitably, to offer consumers better products than would otherwise be possible.
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But as software and hardware products both proliferated, it became apparent that there were economies of scale to be achieved in the selection process. A typical piece of software required that the dealer have considerable familiarity with its capabilities and idiosyncrasies before he was in a position to advise customers in an effective manner. Shelf space at dealers was therefore limited not so much by the physical availability of space as by the dealers' ability to familiarize themselves with new products. Since evaluation of such products prior to selection required substantial dealer efforts, it made sense to combine the efforts of a number of stores in some way.

In the microcomputer industry, this combination has taken two forms. In some cases, the chain is the primary focus of the selection process, though in the case of ComputerLand, individual franchisees are free to strike deals for products which have not been selected by the chain. The alternative is to have the selection handled by wholesale distributors. In the case of software, distributors have chosen to go well beyond merely warehousing products to offering support and maintaining lists of fast-selling software, again as a aid to the selection process of individual dealers. It should be noted, however, that the services offered by the distributors and by the chains are at least in part subject to free riding.

3.3 The Demise of Distributors in Microcomputer Retailing

The central role of the provision of pre-sale services in selling microcomputers is illustrated graphically by the experience of distributors. Distributors are used as a marketing channel for many computer related products, but not for computers themselves. For example, computer terminals and related peripherals designed to be added to larger systems are customarily handled by distributors, as are the components of the computers themselves. In contrast, personal computers are typically distributed directly to retailers by manufacturers, thus bypassing the distributors altogether. The leading microcomputer manufacturers, IBM, Apple, Compaq and Kaypro, have all chosen to distribute directly to dealers. More significantly, other manufacturers who had chosen originally to utilize distributors have since abandoned this channel in favor of direct distribution. The list of such companies, cataloged in a very useful Electronic News article,2 includes Xerox, Data General, Burroughs, Eagle, Televideo, and, possibly, Digital Equipment. Electronic News quotes a distributor who notes that very few computers are available at wholesale to distributors. The obvious question is why distributors have been successful in the marketing of other computer related products, but have been avoided in personal computer marketing. The

2"Desktop CPU Firms' Direct Dealer Moves Threaten Distributors", February 20, 1984, p. 20.
answer is provided by our analysis of pre-sale services. While distributors do provide services—order taking, warehousing, and customer contacts—which are useful to manufacturers, the use of distributors limits manufacturer control over the eventual dealers selling its products, and thus weakens the manufacturer's ability to police dealer property rights to pre-sale services. It is important to recognize, however, that the liability of distributors is not that they cannot provide services to retailers, services which then serve as a basis for pre-sale dealer services to customers. The problem posed by the use of distributors is instead that their use makes distribution harder to police and transshipping accordingly harder to eliminate.

Some manufacturers will still choose to market their products through distributors. These include smaller companies with very little marketing expertise of their own and little in the way of brand recognition for consumers. Instances of the use of distributors by personal computer manufacturers are chronicled in "Hardware Distribution: Service and Support now Name of Game," As one manufacturer notes, "I don't believe any manufacturer, certainly not the smaller companies, can support 200 to 300 dealers. You can't be responsive enough to a hundred organizations with a problem, or provide them with the product information and support that they need." This company uses a network of exclusive distributors to service its dealers. The distributors are responsible for providing the dealers with the information necessary to permit dealers to provide special services to potential customers. This example, and others like it, show that the distributors can provide services if necessary and that distributors may indeed be more efficient in doing so than the manufacturers themselves. Indeed the distributors are likely to have more experience in dealer relations than most manufacturers, and therefore would seem ideally suited to serve their traditional role as intermediaries.

This liability of distributors as a marketing channel is clearly recognised by industry participants. David Kay, vice-president of marketing at Kaypro, argues that "(i)t's fine to sell components through a distributor because the end-user is very sophisticated and doesn't really need much support beyond delivery ... Not so with the guy who buys a computer, where there's so much personalized service needed." This comment is particularly telling in that it comes from the manufacturer of a system that is sold in bundled form. That is, the Kaypro is sold with a bundle of software including Basic, word processing, database, and other packages. Despite Kaypro's decision to limit the choices that its prospective customers must make, it is nevertheless in need of dealer-provided services in order to sell its machines.

The demise of distributors in the personal computer distribution chain simply serves to underline the significance of pre-sale services at retail, and the
lengths to which manufacturers must go in order to protect the provision of such services. The lesson for small business in this experience is clear. In the absence of effective, enforceable vertical restraints sufficient to prevent diversion of products into the hands of discounter, manufacturers will need to exercise very close control over their distribution systems. This means that they will either choose to deal with a small number of large distributors whose activities can be monitored or that they will handle the distribution function internally. Neither of these options is beneficial for small business distributors, nor are the alternatives particularly efficient when compared with the option of simply allowing manufacturers effective legal control over the extent of the resale markets for their products.

3.4 Distribution of Multiuser Systems

Personal computers are evolving rapidly as more and more functions are designed into powerful and inexpensive microprocessors that serve as the heart of new computer designs. The challenge for design engineers is to use this power to enhance significantly the range of tasks which a personal computer user may address. In part, the new designs will simply permit a user to accomplish his/her current computer related tasks more easily and more rapidly. Cheaper memory and more powerful processors will permit more on-line help and higher level (more English-like) command languages, easing the demands made upon users. The additional processing power will also be brought to bear in linking users together, the topic of this section. This linkage will permit users to share both files, such as accounting records, and relatively expensive peripheral equipment, such as typesetters, laser printers, and tape drives. It is in the area of shared resources that much of the improvement in computer capability is likely to be realized. More importantly, for our purposes, as personal computers are linked, the informational demands placed on computer distribution systems will almost certainly increase. The possible combinations of equipment will explode and the range of possible uses which will need to be addressed by firms selling equipment will also increase substantially. Hence the vertical restraints issues addressed in this report will become more salient as the multiuser market grows.

Personal computers currently are almost always restricted to accomplishing a single task at a time. A user enters input to the computer interactively, waiting while the processor responds to his/her latest instruction. This way of working is a consequence of the relatively simple operating systems, such as CP/M and MS-DOS, that populate the microcomputer world. This approach is, however, rather wasteful, both in terms of processor resources and in terms of the time of the user. The processor is ordinarily able to respond to simple instructions much faster than a user can type them at the keyboard, and thus much of the time, the processor is idle, awaiting additional input. It could be doing some other task at the same time, if the operating system were structured
to interleave that alternative task with whatever the user at the keyboard was requesting. A user could accomplish a series of routine month-end accounting tasks in the background with an accounting package or spreadsheet, while simultaneously entering text into a file from the keyboard. The keyboard input is so slow, that the length of time needed for the background computations would not be lengthened appreciably, even when the job is done on a moderately unsophisticated machine such as the IBM PC. But naturally, the operating system would need to be more complex than current microcomputer systems to keep track of the needs of two concurrent tasks. One simple example of concurrent processing that has already implemented at the microcomputer level is print spooling. A document which is ready for printing is stored in a reserved area of memory, and is chipped to the printer buffer when the computer receives a signal that the previous text has been printed. This shipment of text to the printer can occur in the background as far as the user is concerned. That is, the user can edit another document without waiting for the printing process to be completed. Clearly there are many other examples of tasks that could usefully be carried out simultaneously. A program could be compiled in the background while the user simultaneously edited a memo and transmitted it to another system. The second machine could receive the incoming file without disturbing its user, who might be updating a file while also running a mailing list merge program in the background.

Operating systems which permit several tasks (sometimes referred to as processes) to be running concurrently do exist. Those operating systems are referred to as multitasking, for obvious reasons. They are, however, much more complex, and therefore difficult to maintain than are the single-tasking systems. In addition, they put more demands on their users, who are required to indicate which tasks are to operate in the foreground, and which are to be hidden from sight. Examples of multitasking systems include Concurrent PC-DOS from Digital Research and the UNIX operating system from A. T. & T.

It should be apparent that once an operating system is multitasking, it is a short step to convert the system into one which supports a number of users simultaneously. That is, there is not much difference between a system that allows a single user to put the processor to several uses concurrently, with slices of the processor's time going to each task, and a system which distributes the time slices among several users. But the addition of multiuser capabilities to a multitasking system again brings with it additional complexities. More devices will need to be monitored as additional terminals and printers are placed on the system. Conflicts among users will inevitably arise, not only over access to the processor, but also with respect to the files that the users can share. For example, an attempt by a financial analyst to analyze a company's records while a bookkeeper was simultaneously doing a series of postings could lead to unacceptable results. An operating system needs to be quite sophisticated to resolve conflicts at the both the processor and the file level. Sophisticated systems are necessarily more difficult to use and maintain, and their multiuser characteris-
tics also argue for central provision of instruction to new users. Hence, the way in which services are delivered will be considerably different as multitasking and multiuser systems become more prevalent.

Most of the multiuser systems currently available in the microcomputer world have their roots in the minicomputer world. These systems, chief among which is UNIX, have a reputation for being difficult to use. Such reputations appear to be earned through a combination of cryptic command syntax and documentation which is at best difficult to assimilate. These are not insurmountable problems, as “shells” can be written to insulate a user from the heart of the operating system and documentation can be limited to what the user needs to know to operate the shell together with applications software as appropriate. There remains, however, the difficult problem of configuring a shell to the needs of specific users and of choosing appropriate applications software packages. It is apparent that pre-sale service will be an essential part of conveying to consumers information about how such systems may suit their needs.

The basic problem of explaining to consumers what a particular system is capable of and of developing a configuration suitable to specific requirements is shared by personal computers and multiuser systems alike. The multiuser systems exacerbate such problems because of the increased power that these systems place at the disposal of users. The power that these systems offer increases the range of options facing the user and thereby increases the number of choices which a user must make. With these systems, it is no longer sufficient to inform a particular user of the capabilities of a system suited to that user’s anticipated needs. A comprehensive needs assessment for all potential system users must be carried out and the results of that assessment embodied in an equipment and software recommendation that must satisfy the needs of disparate users. In the personal computer case, the choice of a printer might be between an inexpensive but fast dot matrix printer or a slower but better quality fully-formed character printer attached to the system. With the multiuser system, both these alternatives remain possible, but the consumer must also consider whether printers are to be supplied at each workstation, or whether users are instead to share fast, high quality output devices such as laser printers or high speed daisy wheel machines.

The task of informing customers about the available possibilities for such systems is accordingly much more difficult to accomplish than the analogous information provision for personal computers. It should not be surprising, therefore, that distribution of such systems differs significantly from that for personal computers. In particular, smaller multiuser systems are often distributed either by value-added remarketers, almost all of which are small businesses. These firms submerge the brand identity of the hardware used in their systems, or by the marketing arms of the manufacturers themselves. Thus IBM carefully controls the distribution of its relatively small multiuser systems, distributing primarily through its own sales force, and employing remarketers only when
they can demonstrate a clearly defined target marketplace for their IBM-based systems, and agree not to sell to general users in conflict with IBM's own personnel. This carefully controlled distribution helps to ensure that distributors who develop systems for special applications need not fear that their efforts will go unrewarded due to undercutting of their price structures by vendors selling only the bare hardware and software for such systems. It also protects IBM's own service provision—services provided centrally for a multiuser installation—from erosion from those same component-only vendors. We will return to the tensions between manufacturer-controlled sale efforts and specialty retailing in more detail in Chapter 4.

Specialty computer retailers do not appear to have been particularly successful in competing in this marketplace. Their failure to compete successfully looks ominous when viewed against the pattern of developments likely in the personal computer market. As personal computers become more capable, they will be more able to imitate minicomputer systems, and will therefore need to be targeted at multiuser environments. More important, however, will be the likely trend toward local area networks. As opposed to traditional multiuser systems which require users to share the system's processing power, local area network (LAN) based systems will provide each user with a processing chip dedicated to that user's needs, but will otherwise link users together to share peripherals and files. These systems will thus present the same informational problems for distribution as do the multiuser systems. The software appropriate for a particular user's application might still be chosen analogously to that for a standalone personal computer, but with a LAN, the distributor must also ensure that that software product is compatible with the peripherals on the network, rather than simply a printer assigned to the user's own computer. In addition, the software must be compatible with the LAN's own software, so that the user can access files stored elsewhere in the system and can write altered files to those same remote storage devices. The increase in complexity that this sort of sharing entails is illustrated by the LAN adapter designed by IBM for its newly announced broadband LAN. The IBM adapter is a card which fits into each personal computer attached to the LAN. Each of these cards includes several microprocessors dedicated to the operation of the LAN itself. These processors include an Intel 80188 microprocessor, a more recent version of the chip that drives the IBM PC itself. Thus, the processing power of the LAN adapter exceeds that of the PC's which the LAN serves to link.

The point of this discussion is simply to illustrate that the specialty computer retailer distribution channel must evolve if it is to remain viable. The problems of the gray market and free riding which are discussed at length below will only be exacerbated by the increasing use of LAN's. If solutions to the problems of distribution through conventional retailers are not found, this channel seems certain to decline in importance relative to the alternatives of direct distribution and tightly controlled value added remarketers.
Chapter 4

Distribution Conflicts with Direct Sales

4.1 Introduction

The multiple channels through which microcomputers are distributed virtually guarantee that conflicts between channels will emerge between the various sales forces inhabiting the marketplace. Such conflicts are nowhere more apparent than in the placement of microcomputers in the largest U.S. corporations, an environment where conventional computer retailers and other independent sales organization come into conflict with the direct sales forces of the microcomputer manufacturers. Computer dealers have accused manufacturer's salespersons of undercutting their prices through volume discounts and other inducements, but the manufacturers have simultaneously attempted to deny the dealers access to the equipment required to make sales to large customers. The paradox is apparent: if manufacturers are more efficient in the sense that their sales forces can distribute at lower margins than the computer retailers, as suggested by quantity discounts, the manufacturers would feel no need to exclude their dealers from corporate accounts. Yet such exclusion is practiced. The informational analysis of computer retailing provides a resolution of the apparently paradoxical actions of the manufacturers and provides a basis for predicting the course of the competition for large corporate accounts.

Before proceeding with the analysis, it is useful to have some information as to the magnitude of the problem. According to estimates developed by Future Computing, a leading microcomputer research firm, 1983 sales of personal computer hardware to Fortune 1000 companies amounted to $1.36 billion. Of this total, direct distribution captured a 44 percent share, while computer stores (both independents and chains) trailed with 34.5 percent. Other unspecified
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channels accounted for the remainder. This preeminence of direct sales apparently is increasing, and Future Computing estimates that by 1988, direct sales will account for 53% of the market, while stores will fall to 30%. We shall see that analysis from an informational perspective suggests that unless manufacturers are able to use vertical restraints effectively to control channel competition, these estimates of the shifts that will occur may well be conservative.

Our analysis has significant implications for the success of personal computer manufacturers in the business marketplace. To the extent that specialty retailers are hampered in reaching this the market segment consisting of large corporate customers, new entrants to the personal computer market will need to have in place large sales teams of their own. This state of affairs would appear to favor the market leader, IBM, as well as established companies in other areas such as A. T. & T. Vendors of larger computers offering personal computers as add-on products could also benefit. Such vendors might include the minicomputer vendors such as DEC and Data General and former office equipment vendors such as Wang and Xerox. However, these firms would need either to offer very broad lines of their own or to agree to remarket personal computers of other manufacturers relabeled under their own brand names. Companies such as Apple and Tandy could survive in this environment only through cooperative agreements with manufacturers of larger machines, but such cooperative agreements would certainly result in strains between the dealer channel and the sales efforts of the minicomputer partner.

It is apparent, then, that the success of the specialty retailers in penetrating the corporate marketplace will have a very considerable impact on the way in which the personal computer market is organised and on the survivors in the business computer market in general. This section considers the strains between the manufacturer-direct sales channel and the specialty retailers in order to evaluate the role that vertical restraints are likely to play in this segment of the market.

4.2 Personal Computer Products and Marketing in the Corporate Marketplace

What are the strengths and weaknesses of the competing marketing channels for microcomputer distribution when representatives of each battle for sales to the large corporation market? Initially, many of the microcomputers placed in such organisations were used by individuals at their own instigation. The microcomputer world was separated from the conventional data processing activities of the firm. These latter were carried out on mainframe or minicomputer equipment under the auspices of the data processing department which was typically

characterized by long backlogs in applications development and an orientation that made its computing resources inaccessible to the executives responsible for management and planning. Many industry experts agree that the ability to service the needs of these unconventional users of computing resources was the key to the success of the microcomputer in the business environment. Indeed, the move of Apple Computer products from the electronic hobbyist market to the much larger and more lucrative business market is customarily dated from the introduction of VisiCalc, the first of the “spreadsheet” packages. This software permitted the manager to enter balance sheet or income statement results into a matrix, the columns of which represented months or years of the firm’s operations. By entering formulas representing the relation between various rows of the matrix, the manager could then recalculate one cell of the table, and the repercussions of this change for other table entries would then be figured automatically. In addition, the manager could develop new columns based on “what if” projections to compute the effects on the firm’s operating results of various changes in strategy. The spreadsheet allowed this to be done very efficiently by a manager operating without any support from the data-processing department. All that was required was a microcomputer, some knowledge of the firm’s accounting practices in order to develop the relations between the cells of the tables as formulas, and the time required to enter the firm’s data into the program.

The marriage of the microcomputer, a source of computing resources under the direct control of the user, with simple but powerful spreadsheet software led to an explosion in microcomputer demand from large firms. Since the microcomputer was most often employed because of the inability of central data processing departments to provide similar resources under their auspices, this demand took the form of requests by individual users or departments, and almost by definition avoided centralization. As a result, each user's needs were expressed independently, and even if the activities of a number of microcomputer users in a particular firm overlapped to some degree, they were unlikely to know of the overlap. Hence each user was a separate customer who needed to be instructed separately as to the potential uses of a particular machine and the relevant software and peripherals most useful in his or her particular application. Each corporate user was therefore not much different than a typical small business user. The applications may have differed, but the need to serve each customer independently was present for all.

It is nonetheless clear that this situation in the large corporate environment presented many opportunities for centralisation of the selection of equipment and software, the entry of data and formulas and the training of users. For example, the spreadsheet simply allowed users to specify a matrix representing a firm's operations with formulas linking the contents of the various elements of the matrix. It said nothing about the appropriate content of the formulas themselves. But once a spreadsheet program had been appropriately customized for the characteristics of a particular company, that custom spreadsheet could
then be shared with other users so that all each had to do was to enter his or her particular suppositions about future performance. Even more apparent are the potential savings in data entry. It is fairly ludicrous to have a large number of users spending their time entering firm data at the keyboard when that data could easily be entered once and disseminated by passing floppy disk copies from user to user, or even more directly, by downloading the data from the firm’s mainframe, where it would have been resident in any case. Finally, the training needs of potential users could well be handled centrally in view of their overlapping computational needs.

Management of large corporations, while slow to embrace the potential benefits of centralised coordination of microcomputer use within their organisations, has now moved to provide direction to both computer usage and, more importantly for our purposes, computer selection. This shift in attitude is indicated by the increased coverage of personal computers which has appeared in publications directed at DP departments and upper level managers with responsibility for managing information. As just one example, *Information Systems News*, which advertises itself as “the newspaper for information management in large user organisations,” has initiated a special feature section on personal computing in large user organisations, and devotes extensive coverage to personal computer strategies, chronicles of the way in which information managers exert control over microcomputers in their organisations. Similar increases in personal computer coverage have occurred in other publications with similar target audiences, publications such as *MIS Week* and *Datamation*. While these developments are relatively recent, they do portend ever more centralisation in computer selection.

The fundamental impetus for centralisation is the efficiency in the acquisition of information about computer capabilities and compatibility that is thereby generated. This perspective on the problem confronting manufacturers wishing to sell to large organisations leads one to focus on marketing considerations related to the provision of information—special services—to users in an efficient manner, not hardware or software issues. In contrast to this view, much attention in the trade press has been devoted to issues of micro-mainframe compatibility. While providing the ability for one’s microcomputers to communicate with mainframes of other manufacturers is obviously a valuable function, such capability falls far short of providing entry into the large user marketplace. Microcomputer manufacturers wishing to penetrate this market must make provisions for efficient central delivery of systems so that selection of machines and software, transfer of files across machines, and the user training required to implement such a system can be handled in a cost efficient fashion.

What is the role of the traditional microcomputer retailer likely to be in this large user marketplace? Clearly, if the one-time central provision of information about system capability is more efficient than providing services to users on an individual basis, computer retailers will not be able to recover their normal margins on sales to large organisations. However, if the computer dealer
designs a system useful to a large number of the users in such an organisation, it risks finding its services being subject to free-riding by other dealers. Manufacturers will be unwilling to impose "airtight" restraints in the marketplace which guarantee high margins to dealers because efficient margins are smaller for large organisation sales than for small business sales. Downward pressure on specialty retailer margins on sales to large organisations and the need for centrally handled sales will tend to favor direct sales by the manufacturer, simply as a device to limit free riding. If this process described the full extent of competition among distribution channels to serve large corporate users, there would be little conflict between channels, simply because the manufacturer's own sales forces would consistently underprice the dealers. There would be no need for vertical restraints, and complaints about the functioning of this market segment would be limited to dealer claims of unfair competition.

This is not the end of the story, however. When manufacturers rely on dealers for provision of customer services, the manufacturers price to the dealer will reflect only the manufacturer's production and distribution costs. When the manufacturer sells directly to large organisations, the additional costs incurred in the central provision of information will be rolled into the price at which the equipment is offered to such customers. Since the dealers pay lower prices for equipment, prices which do not reflect the services provided to customers by manufacturers, the dealers are in a provision to free-ride on the manufacturer's efforts. The problem is one of providing services to all classes of customers as efficiently as possible without penalising customers in any one class unduly. For policy-makers, however, the most pressing issue is likely to be one of coping with a paradoxical set of complaints from dealers. The dealers will almost certainly complain that where they are allowed to compete with manufacturers, the manufacturers will compete unfairly by undercutting typical dealer prices, but that the dealers are simultaneously barred from selling a number of products. The paradox is why a dealer would want the right to compete in a market in which his ordinary prices would almost surely be undercut. One solution to the problem of channel conflict is to sell to large organization customers at prices which are the same as dealer prices. When large customers are very sophisticated and purchase in volume, this solution will be adopted, and the only apparent conflict between distribution channels will be in the form of dealer complaints that they are being undercut by the manufacturer's direct sales forces. The undercutting will take the form of manufacturer-direct pricing which is below the price levels which that manufacturer suggests that its retailers maintain. The lower prices offered will reflect savings in the cost of services made possible by the size and organisation of the customer's computer system needs. Therefore the dealers should be able to compete for these sales at prices comparable to those offered by the manufacturer, with similar services provision. A problem arises if both dealers and manufacturers sell to such consumers. Assuming that the large users require considerable service from the manufacturer's representative, services in the form of design consultation and other pre-sale efforts, equal prices charged
to these users and dealers will lead to dealer prices which are too high to be efficient. From the manufacturer's point of view, a better solution is to charge higher prices to large users and to prevent dealers from competing for these users. This is the vertical restraint known as customer reservation.

It is interesting to note that such customer reservations are already present in the personal computer market. Consider IBM's marketing of its personal computers. IBM has used conventional retail channels to sell its low-end machines, the PC, the PC/XT, and now the PCjr. Its resort to retailers for these machines has obvious roots in the wide variety of application to which they may be put. IBM advertises that its machines are really different computers depending on the way in which they are configured, and it relies on its dealers to provide the configuration services. These are perhaps the archetypal pre-sale services. They are not easily provided directly by IBM in part because of the open-architecture configure of the machine and in part because of the diverse nature of the potential customer base for these products. IBM also markets its PC's directly to large organizations through its National Markets Division. It has been accused by dealers of undercutting their prices—a not surprising charge in view of our analysis. Presumably the reason that dealers have not been particularly successful in free-riding on IBM-provided services thus far is that those services are still individualised to some extent, so that the opportunities for free-riding are still limited enough to be offset by IBM advantages in identifying and contacting potential users directly. In any case, marketing of IBM's most popular personal computers does not yet seem to involve customer reservations.

The situation is different for members of the IBM PC line which are designed to work in concert with IBM's larger computers. These machines include the XT/370, the AT/370, and the 3270-PC. For example, the 3270-PC permits windows for the display of up to four mainframe programs running simultaneously, two "notepads," and a conventional PC session. The product is a combination of a very sophisticated 3270 terminal and a PC, and obviously requires access to a mainframe (or supermini) in order for its features to be useful. Even more interesting for our purposes is the XT/370, a machine which consists of a standard PC/XT augmented with three additional boards in its expansion slots. One of these boards mounts two Motorola 68000-series chips which permit execution of a substantial portion of the IBM 370 instruction set, a second is a dedicated memory board, and the final board provides for 3270 communications with a mainframe. Once again, this product must be linked to an IBM mainframe, but the remarkable characteristic of this system is that it converts a standard PC series microcomputer into a mainframe environment. Both this product and the 3270-PC could easily have been offered through IBM dealers, but IBM chose initially to reserve them for its own marketing arm. This decision can be interpreted as a customer reservation. More recently, IBM has been reported to have been willing to offer these products to a small portion of its dealer organization. Dealers would be required to meet substantial requirements for training.
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and support, requirements that go far beyond those applicable to the ordinary run of IBM retailers.

There is no reason to suppose that dealers would prove unable to sell the XT/370 effectively. The machine is, after all, an XT at heart, and dealers has proven an effective method for distributing these machines. Absent some form of dealer free-riding on manufacturer services, there would be no reason to deny these machines to selected dealers which had demonstrated the level of expertise necessary to support this equipment. In this case, however, the characteristics of these machines makes them eminently suitable for free-riding. In both cases, the link to a mainframe means that much of the programming necessary to support the functions the machines support will be provided centrally. In the case of the 3270-PC, the support will consist of providing consistent applications environment so that the user may easily access mainframe data in a reasonably transparent fashion. This mainframe-resident software is likely to be customised by IBM for particular installations, and the cost of a group of 3270-PC's will therefore include a large up-front expenditure resulting in services amenable to free-riding. IBM could simply have chosen to charge for these services up front as part of the price of the mainframe itself, but this is less efficient than loading the service charge into the cost of the 3270-PC if users of the attached mainframes will vary significantly in their use of the PC add-ons. The 3270-PC will run on the same mainframe systems that support ordinary 3270 terminals. The latter require much less special support as many terminal uses are not in search of the same degree of "user-friendliness" as is to be provided to the target 3270-PC customers. Hence rolling the service charge into the terminal price is a more efficient pricing method than a fixed charge because it is more flexible.

The XT/370 is expected to have more sophisticated users that the 3270-PC, but the same sort of central support will be required. XT/370 users will use mainframe VM/CMS code that is downloaded to the XT. The question again arises as to why IBM does not simply charge higher prices for its mainframes to which XT/370's are to be attached, and the answer is again that IBM wishes to price discriminate according to the differing reliance placed by its customers on XT/370's attached to its mainframes. If the XT/370 could be attached only to special mainframes, there would be little reason to prevent dealers from competing for XT/370 placements. Since, however, this machine configuration would lead to much less flexible mainframe systems, the cost to IBM's customers of this option would be substantial. IBM apparently intends to support various mixes of its lines of workstation in 370 environments, so that separate pricing for the various members of the workstation family seems efficient.

This analysis has troubling implications for independent computer retailers. Industry trade press reports suggest that IBM is positioning computers in its PC series to serve as workstations in conjunction with its mainframes. The company has already announced its PC/IX operating system, a single user version of A. T. & T.'s well-known UNIX operating system. This system costs $900 on
the PC, and so is apparently not going to constitute significant competition for the current lead PC operating system, PC-DOS. IBM has recently announced a Unix product, VM/IX, that runs on its mainframes under its VM operating system. This product will permit close linkages between the PC/IX world and that of the mainframe. Its importance in IBM strategy is still unclear, however. But in general the advent of multi-user systems, some of which are linked intimately to mainframe databases raises anew the problem of IBM of receiving compensation for the information which it provides at the central site or to programmers responsible for system choice and maintenance. As linkages among IBM equipment increase, and as the flexibility of IBM's product line expands with the introduction of new products, the balance in IBM's distribution channels decisions will tip toward direct sales in order to solve its information problems. Machines which either stand alone or communicate with remote databases is fairly routinized fashion will continue to be sold through independent distributors and dealers, but the line between products reserved exclusively for IBM's own sales force and those marketed by ISO's (Independent sales organisations) will be drawn at lower and lower levels unless IBM's requirements for dealers offering the higher-end personal computer products prove effective in preventing those dealers from competing with IBM's own sales force. The point here is that the restrictions which IBM imposes on its independent distribution channels must be equivalent to setting minimum retail margins on such products or IBM will simply choose to rely solely on its own distribution systems.

What will be the role of retailers if IBM denies them access to many of its popular models? Currently, many retailers are offering IBM "clones," machines which are compatible to a greater or lesser degree with IBM products. The prospects for these machines are not outstanding in the long term. The reason is that new versions of the IBM PC lines will almost certainly be less easy to emulate than current equipment. The most difficult part of a system to emulate is the BIOS, the basic input-output system, often coded in the computer's "firmware," that is, permanently resident in a memory chip that the computer's microprocessor refers to for directions. As a result of litigation between Apple Computer and an imitator, Franklin, it has been established that the BIOS software coded in ROM (read-only memory) cannot be copied. IBM has reached settlements with two of its imitators, Corona Data Systems and Handwell (an importer of Taiwanese copies) requiring that they not copy IBM ROM's for their own machines. There is another method for obtaining compatibility with IBM: one can emulate the actions of the ROM in software provided with the machine. That is, when an instruction in the computer program designed for the IBM issues a call to the IBM ROM, this call is "trapped" and the appropriate action that the ROM code was supposed to carry out is handled elsewhere. This approach is employed by a leading clone manufacturer, Columbia Data Systems.

The ability to emulate the actions of the ROM BIOS depends on how large, powerful, and complicated these routines are. As ROM code expands in size and
complexity, the emulation in software route becomes more and more difficult. As one example, the newly announced Apple Macintosh computer includes 64K of ROM, a large amount of code that would be extremely difficult to emulate. Assuming that IBM follows a similar strategy, succeeding versions of its machines will be much more difficult to copy than the PC, and the clone business will suffer.

It continues to be in IBM's interest to offer open architecture machines, that is, products for which add-on boards, other peripherals and software will be designed by third party vendors, many of which are small business startups. To see why this is true, it is necessary to recall that IBM is selling applications, not computing hardware. Additional applications made possible by the activities of the third party vendors increase the demand for the IBM products which are the central components of such systems, and therefore benefit IBM. This observation holds true so long as IBM does not wish to use peripherals as a disguised mechanism for discriminating in prices at which its computer equipment is sold to users. As a result there will be opportunities for dealers to sell IBM add-ons and software even if their access to IBM computers is limited.

By this same logic, IBM is likely to continue to support "Value Added Remarketers," the company's term for firms that bundle its products with software or peripherals from other sources to provide tailored systems for particular uses. These could include professionals such as pharmacists, doctors, dentists, accountants, and lawyers, as well as specialized standalone uses within large firms. Additional targets could be small business users in retailing, farming, and other service-related business. The defining characteristics of such niche or vertical (the industry's term) markets will be a very focused approach to a particular application and a lack of overlaps with other uses to which the machine could be put.

4.3 Conclusions

What will be the role of the specialty retailer in marketing sophisticated products, particularly those directed at the corporate market? The answer depends on whether the specialty retail channel can be controlled by IBM and other participants such as A. T. & T. through the use of vertical restraints. These must ensure that manufacturers receive compensation for their centrally-provided services. This requirement means that margins charged by the specialty retailers on linked products are not eroded and that the specialty retailers provide a share of the support that corporate users require. Without effective restraints—restraints which are equivalent in effect to resale price maintenance—manufacturers will simply choose to deny their relatively sophisticated products to dealers.

This point requires reiteration. Dealers will complain of unfair competition by manufacturers for sales to the corporate marketplace. If responses to these
complaints take the form of non-discrimination rules or other limits on manufacturer behavior, the manufacturers are likely to respond by denying to dealers the products that they must have to sell into this market. The result would be a much more limited dealer channel, and an impairment of the ability of new manufacturers to enter the personal computer marketplace generally. The point here is that one must consider the possibility that efforts to help dealers compete may end with the perverse result of denying them the tools they need to enter the corporate market.
Chapter 5

Home Computer Marketing

5.1 Introduction

In the last chapter, we considered the implications of the informational theory of vertical restraints for the choice of distribution systems at the high end of the personal computer market. For complicated systems linking users together, a prime requisite for a distribution system is that it provide sufficient information to consumers to permit them to choose wisely for a wide variety of possible configurations. The competition for specialty retailers at that end of the product spectrum is thus likely to come from alternative channels that handle such information efficiently. In this chapter, we turn to another interface between distribution channels, that between specialty retailers and mass merchants. The latter are likely to provide very little information to consumers beyond what they can obtain from manufacturer advertising and independent study. Hence the mass merchandising channel must compete with specialty retailers by providing computers at lower margins to make up for its informational deficiency. It should not be surprising, then, that mass merchants have been most successful in selling simple machines, some of which are little more than game consoles. These computers have been sold primarily to customers for use in their own homes, rather than to those interested in business and professional uses of the machines. The primary question to be answered in this segment of the marketplace is whether more advanced machines now becoming available in this market segment will be retailed successfully by the mass merchandiser channel, or whether their more complicated applications will require an increased dose of the information that specialty retailers are more adept at providing.

In this chapter, we analyze the home market and suggest that new products are likely to be sold effectively through specialty retailers. We suggest reasons
why the home market has been slower to expand than many observers had anticipated. The analysis suggests that decisions to offer new machines through mass merchandisers are risky indeed, and that if manufacturers are successful in controlling their distribution by means of vertical restraints the specialty retailers are likely to account for an increasing share of the lower end of the market.

The bulk of the analysis is included in section 5.2, the home computer market analysis. Section 5.3 considers software stores as an illustration of the ideas in section 5.2. A brief summary is provided in section 5.4.

5.2 Home Computer Marketing

The market for personal computers in homes has been a volatile one, even by the standards of the computer market. Failures in this market have been nothing short of spectacular, and have included large, experienced, well-financed firms such as Texas Instruments, Timex and Mattel, as well as ambitious entrants such as Coleco. Price cutting has been rampant, as has red ink even for the surviving firms. Much of this instability must be attributed to the nature of the products offered to the home market. In general, it is fair to say that most of the manufacturers have offered to consumers equipment that was capable of performing a number of tasks, none of which was particularly important for home management. Word processing has been offered in rudimentary form, but it is not clear that such software would provide better results than handwritten letters. Checkbook management and recipe files also can be handled as well manually as by a computer, at least until the number of tasks involved became quite large. Probably the only application that has been sold successfully (apart from games) is educational software. With more and more schools offering access to machines more powerful than, and incompatible with home computers, the lure of the home machine for this latter application has faded as well.

The failure of the personal computer to carve out a niche in the running of a typical household may thus be attributed in part to the failure of manufacturers to develop applications software products of demonstrable use to households. But there may also be another factor involved. Home computers have typically been marketed through mass merchants, rather than through the specialty retailers that have marketed higher-end products to businesses. Since that mass merchandisers has served as little more than convenient warehouses for computer merchandise, and have not provided pre-sale support for computer consumers, this channel has limited the types of applications that the home manufacturers could introduce effectively. The informational limits of the mass merchandising channel imply that new applications could be introduced only if the potential market for these new programs was quite broad. This is because the manufacturers needed to rely of devices such as advertising to convey the uses of their computers to potential customers, and narrowly targeted
software programs could not be cost-effectively exposed to consumers by means of most available advertising media. The utilization of home computers thus may not only have been limited by the availability of truly useful software, but also by the inability of personal computer manufacturers to apprise customers of what useful software does exist.

The home computer market is currently in a state of flux as more consumers are opting for high-end machines with large software bases and traditional home computer manufacturers are planning new and much more capable models that may be useful to business users. During the 1984 Christmas season, IBM PCjr and Apple II computers sold very well at the specialty retailers with many of these sales attributed to home purchasers. Recently Atari has introduced its ST computers, christened the "Jackintosh" computers by industry observers after Atari president Jack Tramiel and their resemblance to the Apple Macintosh. These computers will be comparable in power to the Macintosh, employing the same processor and an icon-based operating system that mimics the Macintosh approach. They will sell for very much less, however, and will be marketed through discount stores such as K-Mart. Commodore plans a similar but even more capable machine, but its distribution plans are less clear. These developments make it apparent that a collision between the home computer-mass market world of Commodore and Atari and the business-oriented specialty retailer approach of Apple and IBM is imminent. Given the importance of small business in the specialty retail channel, the outcome of this confrontation will obviously have significant small business consequences.

In this section, the informational perspective on computer retailing is applied to the analysis of the marketing of home computers and to this impending collision. The focus here will be on the boundary between the two principal marketing channels competing to serve this market, the mass merchandisers and the specialty computer retailers. As we have emphasized, the choice of distribution channel governs not only the success of a computer manufacturer's current products, but also the possibilities for success of machines yet to be developed, and these strategic considerations may be as important in manufacturer decision-making as current profitability. In addition, the selection of a distribution channel affects crucially the configuration of the equipment that can be offered to consumers. Because this market is so new, it should not be surprising that several parallel strategies have emerged on the part of the equipment manufacturers. Thus far, the less successful rivals in the market, companies such as Texas Instruments, Atari, Coleco (Adam) and Mattel (Intellivision) have chosen to market primarily through mass merchandisers, and have had little success in the specialty retail channel. Commodore has sold computers through both specialty retailers and through mass merchandisers, and has thus far proven quite successful, though its representation with the specialty retailers appears to have waned. Tandy has offered products not unlike those of its low-end rivals, but has differentiated itself by marketing through company-franchised, hence closely controlled outlets. Finally, the high end of
the market is occupied by two of the major personal computer manufacturers, IBM and Apple, each of which has been careful to control distribution through specialty retailers. This section considers each of these strategies in turn.

The general pattern here should already be apparent. The more sophisticated the computer, the greater the reliance on the specialty computer retailer. In part, this pattern of allegiances is simply rooted in historical accident. Three of the companies at the low end of the spectrum, Atari, Coleco, and Mattel, are migrants from the market for game players, essentially dedicated computers with microprocessor power devoted primarily to computer graphics. The game consoles were obvious candidates for mass merchandising. The consumer was not required to make any choices, either in hardware or in applications. One simply bought the console, plugged it into a television, and inserted a cartridge. The games may have differed marginally, but basically all games could be considered a variant of a single application. Since the target audience was diverse and the message that the game manufacturers had to transmit to customers was simple, they could rely on advertising to get their message across. Specialty retailers had little role.

The obvious migration path for these firms was to upgrade the capabilities of their consoles by increasing the computing power of the hardware and adding a choice of software packages. The machines could still be heavily advertised with spokesmen like Alan Alda (Atari) or Bill Cosby (Texas Instruments) attesting to their simplicity of use or utility, but as the potential of the machines expanded, the advertising necessarily became less focused, more oriented toward vague promises of usefulness. In addition, as the flexibility of the machines increased, so did the number of choices which consumers were compelled to make. Did the consumer want to try some Basic programming? Some form of mass storage, such as a disk or tape drive was indicated. What about some to save the results in hard copy form or to do some word processing? A printer would then be appropriate. What about contacting one of the electronic information sources? A modem would be required. Did the limited resolution and short lines of the display on the family television lead to eyestrain and ineffective word processing? A monitor would solve these problems. But as the equipment options grew, the possible combinations grew much faster. Beyond these hardware issues lay the choice of the software necessary to implement these new functions. The information requirements of intelligent choices rapidly expanded far beyond the capabilities of the mass merchandisers and advertising to inform potential consumers. Hence the result that consumers were left wondering what to do with the machines they either had purchased or were considering purchasing. There is considerable irony in this situation, for the machines offered by these companies were capable of far more that the game consoles they replaced, and were priced as low or lower than those consoles. Yet despite, or indeed because of, this increase in power and flexibility they apparently failed the market test. It is sometimes alleged that the market for home computers has not expanded nearly as rapidly as it might have because of a lack of applications suitable for
home use. By this argument, a product like VisiCalc will eventually materialize which will galvanize consumers to want their own machines. This analysis may apply at the high end of the market, but at the low end, the lack of new applications is less of a problem than the failure of the companies offering computers to inform consumers about applications already available.

One solution to this informational bottleneck caused by a plethora of choices available to consumers is to change marketing channels. As we shall see below, this has been a successful approach. There is an alternative, however. One can provide more power and flexibility than was present in game consoles and still limit the informational burden placed on consumers by bundling components together, thereby lessening the number of choices the consumer must make. This strategy has obvious costs, for the bundle will inevitably prove unsuitable to some consumers, some of the functions included will prove unattractive to others, and applications growth necessary to maintaining demand will be stifled. But the strategy does permit low-cost mass merchandiser distribution and increases the efficacy of mass media advertising. An example of a company pursuing this strategy was Coleco. Coleco's Adam computer came with computer console, mass storage device (a cassette tape drive), a very slow letter quality daisywheel line printer, and software (word processing, Basic, and a game cartridge). The purchaser thus had access to programming, games, and word processing, a complete home system. In Coleco's case, this was not enough, and the company followed the examples of Mattel, Timex and Texas Instruments in abandoning the home market. Nevertheless, one may expect the strategy to reemerge from time to time as home computer makers attempt to use the mass merchandiser channel to market their products.

One instance where this approach is likely to resurface is the Atari ST line mentioned above. The ST line is based on a Motorola 68000 microprocessor, the same as used in Apple's Macintosh and a more powerful chip than the 8088 employed in the IBM PC. The ST will use a proprietary operating system, thus limiting the availability of software for the new machines. The user interface will mimic the Apple approach of using graphics and a mouse as a pointing device and these computers should therefore be relatively easy to use. The interface is called GEM (Graphics Environment Manager) and is a product of Digital Research. The operating system and GEM will be encoded in ROM (read-only memory) that is incorporated in the computer and will therefore not need to be reloaded from disk when the machine is turned on. A 128K version will sell for $400 and a 512K version for $600. A tape drive and color monitor will add about $300 to the price, but the machine will still sell for less than one half of the price of a Macintosh and will offer color as an additional inducement. In addition, the Atari keyboard will offer a more professional layout than that of the Macintosh, and may therefore be more appealing to business users.

Based on these specifications\(^1\) this machine would appear to be a very at-
tractive alternative to the Apple product, and indeed, considerable concern has been expressed by Apple owners that their machines will be superceded by these aggressively priced Atari models (or by similar machines in the offing from Commodore). Such concern may be excessive. The Atari machines will be capable of very sophisticated tasks, but whether software will be written and marketed for these tasks is an open question. Atari's decision to market these machines through the mass merchandising channel represents a considerable business risk. It appears likely that the use of the mass merchant channel will limit the software sold with these machines to imitations of the best known software sold for rival products such as the Macintosh. Less well-known applications simply will not be marketable through this channel, as means to explain the applicability of such software to a consumer's needs do not exist.

Informational defects of the mass merchandising channel may help to explain Atari's curious attitude toward independent software developers. Most manufacturers have gone to great lengths to get pre-production versions of their new computers into the hands of software developers in order that a large software selection can be on hand to coincide with the introduction of the machines. In contrast to the usual approach of offering computers to software developers on favorable terms, Atari is selling early versions of its computers to developers at a substantial premium over its announced retail prices. This approach is supposed to limit contacts with developers to those which are truly interested in writing software, but appears more likely to reflect an attitude that only a limited range of software will be saleable through the mass merchants, and that Atari will need to write much of that internally. If so, these machines may be quite capable at well defined and universally necessary computer tasks, but they will lack the flexibility that characterized most successful personal computer lines.

The nature of available distribution will govern the products that companies such as Commodore and Atari introduce, and not the reverse. As long as personal computers continue to be general purpose machines, it would appear that there will be a significant role for the specialty retailers that explain to consumers how computers can be put to use for their intended applications. This sort of aid does not appear to be forthcoming from the mass merchandiser channel. In this regard, it will be interesting to see how Commodore chooses to market its own new computer product, often referred to as Lorraine. This product will be similar to the Atari ST, but more powerful. If so, it would seem a candidate for the specialty retail channel that once handled Commodore's C-64 before giving up in the face of the discounter competition. It will be difficult for Commodore to obtain distribution in the specialty retailers without substantial guarantees of protection from discount competition. Hence, if Commodore decides to use the specialty retailers, we may anticipate that vertical restraints will be used even more extensively than by current users of the specialty retailer channel.

Commodore and Atari will find it difficult to attract specialty retailers in part because these retailers have already become successful at selling their established
computer lines to home customers. As mentioned above, Apple II and IBM PCjr computers have been priced low enough and have now become sufficiently capable that they are selling rapidly to the home marketplace. Neither of these computers is trivial to learn to use, and the willingness of specialty retailers to stock their products is thus based in part on the existing stock of knowledge of their properties that the retailers possess. This knowledge is derived from selling these machines or closely related products to the business market. The new machines from companies such as Commodore will almost certainly offer new architectures and incompatible operating systems, requiring substantial investments in information and training by dealers choosing to carry them. In addition, each machine will require a separate software inventory, a considerable fixed expense. It is apparent that companies such as Apple and IBM as well as other vendors with established business computer lines will be at an advantage in attracting specialty retail distribution.

5.3 Software-only Stores

Consideration of specialty retailers that specialize in sales of software has been deferred to this chapter because the inventories of such stores are oriented toward packages for home computers and low-end business machines. Thus these stores tend not to offer much in the way of IBM PC software, but do stock packages for Commodore, Atari, and Apple.

The reasons for this concentration on home computer software are straightforward. The discount outlets that sell home computers typically carry only a narrow range of software that will appeal to a large fraction of their typical customer base. But since computers are inherently flexible, this narrow range of software will far from exhaust the available applications for home computer products. Moreover, some of the packages designed to be broadly applicable will fail to meet the idiosyncratic needs of some consumers for their intended applications. Hence there is a need for outlets that will provide a more complete inventory of software for the machines sold by the discounters. Moreover, the holders of this inventory can provide a portion of the consumer information that discounters fail to provide. The software-only stores thus can play a role in making computers sold through discount stores much more useful than they otherwise would have been.

There are several problems with this strategy, however. The first is that software is even more susceptible to free-riding than is hardware. This is because there is less of a link between pre-sale services subject to free-riding and post-sale services that can be withheld from consumers who purchased their equipment elsewhere. Recall from Chapter 1 that mail order firms are more successful in the software market than in hardware. A hardware add-on product is much more likely than a piece of software to require modification to make it work with a particular system. A second problem for software only stores
is that they must rely on the discounters to sell hardware. To the extent that specialty computer retailers become the channel of choice for home computer hardware, the software only stores will have little to offer in comparison to those specialty retailers. Their only option will be to compete on the basis of price and to drop any demonstration and support services provided. If so, they will simply become convenient mail-order-like outlets. Finally the software-only stores must rely on the hardware manufacturers that sell through discounters to maintain open systems so that extensive follow-on products are possible. If these manufacturers provide bundled, closed systems, the market niche of the software-only stores will close. It may be difficult for the software-only stores to obtain add-on software to sell in any case, for while new graphics-oriented machines are designed to be easy to use, the graphics interfaces are difficult for software designers to program. Hence, follow-on products will be slow to come to market.

5.4 Conclusions

The future of the home computer market can take two possible paths. To the extent that manufacturers targeting the home market wish to sell through discounters, those manufacturers will need to package their systems in such a way as to minimize the need for consumers to make decisions. This is a risky strategy, for it limits the usefulness of home computers by limiting their flexibility. Manufacturers of such machines will need to compete not only with more flexible machines sold through specialty retailers, but also with manufacturers of products that devote microprocessors to particular uses. As personal computers incorporate more powerful processors and give access to ever more applications, the need for the informational services provided by specialty retailers will likely increase, so that one may expect that their share of sales at the low end of the market will increase. If this comes to pass, the other major potential small business segment, software-only stores, can be expected to languish.

Developments in the near future will shed considerable light on the future course of this market. Atari's strategy to market its sophisticated ST models through discounters is a risky one, but should it succeed, the specialty retailers will face competition from a very capable rival product. Perhaps more important is Commodore's decisions about the marketing of its new machine. Since this product is rumored to be considerably superior to Apple's Macintosh, it presents a formidable challenge to existing equipment. Even though it may be easy to use, its sophistication would suggest that it will be marketed through computer retailers. Whether Commodore is able to attract such distribution will have an important effect on the success of this machine, and on the fortunes of the specialty retailers themselves. It is likely that Commodore will not attract retailer distribution unless it is willing to exercise substantial vertical control over its distribution system. It is quite unlikely that Commodore will be able
to combine specialty retailers and discounters in the same distribution system.
Chapter 6

The Impact of Integrated Software

[Note: This chapter was written during the summer of 1984 as a number of integrated packages were either being released or announced. Subsequent events suggest that the analysis provided here was substantially correct, and it has therefore not been revised. Of the available integrated programs, only Symphony has proven a sales success. Framework has disappointed its designers despite a warm critical reception. Neither Enable nor the Smart series has made a noticeable impact. Even in the case of Symphony, sales of this integrated product have been considerably outpaced by those of its older, less integrated rival, Lotus 1-2-3.

Integrating packages are just reaching the market at this writing. It appears that the market battle may take place not among integrated packages, but rather between integrating packages for MS-DOS machines such as IBM's Topview and other operating environments such as Unix.]

6.1 Introduction

The introduction of computers based on microprocessors using 16 bit architectures has created a number of new opportunities for software designers to increase the functions available from applications programs. The main advantage of the 16 bit chips over the previous generation of 8 bit processors is in the amount of memory that the chip can address. Eight bit chips such as the Motorola 6502 used in the Apple II and III computers and the Intel 8085 and Zilog Z80 chips used in CP/M computers running the CP/M operating system could address a maximum of 64K bytes of memory directly. More could be incorporated into programs by means of bank switching, a technique causing the computer to keep track of what was present in 64K increments of memory and to switch between these banks as needed. This bank switching required
increases in the sophistication of the operating system and taxed the processor as well. In contrast, the advent of the 16 bit systems together with a very rapid decline in the price of memory meant that much larger programs could remain resident in memory. The 8088 chip used in the IBM PC could address one megabyte of memory. Even when one subtracted the memory space reserved by the designers for system purposes, the user's program had up to 640K bytes of memory to work with, ten times the amount available in a typical 8 bit system. Currently, systems are being shipped that employ even more advanced processors capable of addressing ever increasing amounts of memory. The new IBM PC/AT employs an Intel 80286 processor in a design that accommodates over three megabytes of memory and which does not exhaust the capabilities of the processor. Systems on the horizon will incorporate 32 bit microprocessors with power equal to that in the most powerful of today's minicomputers.

The question for software designers is what to do with this additional capability. The answer to this question of how to utilize additional system capabilities has not proven to be one of offering new and different applications in comparison to those of the 8 bit world. Applications have continued to be dominated by the "big three" business programs—database, word processing and spreadsheet programs. Even the newer applications, such as project management, could be implemented in an eight bit environment. More elaborate programs requiring the processing of large amounts of data, including statistics and forecasting programs, have generally remained on mainframe hosts, though some migration will surely occur as minicomputer-like microcomputers become more widespread. Instead of offering new applications or porting mainframe programs to microcomputers, applications developers have concentrated on enhancing the capabilities of existing applications. This improvement has occurred in several ways. Increased memory has allowed software developers to make programs more "user-friendly" by permitting the use of on-line help—screens of information on the use of commands available at the touch of a key—and by automating commands that had previously required a number of keystrokes. There is little difference in the capabilities of a well-designed eight bit word processor such as WordStar and its newer successors such as MultiMate and Microsoft Word, but the more recent programs are generally regarded as being much easier to use. Apart from the on-line help and more transparent command sequences, the newer generation of programs are also easier to use because functions which required a user to employ multiple programs have now been combined in a single program, thereby again simplifying use. As one example, the preparation of a mailing list with WordStar requires the use of a second program, MailMerge, while the merge function is built into many of the more recent products.

Though the movement toward integrating separate functions into a single program has been underway for some time (WordStar itself is an integration of two programs which are sometimes sold separately, a text editor and a text formatter), a new class of programs is emerging which are known specifically as integrated software products. One of the first such products was Lotus 1-
2-3, a very successful package which combined an advanced spreadsheet with the ability to pass portions to programs capable of displaying graphs of the data and printing those graphs with appropriate legends. In addition, the program possessed rudimentary database management capabilities. The success of 1-2-3 probably stemmed as much from the sophistication of the spreadsheet—sophistication based on the use of context-sensitive help screens and a large capacity spreadsheet, both memory dependent capabilities—as from the integration of the graphics function and database capabilities, but the stage was set for yet more integration of functions.

The more completely integrated programs are now reaching the market. Lotus is shipping Symphony, an enhanced version of 1-2-3 which also includes a limited word processor and a communications package. Ashton-Tate, another well-established software vendor, is offering Framework, a similar package which also includes an outlining feature. Several smaller startup companies are also offering competing programs, companies such as Innovative Software with its Smart series and The Software Group, with Enable. These products are being heavily promoted, and it is clear that their designers believe that the next great successes in the software market will come from these types of programs.

What is it that distinguishes these programs from existing applications packages? Suppose that one wanted to prepare a business document which included information extracted from a database, financial calculations from a spreadsheet, graphs of the results, perhaps information from a mainframe computer, and text to describe the results of the analysis. When using separate applications programs, this would require knowing a number of command sequences and user interfaces, but, more importantly, the user would be required to convert files prepared by one program to work with the others. There are a number of ways in which files are stored by the system, and although it is possible to convert file formats, it is often quite difficult to do so in practice. The integrated program presents the user with a common interface applying to all of the programs which make up the package. More importantly, each of the component programs stores data in the same manner, facilitating transfer without user intervention. The intended result is that a user who might ordinarily choose to master only one component of the applications offered in the integrated package will now have much more computing power at his/her disposal with little additional learning effort.

The new packages are not the first to attempt to integrate capabilities of a number of applications, though the newer packages are distinguished by the more "seamless" nature of the integration involved. The pfs series of Software Publishing Company, now offered by IBM as its Assistant series, uses the same keystrokes for identical operations in each member of the software family. In addition, each program uses a common file structure. These programs constitute an integrated environment, though not so closely integrated as, for example, Symphony. Another approach is that taken by VisiCorp, with its VisiOn series. The VisiOn series uses an applications manager program to control communica-
tions between its various applications programs. The applications program can be viewed as integrating software, as opposed to the more common integrated software. The VisiOn series has been notably unsuccessful in the marketplace, due in part to its significant hardware requirements (812K and a hard disk) and in part to slow performance. But as we shall see, there is reason to think that the general approach of providing integrating software, rather than integrated software, will prove a successful strategy in the long run.

A number of vendors of software have announced their intention to offer integrating software products. These include DesQ, from Quarterdeck Software, a small start-up vendor. This product uses existing applications without modifications, but is incompatible with a number of programs. It also fails to provide easy file transfer between programs. Two major vendors have announced programs which will carry the degree of integration offered considerably farther. These are Windows, from Microsoft, the producer of the popular MS-DOS operating system, and Topview, from IBM. Each of these promises to provide substantial competition for the integrated software package approach.

6.2 The Economics of Integrated Software

The movement toward integrated software mirrors the approach of the Osborne Computer Company in the hardware market. As discussed in the section devoted to vertical restraints in hardware marketing, Osborne bundled software with hardware, thereby offering a package which would appeal to the typical business user and thereby remove the burden of making separate decisions about each of the packages. The price of this packaging is flexibility. The user obtains a powerful package, but one which is not tailored to that user's particular requirements. In the case of integrated software, the advantages for ease of learning and ease of use of a consistent user interface and file transfer scheme must be balanced against the inevitable losses in capability of the integrated package when measured against the user's particular needs. The applicable economic principle here is the maxim that the division of labor is limited by the extent of the market. The software market has grown explosively, and one should therefore expect increasing specialisation as various niches within the market grow to the point that it pays software developers to address them specifically. The integrated software approach is in direct contradiction to this maxim—one software solution is provided for a wide variety of applications. Inevitably, this monolithic-solution approach must result in compromises for each of the component applications. The compromises are illustrated by the Symphony word processor, a program which has been characterized in early reviews as having limited capability suitable for memos, but not for long documents. Framework's word processor is somewhat more powerful, but lacks such basic features as superscript and subscript. In addition, the cost of the better word processor and outlining feature in Framework is a spreadsheet program which is
not as powerful as those in the Lotus products. Neither of these programs has a database capability remotely competitive with specialized database programs such as Ashton-Tate's own dBaseIII, or any of a number of competing database managers. The point is that integrated software makes compromise almost inevitable, as firms which specialize on only one of the integrated tasks are likely to be able to develop products which are superior for that task.

Even if the components of an integrated package are each comparable to those sold as separate applications, there is little reason to suspect that the integrated package as a whole will be able to dominate the capabilities of separate packages. There is no "best" word-processor, just as there is no best database manager or communications program. The choice of a package is often a matter of personal taste and special needs of the user. Therefore, a package of components which are each well designed is likely to contain elements which are not as well matched to individual applications as would be possible with separate packages.

The desire for integration is in itself somewhat in conflict with the division of labor maxim. It is not clear why an executive would wish to prepare complete documents with integral graphs and spreadsheet data. While there is likely to be considerable demand for the capability to produce completed documents which incorporate graphs, text and data, there is no particular reason why these documents should be completed by one individual or prepared on a single machine. Just as the division of labor in the computation need to prepare the program will be divided among a number of tailored applications programs, the task of using those programs will be divided among a number of individuals—analysts, secretaries, specialists in graphics, and so forth—so that no individual will need to be conversant simultaneously with all parts of the program. The division of labor will apply both to users and to the software that they employ. As long as the tasks are divided among specialists, it is reasonable to provide each specialist with applications software appropriate to the assigned task.

There is nonetheless the need for integration in order that the activities of the various members of the document preparation process can work together without substantial incompatibility. But integration of this sort does not require that each of the applications be part of the same environment. Instead, the integrating software approach can be employed. Operating-system level products can define file transfer protocols to which applications must conform and can also define the nature of the user interface. Such programs are under development by leading OS vendors such as Microsoft and Digital Research. These products are appear likely to prevail over existing integrated packages in the longer term since they offer in principle the advantages of integrated software without foreclosing applications flexibility. But until a standard for such packages is established, the integrated packages will certainly be successful as an interim solution.

Integration will continue to increase as computer capability rises and the programmer's ability to enhance ease of use thereby rises. Just as separate
text editors and formatters are the exception, rather than the rule, integration of database, spreadsheet, statistics and forecasting capabilities and graphics options will surely continue. But much of the integration will be done using separate applications packages tailored to particular uses by programmers, as opposed to having the each of the programs mastered by end users. Whether the current type of integration will continue to prosper is more problematic. Nevertheless, in the near future, integrated software is likely to be very successful. Even though it is designed to simplify access to multiple computer capabilities, the software itself seems certain to be difficult to master and correspondingly hard to explain to uninformed consumers. The advent of such software will therefore present substantial challenges to the distribution system, and hence to small business.

6.3 Distribution Consequences of Software Integration

Integrated software is designed both to make applications more accessible to users than separate packages would be and to increase the range of computer capabilities a user chooses to employ. Despite the goal of being easier to learn than a group of unbundled applications, the integrated package will place greater demands on users than had previous generations of software. While it may be easier to learn the spreadsheet, database, word processing and graphics components of Symphony or Framework than to master separate packages for all of these functions, few users of separate packages would have chosen to learn all of the bundled applications.

This increase in the requirements placed on users implies that correspondingly increased demands will be placed on dealers and distributors. The task of selecting which software to carry will become more difficult and the services required of dealers—both in terms of pre-sale services and training after the sale—will increase apace. While the need for after the sale training can be addressed by special courses and corresponding charges for training services, the need for pre-sale service sets in motion a classic free-rider problem. It is very difficult to explain what an integrated package can do for a prospective customer. Indeed, the television advertising presented by Lotus for Symphony makes no mention at all of its capabilities. The goal of the advertising appears simply to induce customers to ask their dealers for an explanation of program capabilities. But as long as the integrated product is available at steep discounts, there is little reason to expect that retailers will be willing to invest the substantial effort required to become conversant with the features of these programs.

The increased need for dealer services and the corresponding necessity to protect dealer margins from discounting has apparently been recognised by both Ashton-Tate and Lotus. Ashton-Tate, for example, has cut the number of its
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authorized distributors from over 35 to only 5. Among the requirements for its new distributors are that they have certain minimum staffing levels in regard to service and that they sell only to authorized dealers. Dealers are also being reauthorized, and the number of authorized dealers is being reduced from 4,000 to between 2,500 and 3,000. Apparently, the new dealer arrangement is apparently the first time that Ashton-Tate has dealt directly with its dealers. 

According to the company's director of sales, the motivation for these measures is to prohibit mail-order sales either by the dealers themselves or by discounters who obtained supplies reshipped to them by dealers. In order to be permitted to sell Ashton-Tate products, "dealers must show that they have a dedicated outside sales force, a support staff trained in the firm's products, a policy of only face-to-face sales and other evidence of a strong orientation towards corporate sales." Lotus apparently spends considerable effort to eliminate mail order sales, and terminates dealers who sell through mail order outlets.

In the cases of both Lotus and Ashton-Tate, it is unclear how successful these efforts to control distribution have been. A call to a mail order firm on August 13, only three days after Framework arrived in the Columbus retail market, found Framework in stock for $375, as compared with a list price of $695, and Symphony offered for $439. These discounted prices would cut dealer margins significantly, and are just the sort of discounts which Lotus and Ashton-Tate attempted to prevent. It is apparent that the vertical restraints which have so far been adopted have been unequal to the task. MicroPro, one of the leading software publishers, has chosen not to employ vertical restraints simply because they do not appear to work. A MicroPro executive notes that Lotus spends "...a lot of overhead dollars to monitor channels and pursue contract violators...but the results haven't seemed worth the effort." MicroPro notes that while it does not currently control its distribution, it would adopt controls which it viewed as workable.

The marketing developments associated with the introduction of a new generation of software thus provide ample evidence that the developers of this new and complicated software regard the provision of dealer services as critical to the success of their products. Advertising does not appear to be a viable alternative device through which consumers can be informed, so that the dealer is likely to remain an integral part of the distribution chain. However, the need to


control that chain has already led to strict limits on the dealers and distributors permitted legally to handle these products, and even such limits have proven to be inadequate. One may therefore anticipate that distribution in the future will be limited even more strictly. There may be a tendency on the part of the software vendors to favor retail chains which integrate wholesaling and retailing and exercise more control over resale of software than is possible under prevailing distribution arrangements. The need to protect full-service dealers by monitoring their activities is likely to give rise to scale economies in both wholesale and retail distribution, economies which would be less likely to arise were the array of vertical restraints available to the software vendors more effective.
Chapter 7

Conclusions

This report has considered a wide variety of characteristics of the personal computer marketplace that may best be understood as responses to the need to inform consumers about system configurations and software appropriate to the tasks those consumers might wish to accomplish. Specialty retailers have been effective in marketing personal computers in good part because they have been able to act as the consumer's agent, combining products and services from a variety of sources into an effective package of computer capability. If such retailers are to continue to be able to provide such services effectively, they will need to be guaranteed a return on their efforts. Manufacturer devices to guarantee such returns in the form of controlled margins have involved extensive use of vertical restraints. These restraints have most often taken the form of refusals to deal with discounters directly and attempts to prevent those discounters from obtaining supplies indirectly from resellers. Thus far, such efforts have not been particularly effective as evidenced by the volume of advertising by discount mail-order businesses in personal computer magazines and by the growing share of the personal computer market, particularly the software market, that these mail-order firms control. One can expect that as the personal computer market continues to grow, manufacturers will take ever more stringent steps to control discounting, so that complaints to policymakers will increase.

For small business purposes, the conflict between mail order and specialty retail firms is not the major issue. The increasing presence of mail-order marketing simply serves to make specialty retailers less effective. Those retailer, confronted with smaller margins due to free-riding, will simply choose to provide fewer pre-sale services, stock smaller inventories, and as a result will become a less attractive distribution channel in comparison with others available to manufacturers. One the one hand, the specialty retailers are beset with competition at the low end of the market by mass merchandisers offering simple, unsupported products. As computers become more complex, this competition may be less important. Such an effect is most likely if strides to making personal
computers into "appliances" ready to run when taken from the box are slow to come about.

The challenge to specialty retailers at the high end of the product spectrum is more serious. The two alternative channels available to manufacturers are direct sales to end users and sales through value-added remarketers providing tailored systems. The former approach contains no small business component, while there do exist a number of small remarketers. If the specialty retailers are to be successful in competing against either of these channels, it will be because they are an efficient means of informing consumers. In order for them to fulfill that role, they must be permitted a return on their investments in information. The requirement for such a return is that effective property rights in information be created. The role of vertical restraints is to create such rights. Hence, the continued success of specialty computer retailing will depend on a liberal attitude on the part of the courts and policymakers toward the use of such restraints.
Glossary

address A name given to a location in the storage (memory) of a computer. Also verb: to point to or access a location in a computer's memory.

BASIC A comparatively easy-to-use programming language which has become very popular for microcomputers.

board In popular usage, an add-on for computer systems. Common boards include memory boards which permit adding additional RAM memory, display boards which provide signals for CRT monitors, and modem boards, which permit communication with remote computers over telephone lines.

bus A series of electrical connections between the microprocessor at the heart of a computer and the memory and peripheral devices with which it must communicate.

byte A basic unit of measurement in computers. A byte consists of eight switches (called bits, or binary digits) which are either on or off. Depending on the way in which its bits are used, a byte can take on values 0 to 64 or 0 to 128.

chip A silicon substrate onto which a large number of transistors are etched. The result is an integrated circuit.

CRT Cathode ray tube, the television-like apparatus commonly used as a computer display.

disk A storage device which retains information when the computer's power is off. Disks are similar to tapes, but can generally access data stored on them much more rapidly. Disk drives are the devices that spin the magnetic media on which data are stored past heads which read and write on the media. If the storage medium is rigid, the disk is called a hard disk, while flexible media are the basis for floppy disks. Floppy disks generally store less material than hard disks, but have removable media uncommon in hard disk units.
dual distribution Name given to manufacturer's practice of distributing its products simultaneously through its own sales force and through independent distribution channels.

8-bit computer A computer capable of processing eight bits (one byte) of information at a time and which communicates with peripheral equipment in one byte units. An 8-bit computer can generally address 64K bytes of memory.

embedded microprocessor A computer chip that is dedicated to a particular use, such as controlling the fuel system of an automobile. The operation of such microprocessors is not generally noticed by the consumers making use of products in which they are embedded.

exclusive dealing Marketing practice by which manufacturer compels distributors of its products not to handle the products of rival manufacturers.

floppy disk See disk. On the IBM PC, floppy disks are capable of storing 360K bytes of data.

gray market Term for resale of products among distributors. Many computer manufacturers attempt to require that dealers sell their products directly to final consumers rather than to discounters in gray market transactions.

hard disk See disk. The IBM PC/XT hard disk is capable of storing 10 megabytes of information. The PC/AT hard disk stores 20 megabytes.

hardware The physical equipment portion of a computer system.

integrated software Programs which combine a number of functions and which provide for simple data transfer between functions.

kilobyte (K) 1,024 bytes, a common computer measurement.

mainframe A very large central processing unit (CPU) together with high capacity peripheral devices capable of doing a number of tasks together in batches. Mainframes are often used in banking and other fields requiring management of large amounts of data.

mass storage A high capacity means of storing data that retains the data when a computer's power is off. Disk and tapes are the most common mass storage devices in the personal computer world.

megabyte 1,024K bytes (roughly one million bytes)

microcomputer A computer system built around a microprocessor.

microprocessor A computer on a chip.
minicomputer Computer systems somewhat smaller than mainframes that have proven popular for time sharing and scientific and engineering work.

modem A device translates digital computer signals to and from analog signals used by most telephone systems and thereby permits computers to communicate over telephone lines.

mouse A hand-held pointing device. When a mouse is moved, the computer changes the location it points to on its display screen.

multitasking The ability to do more than one job at a time. For example, a multitasking operating system would permit a user simultaneously to print a file and to recompute a spreadsheet.

multiuser A computer system which can handle the requests of more than one user (apparently) simultaneously. Multiuser systems must obviously be multitasking.

operating system The programs which control the activities of a computer’s central processing unit and the peripherals (mass storage, printers, terminals, etc.) with which the processor communicates.

peripherals Computer system hardware apart from the central processing unit and its volatile high-speed memory. Common peripherals include printers, disk and tape drives, and modems.

RAM Random access memory, very fast memory chips in which data often used by the processor are stored. These data are lost when power is turned off.

resale price maintenance The practice by which manufacturers set the prices at which their products can be resold by dealers and distributors. RPM generally is equivalent to setting a minimum margin for resellers.

software Instructions loaded into RAM which govern the computer’s tasks.

specialty retailers Specialty computer retailers are those that sell branded computer products including both hardware and software directly to final consumers. They differ from other retailers in their exclusive focus on computer equipment and from value-added resellers in their sale of off-the-shelf rather than customised hardware and software.

spreadsheet Computer software designed to mimic accountant’s worksheets. Spreadsheets are matrices with rules linking the elements or cells of a matrix. As a result, when one item in a spreadsheet matrix is changed, its implications for other items may be computed automatically. Spreadsheets are thus useful for “what if” analyses. Spreadsheets were popularized by the VisiCalc program. Sales are now dominated by Lotus 1-2-3 and Symphony from Lotus Development Corporation.
systems house Synonym for value-added remarketer.

value-added remarketer A computer reseller who combines hardware purchased elsewhere with software created specially for a particular application.