E-business and Supply Chain Issues in Book Publishing Industry in Asia

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Abstract

The book publishing industry is going through a digital revolution. We have digital books, which are being distributed and sold through e-channels. The book retailing industry has lead the e-retail revolution with innovators such as Amazon.com and Barnes and Noble. Several authors have contributed their mite to the Internet revolution by writing books about the new economy and new technologies. But the back end supply chain of the books publishing industry from author to retail bookstore worldwide operates largely unchanged and does not exploit the Internet technologies to advantage. This supply chain is plagued with inaccurate forecasts, large inventory, obsolescence, long lead times and fulfillment problems. Some efforts on transforming the books publishing supply chain has taken place mostly in the United States but problems still remain. Our study focuses the supply chain problems faced by the industry in Asia. This study also has relevance to the rest of the world since the books publishing industry is very much a global industry. This study discusses how an electronic exchange in this industry will help solve some of the problems. We first map the book supply chain as exists today and also present the map for e-supply chain. We study the performance of the supply chain in terms of better forecasting and better visibility through partnerships.

Introduction

Amazon.com may have been an icon of the digital economy but what is perhaps most ironic is that the books industry in reality is far short of the digital Utopia that the world's largest bookstore symbolizes. The modus operandi of the books industry has remained largely unchanged over the years where common supply chain problems besieging other industries such as long lead time, poor demand forecast etc. are common characteristics of the present supply chain.

The books industry today is generating US$77 billion in books sales worldwide and this does not include newsprints and periodical. It is a highly fragmented industry with over 25000 publishers in the trade-books category alone. In Asia, most of the focus of the books industry is on distribution and retailing. There are some low level publishing being done in Asia mainly in local Asian content but the bulk of the books originate either from Europe or the United States with a centralized distribution model being used to distribute books to the different markets in Asia.

The level of efficiency as demonstrated by the fulfillment capabilities of Amazon.com could easily fool most people into believing that the books supply chain is highly efficient. What many fail to see in the books supply chain is its inefficient back end. In the case of Amazon.com, Amazon had to rely on Ingram to ensure an efficient fulfillment system and at present, the much touted world's largest bookstore have to set up it's own warehouses to support such reputation. Hence, an online fulfillment is still very much supported by traditional distribution system. It would be interesting to consider hypothetically if an Asian Amazon.com would work but what we are more keen on focusing is the back end of the supply chain as we have illustrated through Amazon.com, having a successful front end fulfillment system is just half the success story, the other half, the back end of the supply chain is the key to an integrated and efficient books supply chain.

There is much opportunity to address the weaknesses of the present supply chain inefficiencies through the use of Internet technologies. This paper will look at the present books supply chain with an emphasis on Asia and how the supply chain can be improved through electronic exchanges as well as through a more radical reengineering by creating an electronic supply chain. In the publishing industry, there are generally several main categorization of publishing, namely, trade books publishing, academic books, journals, news publishing, scholarly publishing and Scientific, Technical and Medical (STM) publishing. This paper does not look at journals, news and scholarly publishing as they generally operate under slightly different business models.

Books Supply Chain in Asia

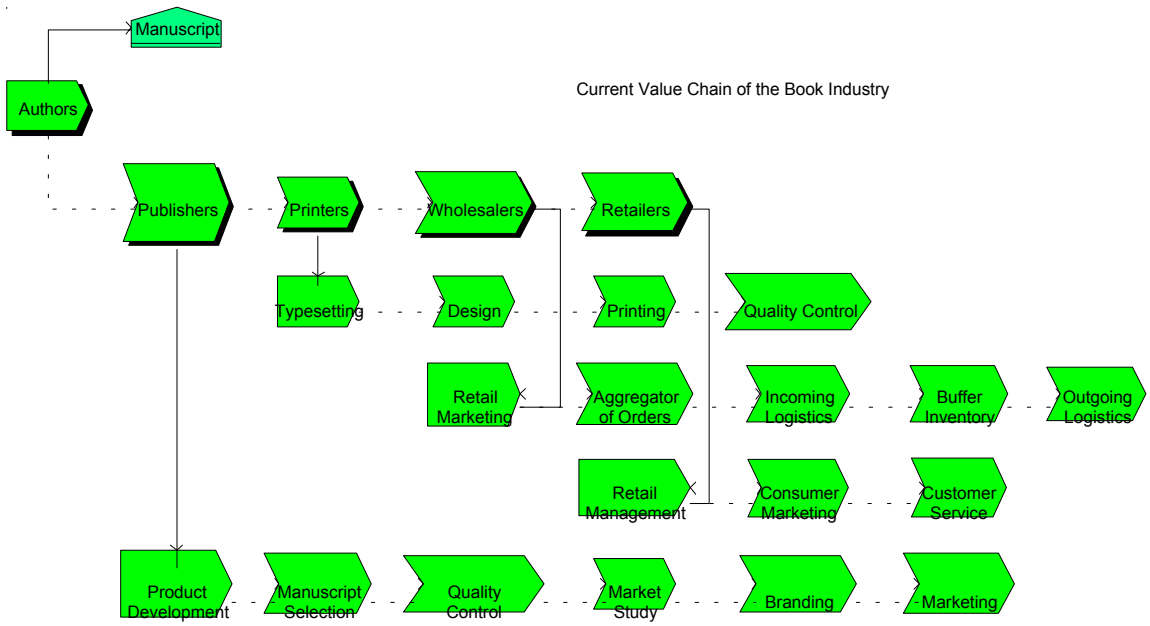

Figure 1: Supply Chain of the Books Industry

In Asia, the books supply chain closely resembles that of the chain in America but since most books authors are non-Asian, the books publishing process itself generally starts outside Asia. Figure 1 shows the roles of various players in the general books supply chain. The role of publishers today is largely in selecting the right materials to be

published through a thorough editorial process. This is a very significant value add in the publishing process, so important is this value that self-publishing does not seem to take off in a big way today because it eliminates the role of a publisher. In Asia, most major publishers such as McGraw-Hill and Pearson Education have presence in this region. Some publishing work is done in Asia but their presence is mostly confined to the role of distribution and local translation. With over 25000 trade books publishers in the US alone, most books publishers in America and Europe do not get their books to Asia because they lack a distribution channel in Asia though some do have agents who deal with their books in a small scale and these are mostly in highly specialized books such as those in the STM category.

A supporting component of the supply chain is the printing process itself that is normally outsourced by the publishers. This process in the past does not figure prominently in the books supply chain but they are emerging as an important player in the chain by providing a more integrated service in addition to merely printing the books.

Asia being a vast region requires many distributors and local wholesalers to aid the distribution of the books to the local markets. Some major publishers have their own distribution presence and the model that is generally deployed is a centralized distribution model. Most of the distribution hub is located either in Hong Kong or Singapore before they are redistributed to other countries in this region. Distributors also play the role of marketer of books to the next level that is the wholesalers and retailers. Sales representatives are often sent out to promote new book titles to retailers at the local level. The practice of drop-shipment of books directly to the specific country from the country of origin is also very common but such mode of distribution requires coordination from the main hub in Asia.

Retailers are the lowest business player in the supply chain and their primary concern is in merchandising the books to consumers. Trade books retailers dominate the scene but some specialized bookstores exists in Asia dealing with highly specialized books. The books retail trade is going the way of the super bookstores in the United States where large bookstore chains are being set up today.

Supply Chain Problems in Asia

There are several chronic problems affecting the supply chain of books in Asia. Some of these problems also plaque the industry globally but our focus here will be on the problems in Asia. As briefly explained earlier, the books industry have a rather simple supply chain as compared to other industries. Simple though it may be, the industry is still very much a manually operated industry. The level of digitization in it's operations is non existence or very low at best.

With most books to Asia originating from outside this region, books have to either be shipped in by air or sea or are printed in this region itself. Books shipped in by sea from the US can take a minimum of one and half month to two months with most time being taken to consolidate the shipment. It is slightly better to ship by air with the time ranging from a week and a half to three weeks. Such a long lead-time is merely to deliver the books from the US to Singapore, which is a regional hub for most books publishers and distributors. Consideration has to be given to the outgoing trip to deliver the books to

the various regional countries from Singapore. Hence the total lead-time could stretch anytime from two to three months.

In Asia as with the rest of the world, the players in the books industry rarely if at all share information on pricing and stock level. There is a lack of information sharing amongst the component members in the supply chain. For example, a distributor in Singapore does not know the real-time stock level for a particular title in the retailers' inventory. The same can be said for the retailers who do not have easy access to the distributor's pricing and stock level information. This situation exists throughout the supply chain.

With a long lead-time and the lack of information sharing in the supply chain, there is often a situation where it is difficult to make a demand forecast for a particular book title. This problem in fact begins right from the start of the supply chain where publishers have to estimate the demand for a new book. It is often difficult if not impossible for publishers to make an accurate forecast for a new book title or a reprint title. What is commonly done is to compare with titles of similar category or target market to forecast it's possible sales if published at a certain quantity. The problem with forecasting exists throughout the supply chain with retailers, distributors and publishers having to make a demand forecast. The demand variability increases as we move up the supply chain or better known as the Bullwhip Effect. The Bullwhip Effect is further increased with the common practice in the books trade where returns are allowed. With a poor information sharing infrastructure, distributors and publishers very often end up with more excess books than expected because of returns which were not considered when decision is made to reprint or reorder.

Information Sharing Through a Books Industry Exchange

The books industry is in need of an Internet based exchange that allows for information to be shared and allows for greater partnership between players in the industry. A neutral party in the supply chain should set up the exchange. A good candidate for this would be the books publishers association. The exchange can come in the form of an Internet portal where there is a database link to the systems of publishers, distributors and retailers.

It would be more beneficial if the system linkages can be more integrated. For example, most distributors do not know the stock level of the books under their distribution in the retail stores. It would be useful if the Point of Sale information from the retail stores were sent to the distributor through the exchange. Similarly distributors can make their stock and pricing information accessible to retailers and publishers. Such level of transparency would be very useful to the improvement of the supply chain through reduction in the Bullwhip effect because real-time information allows for better demand forecast.

The exchange can also serve as a directory for books and their publishers. With such information, retailers will have a wider selection of books and publishers to source from. At present, sourcing of books amongst retailers in Asia is very limited by geographical limitations; books are only sourced from publishers and distributors that have presence in this region when a global sourcing policy should be in practice. A general framework for such an exchange is shown in Figure 2.

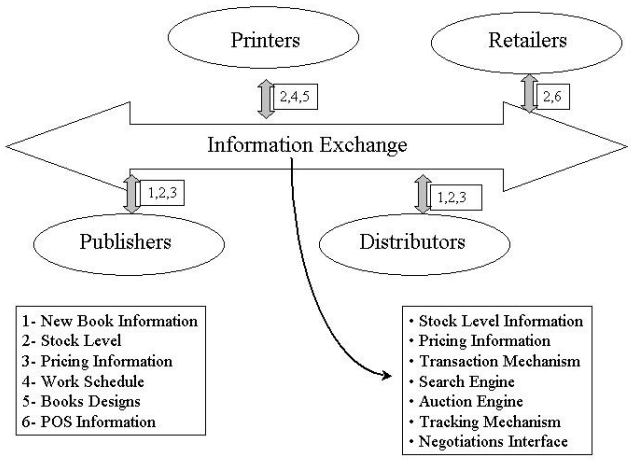

Figure 2: General Framework of a Books Exchange

For such an exchange to work, players in the industry have to change their mindset on operating their business. Many publishers, distributors and retailers are wary of disclosing information through an open channel such as the Internet. A possible solution would be to make information transparent only to registered users and a further addition would be to only enable users to obtain permission from a particular publisher, distributor or retailer before they are able to view data on their systems. In other words, assuming A is a retailer and B is a distributor, A can only view prices and stock level information of B if A is already a registered customer of B or has already obtained permission from B. It would also be a major hurdle to involve major publishers and distributors to be part of such an exchange because many are keen to maintain the exclusivity of their position as a major player in the industry and some are even making effort to set up an extranet of their own. Such effort is laudable but it does not solve the problem of improving information transparency in the supply chain.

Economics of Offset Publishing and On Demand Publishing

To find the optimum quantity to be printed before publishing a book or doing a reprint, a balance has to be made between the costs of holding a book in inventory versus reprinting a new one. It is thus economical to print just enough to last until the cost of holding the books equal to the cost of printing new ones.

Assuming plant cost of reprinting an edition is R, which includes the administrative costs involved in initiating the reprint. At a book sales rate of r, the cost of carrying inventory for y years is

$$\frac{Npcy}{2} \qquad (1)$$

where N = number of copies at the beginning in inventory
p = unit production cost (exclude the plant cost)
c = annual percentage carrying cost
y = years to sell out the edition at a constant rate of r
r = annual rate of sale (ry = N)

Substituting N/r for y and setting carrying cost to be equal to the plant cost of reprinting, we will obtain

$$R = \frac{pcN_o^2}{2r} \quad (2)$$

where N_o is the optimum quantity to be printed. Solving 5.2 we will get

$$N_o = \sqrt{\frac{2Rr}{pc}} \quad (3)$$

N_o just gives us a rough estimate on the quantity to print. Some commercial decisions may overwrite this analysis because other factors such as the type of books and business policy of a publisher may change the strategy in printing quantity. However it is worth noting that this formula is very suitable for books that are selling rapidly and at a considerably stable rate.

Even if we print N_o, there is still the question of whether the print run will finance itself. A generalize equation can represent all these costs associated with a reprint.

$$2R + Np + Nb + O \quad (4)$$

where R = Plant cost
N = Print quantity
p = Unit production cost
b = Unit processing cost (administrative and logistics)
O = Miscellaneous overhead (Catalogue etc)

R + Np is equivalent to manufacturing cost. Carrying cost that will be accumulated during the life of the printed edition must be added and optimimally it is equivalent to R.

Publishers often set a certain percentage to this cost as profit. Hence a minimum condition to be satisfied before reprinting is approved is

$$P\,[\,2R + N\,(p + b) + O] \quad \text{where} \quad P \geq 1 \quad (5)$$

To justify doing a reprint, the rate of sale r must be sufficiently large enough so that

$$N_oLD \geq P\,[2R + N\,(p + b) + O] \quad (6)$$

where L = List price of book
D = Proportion of list price received by the publisher

In practice however, it is difficult to predict with certainty the demand for books. Book publishers can however use historical record of books that are of similar nature to the new one that is being published to get an idea of the possible demand pattern.

Publisher's cost can be considered in several parts when we try to generalize a cost equation to represent it. The first will be the manufacturing cost followed by the operation cost. Manufacturing costs consist of the fixed plant cost and the variable total production cost that is dependent on the number of copies printed. Operating cost consists of one part that is a fixed cost such as editorial cost and variable operating cost such as logistics that is dependent on the number of copies printed.

$$R_1 + Np + O + bN \quad (7)$$

Normally, carrying cost is added to the fixed costs in equation 7, hence equation 8.

$$(R_1 + R_2 + O) + (p + b)\,N \quad (8)$$
$$F \quad + \quad VN$$

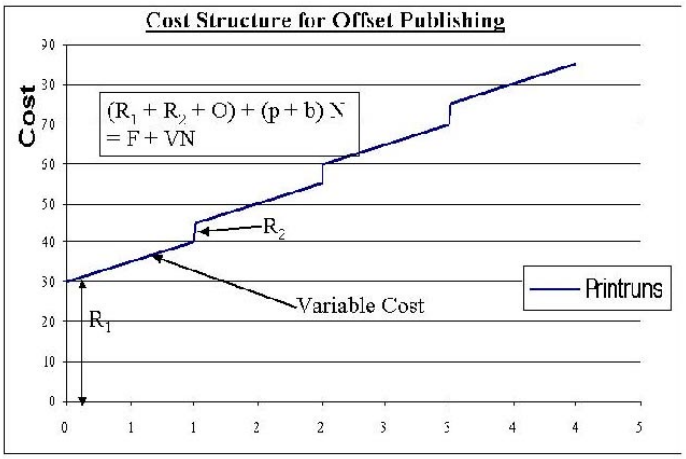

Figure 3: Cost Structure for Offset Publishing

In reality, books are not priced at the same price. There is a discontinuity in pricing versus the level of book sales. This is to enable publishers to reach a wider market reach with one title.

In on demand publishing, the cost structure would differ considerably as compared to traditional offset printing because the cost is lowered through bulk printing quantity in offset printing. Offset printing has a very high setup cost due to the need to prepare plates and films on older machines. But the cost per unit is lower than that of on demand machines. The capital investment for offset printing technology is also much less than that of on demand printing technology.

The printing cost for an on demand print run is simply given by

$$R' + N'p' + N'b' + O' \qquad (9)$$

The plant cost is considerably much smaller than that of offset printing. However, the production cost per unit would be much higher in on demand printing because it is normally calculated per page. The unit cost for the variable overhead as denoted by b' may be smaller than that in offset printing because on demand printing can be printed near to where the demand arises. This saves significantly on logistics costs. However, the smaller volume per order would mean a higher ordering cost for the publisher. Another potential cost savings will be in the form of a smaller or non-existence obsolescent cost for books that is very common through bulk printing using offset printing technologies.

In equation 3, we can obtain an optimum printing quantity assuming that the demand is constant. If we extend this to on demand printing technology, a rough analysis will show that the optimum print quantity is reduced significantly through the different cost structure of on demand publishing.

We assume that the plant cost, R' for on demand publishing is a quarter that of offset printing, 0.25R and the cost per copy is 10 times that of offset printing. The optimum printing quantity for on demand printing, N_o' would be

$$N_o' = 0.3162 \ N_o$$

To compare between the cost of offset publishing and on demand publishing we have to consider some other additional cost incurred on offset printing. The first is the obsolescent cost; it can be represented as a percentage of books remaining after each run. Then we have to determine the difference in per unit overhead which differs between the

two publishing method due to the logistical costs; offset publishing incurs a higher logistical cost.

$$R' + N'p' + N'b' + O' = 2R + Np + Nb + O \quad (10)$$

where b generally larger than b'

Solving 10 will give us a ratio of N' and N. To determine which method is better, considerations have to be given to the potential profit or loss that can be generated. They can be found through equations 11.

$$\textbf{Profit/Loss from offset printing} = N_s LD - \textbf{Cost of printing} \quad (11)$$

where N_s is the forecasted sales

L is the list price of the book

D is the proportion of books received by the publisher

Profit/Loss from on demand printing = N'L'D' – Cost of printing

Singapore as a Hub for On Demand Printing in Asia

It is still uncertain today as to which method is better but using the simple analysis presented above, choices can be made depending on the publishing conditions. Whatever the method employed, an electronic supply chain of books can be set up through the use of modern printing technology. With a computer copy of a book, it can be printed anywhere in the world. Taking advantage of this, we can thrive on Singapore's advantages to set up a hub for On Demand Printing in Asia. At this stage, perhaps printing can be extended to even offset printing due to the prohibitive cost of on demand printing technology. With books printed nearer to the market, lead-time can be shortened considerably and better forecast can then be made.

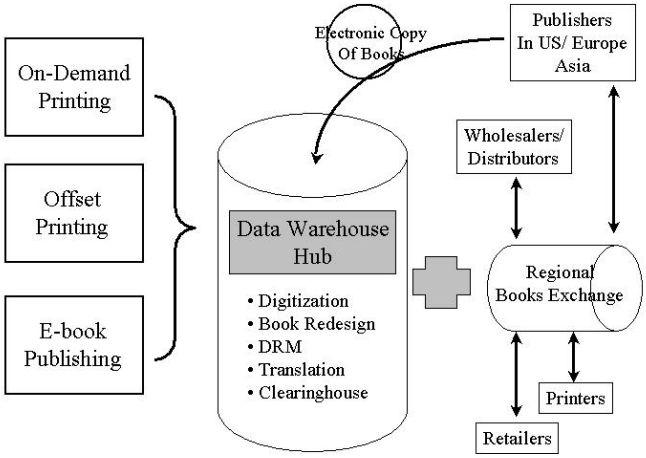

Figure 4: Data Warehouse Hub Model

The general framework for such a hub is presented in Figure 4. Publishing work will till be done in the US and Europe where most publishers are based but the final printable copy in computer copy could be kept in a data warehouse in Singapore which has an excellent IT infrastructure. The publisher will own rights to the digital copy. Third party printers can then be instructed to print the desired copy for the regional market. These printers can be located in the regional country itself where the market is. With a

distributed printing arrangement, this would mean books would be distributed through a decentralized distribution strategy that in the past existed.

Printing access is controlled through a digital rights management system, which will restrict the number of copy each file issued, can be printed. With a strong legal system, copyrights enforcement can be enforced if the entire hub is managed from Singapore. Publishers will pay the printers based on the quantity printed and either the printer or a local third party logistics provider will provide logistical services. There will be a clearinghouse system build in the hub to clear the rights to print from this database.

Coupled with an electronic exchange that creates close partnerships between publishing players, publishers from anywhere in the world can distribute books to Asia without the needs to even ship the books physically. One tremendous advantage is the significant reduction in lead-time for books to reach Asia as can be seen in Table 1. The multi-lingual workforce in Singapore also provides the expertise to handle a similar data warehouse for electronic copies of books published by publishing houses in this region. The comparison shown is just a rough comparison based on lead-time. The process time varies considerably between publishers to publishers and another aspect that has to be considered is the cost consideration. At this point in time, such distributed publishing model can only be applied to books that have a small print run quantity where it is more cost effective to print on demand. The analysis given in the previous section would be a good point to begin a simple cost analysis to determine the best publishing strategy.

	Current Practice	**Distributed Offset Printing**	**Distributed On Demand Printing**
Process	*Average Time taken(working days)*	*Average Time taken(working days)*	*Average Time taken(working days)*
Editorial & Planning	90	90	90
Typesetting	10	10	5
Pre-print Work	5	5	2
Printing	3	2	3
Distribution to Asia	50	0	0
Local Distribution	3	3	3
Total Time Taken	**161**	**110**	**103**
Time Taken Excluding Editorial & Planning	**71**	**20**	**13**

Table 1: Lead Time comparison between current publishing practice versus Distributed Publishing Model (Figures obtained are estimates obtained from interviews with industry managers)

Concluding Remarks

The present publishing supply chain has many chronic problems. These problems would require a thorough reengineering of the supply chain to be rectified. As demonstrated through an electronic supply chain that creates a distributed publishing model, the lead-time to bring a book to market can be tremendously improved. Much

work can still be done to evaluate further the cost structure in the distributed publishing model to further improve the supply chain.