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Implications of Pure Electronic Commerce for Vertical Integration

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Abstract

This article identifies how pure electronic commerce transforms the creator-publisher relationship in the book and software industries. Pure electronic commerce refers to a transaction that uses information systems to avoid physical exchange and occurs entirely in the digital form. Using coordination and transaction cost theory as a theoretical framework, this article posits that coordination costs are a key determinant of vertical integration and intermediary tasks in the digital industries and help explain why the transition to pure electronic commerce has been slow. Despite the fledging state of the transformation, the article analyzes the two digital industries in such areas as compatibility standards, complexity of product development, after-sales support, intellectual property, development funding and marketing risks, and brand. The analysis of industry transformation leads to the conclusion that software is likely to be more vertically

integrated than books. Also, once the coordination cost barrier is overcome, it is likely that there will be more vertical integration between developers/authors and publishers, which in turn may result in fewer, larger publishers and that publishers will eventually gain relative market power over the developers/authors.

1. Introduction

One of the key issues in electronic commerce is how it transforms traditional relationships between different stages in the process of moving a product from its source inputs to its final customer. This paper compares two industries, book and software publishing, with the goal of understanding how they will be transformed by electronic distribution. The transformation could involve the replacement or elimination of traditional intermediaries. There are, however, significant barriers to electronic distribution that could preserve the positions of intermediaries such as publishers, manufacturers, distributors, and retailers for many years.

Electronic distribution is part of a process that can be called pure electronic commerce. Choi, et al. (1997) defined pure EC as a digital exchange across three dimensions, agent, product, and process. It is a transaction that uses information systems to avoid a physical exchange. The transaction occurs entirely in a digital form, from payment to delivery of the product. This often involves transforming an item that once was sold in a physical form into a digital format. For example, to accomplish its tasks software simply has to exist on a computer. There is no need for a separate physical box, such as a CD or a diskette, for the software to run. Similarly books can be downloaded onto a display device via the Internet rather than sold on bound paper in stores.

Pure electronic commerce is important because the benefits in terms of lower cost of selling over the Internet are particularly clear. Instead of manufacturing a product and distributing it to a physical retailer (or directly to the customer), the producer can eliminate manufacturing costs and physical distribution costs while no longer having to carry inventories. At the same time many intermediaries that were previously required, such as manufacturers, distributors, retailers, and delivery services, are no longer necessary. There would thus be savings in physical costs and mark-ups that could result in higher profitability per unit, higher volumes, and lower prices (see Wigand and Benjamin, 1995). This paper concludes that coordination costs are a key determinant of vertical integration and intermediary tasks and help explain why the transition to pure electronic commerce has been slow.

2. Research Question

This research is guided by the following question: how will the structures of the book and software industries change if pure electronic commerce becomes viable? In order to explore the potential evolution of distribution channels for pure information goods, we have elected to use a comparative case study methodology. We compared two distinct information goods industries: the book publishing industry and the consumer computer software industry.

These two industries were selected based on the theoretical sampling criterion suggested by Yin (1984). When sampling cases theoretically, Yin advises researchers to select cases for study based on similarities or differences that are expected to be of theoretical interest. Much of the data we employed in our analysis comes from secondary sources. It includes statistical data as well as descriptions of industry operations and processes from books, journals, and trade periodicals. This data was augmented by interviews with industry insiders.

Based on this combination of secondary and primary data, our first step was to build a rich descriptive model of each industry. These constructs are presented in the section that describes the industries. The second step was to analyze the two industries by comparing and contrasting them on approximately 10 dimensions. These dimensions were extracted from a review of literature on electronic commerce, marketing channels, book publishing, and software development. We discovered and incorporated dimensions and removed others in the process of our analysis. Finally, we synthesized the similarities and differences identified during the analysis in order to identify the forces that will have the greatest impact on the evolution of the channels of distribution for pure information goods. We eventually decided that six factors were the substantially more important than others and these are outlined below.

The cases examined here are directly relevant to content industries such as music, newspapers, broadcasting, movies, libraries, and education. Furthermore, an understanding of the pure cases of electronic commerce, the ones for which the greatest potential financial benefit of electronic transactions can be realized, can cast light on what has been a difficult transition to electronic commerce in many industries.

3. Theoretical Foundations

Our analysis of the relationship between creators and publishers led us to the explanatory factor of coordination costs. We thus relied on coordination and transaction cost theory as a theoretical framework for analyzing the book publishing and software industries.

There is an extensive literature on coordination. These works are based on perspectives from economic theory, organization theory, and the parallel processes of computer science (Malone and Crowston, 1994). Here we choose to review the works pertaining to the focus of our research.

Williamson (1975) as well as Picot and Kirchner (1987) explain two basic mechanisms for coordinating the flow of materials or services to add value: markets and hierarchies (see also Coase, 1937). Williamson (1981) categorizes exchanges into market and hierarchy transactions. The first are transactions that support coordination between multiple buyers and sellers. The latter are transactions that support coordination within firms as well as industry value chains (see also Wigand and Benjamin, 1995).

According to Malone et al., “[m]arkets coordinate the flow through supply and demand forces and external transactions between different individuals and firms” while “[h]ierarchies coordinate the flow of materials through adjacent steps by controlling and directing it at a higher level in the managerial hierarchy” (Malone et al., 1987).

Hierarchies are structures of governance that reduce transaction costs because, a high number of transactions, which implies high coordination costs, leads to failure of the coordination mechanism within a market (Coase, 1937; Williamson, 1975; Ouchi, 1980).

Malone et al. (1987) also discuss the tradeoffs between markets and hierarchies in terms of transaction costs. As new information technologies allow closer integration of adjacent steps in the value chain, the costs of coordination will be reduced. As a result, Malone et al. posit that information technology would lead to a shift toward greater use of markets rather than hierarchies, meaning a decline in vertical integration and an increase in contractual relationships. This notion is also supported by an empirical analysis of the relationship between information technology and firm size by Brynjolfsson et al. (1993) Their findings show that investment in IT is associated with subsequent decreases in the average size of firms.

Apart from the well-established transaction cost theory, an interdisciplinary field known as coordination theory emerged. Instead of studying coordination based on the transaction cost theory, Malone and Crowston (1994) examine the tasks and processes of coordination. They define coordination as “managing dependencies between activities” and suggested that progress should be made by characterizing different kinds of dependencies and identifying the coordination processes that can be used to manage them. Examples of dependencies are shared resources, task assignments, and simultaneity constraints (such as scheduling and synchronization).

4. The Traditional Book Publishing and Software Industries

The book publishing and software industries share a number of similarities and differ in several ways. Before conducting an analysis of these two industries, this section will describe each industry in terms of its general characteristics, traditional industry structure, and tasks performed in each industry value chain.

4.1 Book Publishing Industry

Book publishing is a small, relatively diffuse industry with low barriers to entry (Compaine, 1978; Epstein, 2001). The growth of the industry has been steady as seen from the compound annual growth rate of 7.53% over a 30-year period (1970-1999) (Data compiled from AAP Industry Statistics Annual and BISG, Book Industry Trends).

The traditional book publishing industry is similar to other industries in that it consists of producers (authors and publishers), intermediaries (wholesalers, distributors, jobbers, and retailers), and consumers (buyers and end users). It is also possible that book retailers or consumers will directly connect to publishers, although this is not a common strategy in the book business due to the effect of time and variety (Lindsley, Blackburn, & Elrod, 1991). Intermediaries are usually capable of offering a greater variety of titles shipped in smaller quantities in a more timely fashion. The structure of the book publishing industry is illustrated in Figure 1.

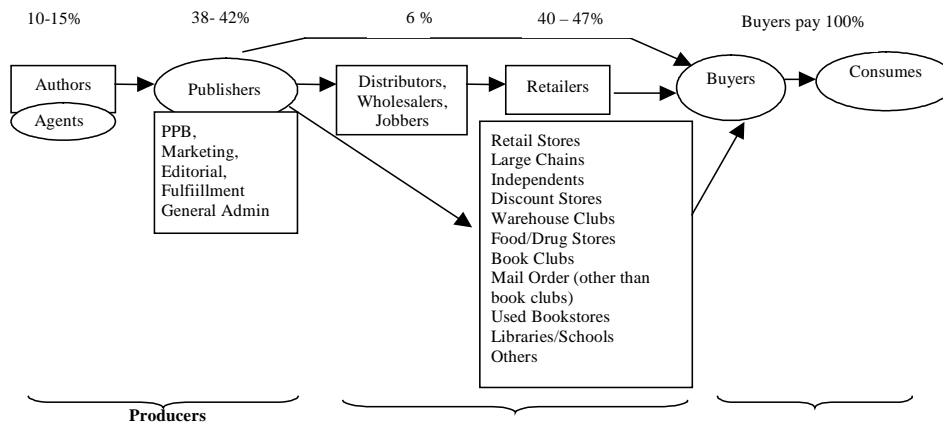


Figure 1: Book Industry Structure

Book production starts when authors submitted their works to publishers, either directly or through an agent. An author has three possible ways of having a book published: “over the transom,” direct referral, or through an agent, which performs “a gatekeeping function” for book publishers and generally charges an author about 15% of the author’s royalty. (Greco, 1997). An author’s cut ranges from 10 to 15% of a book’s net revenue of the list price on those sold (Compaine, 1976; Vernumis Schuler & Associates Communication Industry Report, 1993).

The main task of publishers is to publish books. The production costs they bear are royalties/advances, editorial, marketing, fulfillment, administration, depreciation, and manufacturing, known as paper, print, and binding (PPB) (Greco, 1997). The percentages of each of these production costs vary according to the number of copies produced, considering both fixed and variable costs, and whether the books are paperback or hardcover (Compaine, 1979).

Then wholesalers, distributors, or jobbers put together books from various publishers, carry their own inventories and distribute the books locally, regionally or sometimes nationally to retail accounts. However, the network of wholesaling in the book publishing industry is rather weak. They received only about 6% of a book’s dollar (Compaine, 1976). While large retailers usually act as their own wholesaler, dealing with publishers directly, other small retailers, including libraries and schools, view a distributor or jobber as a facilitator in their book purchases. Publishers usually do not give them as high a discount as a distributor does nor are willing to accept handling a number of orders for small quantities of books (Compaine, 1976; Woll, 1988).

The majority of books are distributed to retailers where individual buyers purchase their books. Also, the emergence of Internet-based electronic commerce in the mid 1990s brought about a new distribution channel, online bookstores such as Amazon.com, Barnesandnoble.com, and Borders.com.

An outstanding feature of the book publishing industry is the concentration in the three major segments of the book publishing value chain: authors, publishers, and retailers. Although there are a great number of authors producing books, books written by a small number of brand-name authors accounted for more than half of total book sales (Epstein, 2001). There are the same phenomena in both the publisher and retailer segments. Book publishing in the US is dominated by five groups: Bartelsmann, Holtzbrinck, Longman, Rupert Murdoch’s News Corporation, and Viacom (Epstein, 2001). In 1992 the twenty largest US publishers had 62% of domestic and export book sales of all types (Bekken, 1997/1998). The five dominant book retailers are Barnes and Noble, Borders, Crown Books, Books-a-million and Lauriat’s/Encore (Bekken, 1997/1998).

4.2 Software Industry

The software industry is one of the fastest growing sectors in the US economy. (Office of Information Technologies, 2000). It is almost six times bigger than the book publishing industry in terms of market size even though it was established long afterward. The total book sales in 1998 were \$23.03 billion (AAP Industry Statistics Annual, 1998) while the NTIA's Telecommunications Industry Statistics reveal that software sales were as high as \$130.6 billion and that the software industry had a compound annual growth rate of 11.18% from 1995 to 1998.

Software by nature is a digital good. However, it is manufactured and distributed in a very similar way as other physical products, including books. Its value chain includes producers (developers, publishers, and manufacturers), intermediaries (wholesalers, distributors, and retailers), and consumers (buyers and end users). Figure 2 shows the traditional structure of the software industry.

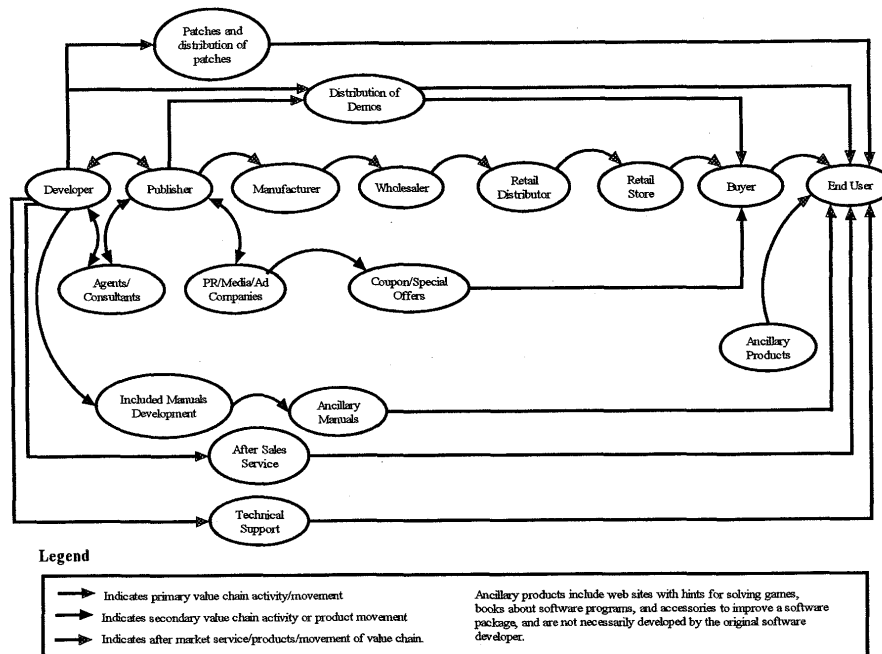


Figure 2: Software Industry Structure

As shown in the figure, software goes through many hands before it reaches its end user. Software developers create programs but, like book authors, they usually do not sell their output directly to end users because it is difficult to attract the attention of a large number of potential users and then distribute products directly to them. They therefore have to attract interest from publishers and then negotiate with them

for marketing and development support. In software development, the product is usually complete before it is sent to the publisher.

The publisher may wish to contribute to some making the product such as providing feedback on design, analyzing focus groups of consumers, and testing the product for bugs. However, the main function of the publisher is to market the product after the developer completes the intellectual task. Publishers often have internal development teams and occasionally developers try to publish titles on their own. This vertical integration between the development and publishing functions is common with software but uncommon with books.

Once the publisher decides the product is ready, it arranges to have the software sent to manufacturing, where it is transferred to CD-ROMs that are boxed and shrink-wrapped. Manufacturing may be internal or outsourced. The product is then sent to the warehouse of a wholesaler or distributor who arranges product deliveries to retailers.

Prior to receiving the finished product, the publisher develops and implements a marketing strategy that can include advertising in appropriate media outlets. The retailers then determine how to place the product in their stores such that the combination of all choices and special deals with publishers maximizes the overall profit level of the store. The retail channels of the software industry are specialty stores (such as BestBuy and CompUSA), general stores (such as Wal-Mart and Kmart), software specific stores (such as Electronic Boutique and Babbages), small independent shops, and Internet stores (such as Amazon.com and arms of traditional retailers).

Like the book publishing industry model, the key problem with this traditional software industry model from the developer's perspective is that it receives only a small portion of the final consumer purchase price, typically 10 to 12%. Many developers consider self-publishing but this is usually discounted due to the importance of distribution channels.

The growth of the Internet has enabled experimentation with different revenue models. Microsoft's dot-net strategy is based on network distribution and ongoing payment for software as a service. Subscription models for games have had greater success than in other areas of Internet content with software such as Everquest and Ultima Online profitable. There are also many companies using the applications service provider model. Digital methods of software distribution remain, however, a relatively small segment of the market, particularly for consumers.

5. Transformation of the Developer-Publisher Relationship

If pure electronic commerce becomes viable the software and book industries will be transformed in different ways. These are listed in Table 1. The differences can be

illustrated through contrasting relationships between the creator and the publisher for each industry. Relationships are typically tighter and more likely to be integrated in the software industry

Table 1: Degree of vertical integration in the software and book industries

Attributes	Books	Software	Previous research on attribute
Compatibility standards	○	●	Shapiro and Varian, 1999; Tiwana et al, Campbell, 1988; Kutschker, 1985; Ghingold and Wilson, 1985; Grashof, 1979.
The need to address the complex issue of compatibility standards applies to software and electronic books but not to traditional books. Authors and small developers are likely to have limited resources to support multiple platforms. Software, though, is likely to have more viable platforms than electronic books.			
Product complexity	○	●	Gatignon and Robertson, 1991; Rogers, 1962; Lovelock and Weinberg, 1984.
Software is systemically complex whereas books are systemically simple.			
After sales support	○	●	Kelly, 1988; Fornell and Wernerfelt, 1987; Kelly, Hoffman, and David, 1993; McCollough and Bharadwaj, 1992; Reichheld, 1993; Tax et al., 1998.
Software requires more support than books because of repeated use and complexity of installation.			
Intellectual property	○	●	Levin, Klevorick, Nelson, and Winter, 1987; Zahra and Bochner, 1999.
Software has valuable elements such as new versions and engines whereas books can have sequels but follow-on products tend to be less valuable than in the case of software.			
Development funding and marketing risk	○	●	Varian, 1997; Shapiro and Varian, 1998; Tiwana et al., 2001; Mullins, 1998; Tiwana et al., 2001; Ashby, 1960.
Most entertainment software titles lose money but this is offset by a small number of blockbusters. Since development cost for books is low, there is much lower risk and thus less need to offset risk through degrees of vertical integration.			
Brand	○	●	Farquhar, 1989; Kotler, 1997 in Randall et al., 1998.
Publisher brands mean little to book and entertainment software buyers but are more meaningful for productivity software			

Code:

- : leads to high level of vertical integration
- ◐: leads to medium level of vertical integration
- : leads to low level of vertical integration

5.1 Compatibility Standards

Network externalities drive markets toward compatibility standards. Shapiro and Varian (1999) point out that standards change the nature of competition in various ways: expanded network externalities, reduced technology risk faced by consumers, reduced consumer lock-in, competition for the market versus competition in the market, competition on price versus features, competition to offer proprietary extensions, component versus system competition.

Tiwana et al. (2001) also stress the importance of interoperability, pointing out that interoperability among systems and platforms is critical for business success. Conflicts among multiple systems can undermine the survival of the business (Shapiro and Varian, 1999).

Having multiple standards increases the complexity of customers' adoption decisions. Product complexity can be characterized by four dimensions: 1) the number of alternative products available to the buyer (Campbell, 1988), 2) the extent of differentiation among these alternatives (Kutschker, 1985), 3) the difficulty in understanding the alternatives (Ghingold and Wilson, 1985; Grashof, 1979), and 4) the complexity in comparing alternatives. (Ghingold and Wilson, 1985; Kutschker, 1985). As complexity increases, it is likely that experts and specialists will be required to form an interdisciplinary team to help in the purchasing decision (Abratt, 1986; Kotteaku, Laois, and Moschoris, 1995; Grashof, 1979; Jennings and Plank, 1995).

Compatibility standards matter for software while traditional books face no such issue. Software producers thus have to adapt to different platforms but will prioritize for the most profitable ones based on the resources available to them. The closest analogue for the book industry is translation into other languages but the process is much more straightforward. Authors and small developers are likely to have limited resources to support multiple platforms. Software, though, is likely to have more viable platforms than electronic books once the battle among Adobe, Microsoft, Gemstar, and Palm, among others, is resolved.

Compatibility standards lead to greater vertical integration in software because the complexity associated with the support of multiple platforms leads the publisher to be concerned with these compatibilities. An individual software developer could not do this task on its own because it is unlikely to have expertise in all of the different platforms and to be able to code software for all of them. Software often is ported to new platforms. There has been, nonetheless, a trend by which some companies have decided to use other firms to make ports to other platforms. This has been facilitated by the lower costs associated with coordinating the work of the firms involved.

The purchasing process for software is quite different than that for books. The existence of multiple platforms makes the purchase decision more complex, particularly when buying software for a business. In most cases, book buyers are purchasing for themselves or for a gift and do not have to consider a wider organization. With the exception of the educational market, books are consumed individually. In contrast, software often has collaborative consumption. Data

produced with a program is exchanged between users while some games are designed for multiple players. As a result there is an interdependence of users that does not usually exist in the book industry. Network externalities exist for software and thus users will pay close attention to the purchase choices of others. This requires software companies to provide technical advice in the purchasing process, which is more likely to result in vertical integration.

5.2 Complexity of Product Development

According to Gatignon and Robertson (1991), customer learning requirements are factors affecting the adoption rate. They feel that these learning requirements are closely related to three dimensions from Rogers (1962): complexity, compatibility, and trialability. Complexity is the degree to which an innovation is perceived to be difficult to understand and use. The more complex the product, the more skills the user needs and the more time it takes to diffuse. (Lovelock and Weinberg, 1984)

Tiwana et al. (2001) define versioning as the ability to produce multiple instantiations of the same basic products for different consumer segments and sell them at different price points. Varian (1997) finds that consumers with high willingness to pay choose one version while customers with lower willingness to pay choose another. According to Shapiro and Varian (1998), functional versioning of physical products can be expensive whereas the relative costs of versioning information products to create artificial differentiation is much lower. They (1999) also suggest versioning of information products into several dimensions.

Software is more complex than books. Readers have passive interaction while software users interact with programs. The use of software is ongoing whereas individual readers use most books only once. Software developers are concerned with the way that their products are used to develop programs that meet peoples' expectations. As a result, software requires better design, architecture, and engineering that will withstand the continuing use of the product. Because software is more complex it generally requires multiple versions. These accomplish several things. First they solve the problems of earlier versions in a process known as debugging. Additionally, in agreement with Varian (1997), it allows companies to take advantage of peoples' willingness to pay by adding more features that some users will purchase. The challenge for publishers is thus the ongoing testing and maintenance. This, therefore, leads software developers to find self-publishing less viable. Individual programmers will find it difficult to keep up with versions in addition to the support that has to be provided to the earlier versions. Coordinating the work of outside firms to fix bugs in a program or to upgrade for additional features implies giving away control over product development. This is why it is rare to see bug fixes and upgrades outsourced.

Books in contrast are much simpler to create. In this industry, only reference and instructional books have multiple editions. Thus, maintaining continuity is much easier with books. The greater complexity of business software compared to books leads the former to be more vertically integrated. Vertical integration in consumer

software is less than that for business software but more than for books. This reason for this is that consumer software is less complex because it has fewer versions.

5.3 After Sales Support

In marketing literature, after sales support or customer service is an element of product strategy. A company's offer to consumers usually includes some services, which can be a major or minor part of the total offer. Companies usually set up call centers to field consumers' complaints and requests for information. It costs less to keep existing customers than to attract new customers or recover lost customers. Customer services should be used as tools in creating customer satisfaction and loyalty (Kelly, 1988). The literature confirms that after sales support is valuable (Fornell and Wernerfelt, 1987; Kelly, Hoffman, and David, 1993; McCollough and Bharadwaj, 1992; Reichheld, 1993; Tax et al., 1998). However, empirical work associated with the question of why after sales support is more valuable for some types of information products than others is scarce.

In our research we determined that products with repeated use and complex installation process such as software require more after sales support than products with low repeated use such as books. This leads to a greater tendency toward vertical integration because a publisher is less likely to have the in-house competency to provide technical support. Having the support in-house will provide developers with information regarding the deficiencies of the program and desires of consumers. Alternatively, information technology costs have decreased to such an extent that it is feasible to coordinate this type of support with other companies that can do it less expensively. Because of these forces the extent to which vertical integration will prevail is unclear with respect to after sales support. In contrast, after sales support is not necessary at all in the book industry.

5.4 Intellectual Property

Intellectual property laws are used to protect a venture's interests by reducing a rival's ability to copy its products and control the environment in which competitors gain access to its technologies. Having intellectual property rights, such as copyrights or patents, can give a venture a temporary monopoly. (Levin, Klevorick, Nelson, and Winter, 1987) and increase the venture's ability to introduce and make profits from exploiting its new technology (Zahra and Bochner, 1999).

The value of intellectual property tends to be higher for software. The value of a franchise is high because it means that new versions or sequels of a product can come out and benefit from an installed base of users. Occasionally the book industry will develop a successful series such as "... For Dummies" or Nancy Drew but the general rule is fragmentation whereas series such as Quicken or Final

Fantasy are much more common in the software industry. Publishers will often buy out developers of a successful series such as when Microsoft bought Ensemble Studios, creators of *Age of Empires*. In this way they can use engines and expertise developed in one title in several others. Unlike books, software development involves reuse of code and features from previous releases. This means that having ownership over this intellectual property is crucial. The coordination process will become too expensive if negotiations for licensing fees have to occur every time a piece of code or a feature is reused.

5.5 Development Funding and Marketing Risk

The fixed costs associated with information products are high, while the variable costs, or the economic costs of reproduction, are relatively low (Varian, 1997; Shapiro and Varian, 1998; Tiwana et al., 2001). The market for information related products changes rapidly. Mullins (1998) holds that organizations involved in information product development have to cope with a high degree of uncertainty during the process of development. Examples are the appropriateness of a certain technology standard over another, the nature and extent of customer needs, the level of resources invested, and the timing of commitment. (Mullins, 1998; Tiwana et al., 2001) Firms have to encounter high organizational and financial costs if they are “to develop structures that incorporate as much complexity as the processes they manage.” (Mitchell and Singh, 1996, citing Ashby, 1960). In other words, the more complex the product, the higher the challenges and costs of maintaining efficient business practices.

One of the key roles of software publishers is the financing of development. Software projects that require investments of millions of dollars and involve teams are rarely self-financed. Thus publishers often negotiate advances and royalty terms prior to product development. Finance is usually provided in stages once milestones are completed to the publisher’s satisfaction. While book publishers also provide advances to some authors this is seen as an incentive in the face of competition for established writers. The cost of book development is primarily the opportunity cost of the author’s time. This also means that there is little incentive to vertically integrate because there is little investment needed prior to completion of the work. The lower need for development financing also gives authors a greater probability of disintermediating publishers than can occur in the software industry.

The software publisher also has an incentive to vertically integrate to ensure a steady stream of titles that will make efficient use of their marketing infrastructure. Book publishers, in contrast, have greater numbers of independent authors to work with because development costs are much lower for books.

Publishers must make substantial marketing investments to have any opportunity to recover development budgets for software projects. Much of the marketing infrastructure, such as employees and retail space forged by channel relationships, is either used through a constant stream of new products or wasted. When

publishers incorporate development in-house they are better able to provide a steady flow of products thus smoothing out the usage of their marketing infrastructure by controlling the development process and release dates. Book publishers, in contrast, have less need to have in-house development because they usually have more titles and less investment in each of them, which results a steadier flow of new releases and lower risk.

5.6 Brand

A brand is an identifier for a set of products offered for sale by the same organizational entity (Kotler, 1997). If a brand's product offers consistency regarding attributes that are difficult to observe before purchase, then consumers can use the brand label as a surrogate for performance (Farquhar, 1989; Kotler, 1997 in Randall et al., 1998).

Publisher brands are of little importance to consumers. They do not usually gravitate to Signet books or Eidos software but rather to star authors such as Tom Clancy or entertainment licenses such as Star Wars. Brand, however, has some impact in the field of productivity software. Publishers like Microsoft and Lotus developed reputations sufficient to foster sales of new products. The value of the brand reputation can encourage some publishers to develop in-house to improve quality control. However, compatibility and features are more important. Publisher brand rarely matters to book buyers with the notable exception of academic press. The lack of importance of publisher brand increases the probability of it being disintermediated in the distribution process.

6. Coordination and the Future of Pure Electronic Commerce

Software tends to be more vertically integrated than books. In the book industry authors are usually separate from the publisher whereas software publishers more commonly have in-house developers. As illustrated above, the higher the coordination costs the more likely integration will occur. A software publisher will be more likely to have in-house development, for example, when it needs to support multiple generations of a program. Table 1 shows that, for every category, software has a higher level of vertical integration than books.

We have identified an important factor that affects how the distribution value chain for pure information goods will evolve: the nature of the coordination requirements that exist in the creation process. In general, greater coordination requirements in the development process for software will lead to several tendencies:

- There will be more vertical integration between developers/authors and publishers. That is, developers are more likely to become employees of the publisher rather than independent contractors.
- There will be fewer, larger publishers. That is the publishing industries will become more concentrated as only the larger players have the resources necessary to engage in large-scale development processes.
- Publishers will gain relative market power over their suppliers (i.e. developers/authors).

It is possible that the demands imposed by increasing coordination requirements at either end of the value chain will cause the nature of the two products we are discussing to become more alike. As devices and distribution channels evolve books and software are likely to become more alike. Books will develop more active functionality as novels become more like web pages and textbooks become more like computer-based training. Ultimately, the genres of information goods that we recognize today – books, software, records, movies – may disappear, and new forms, beyond what we can imagine, will evolve.

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