CHANNEL STRUCTURE AND PRICING STRATEGY FOR VOLUME SOFTWARE DISTRIBUTION BUSINESS IN HONG KONG

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DISCLAIMER

The real names of companies and products are withheld throughout this document due to confidentiality reasons, however, the sales figures quoted in this document are prepared as accurate as possible.

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ABSTRACT

The aim of this document is to investigate the effect of different distribution channel structures on volume software business in Hong Kong. This report will start with a case study of a US based software manufacturer in Hong Kong, then identify the economic models that capture the features of this business.

Through scenario analysis of applying different channel strategies on the model, we will propose the optimal channel structure for the volume software distribution business in Hong Kong.

TABLE OF CONTENTS

CHAPTER I

FOUNDATIONS

Company Background

Automate is a leader in the development and marketing of computer aided design and drafting (CAD) software, primarily for the business and professional markets. The company's software products are sold worldwide, through a network of dealers and distributors. In 1997, Automate became the largest PC CAD (Computer Aided Design) and 3D-animation software company in the world, it is also on of the five largest software company worldwide[1].

Automate first started its business in 1982, by producing CAD software that runs on DEC PDP 11 minicomputers. Automate's first product AutoDraw was a simple electronic drawing board software that replaces traditional paper based drafting. Later, as Automate believed that IBM PC computer would dominate the computer market, it bet its fortune on IBM PC, and started porting its minicomputer-based software to the PC platform. From 1984 onwards, Automate mainly focus on producing CAD and multimedia software that runs on IBM PC computers.

Like many software companies, Automate was started up by only a few young programmers. Right from the beginning, Automate used resellers as its sales vehicle;

[1]Automate Annual Report 1997.

subsequent expansion was thus achieved through expansion of its reseller network to enlarge geographic coverage.

In 1997, Automate has about 2445 employees, selling software to over 150 countries. The revenue of Automate totaled over 500 million US dollars, with 40% of the revenue coming from Northern America, 34% from Europe and 26% from Asia Pacific. As of 1997, the total number of Automate's customers exceeded 3 million worldwide, and Automate's flagship product AutoDraw is also the world's best selling CAD package, with over 1.8 million installed units worldwide, a market share of over 60%. Automate also has a very strong presence in the multi-media and animation production industry. It's product 3D Workshop has a market share of over 75% in the videographic industry[2].

The Software Industry and Automate

The software market can be segmented in different ways, like by area of applications, by hardware platforms, or by price. During our discussion, we will segment the market by the degree of uniformity of the end product.

Software can be classified into different groups; namely, off-the-shelf software, customizable applications and tailor made applications. By off-the-shelf software, we refer to those software that are relatively simple, low price, well understood by end-users and are usually sold through retail stores[3]. Examples are Microsoft Windows and Microsoft Money etc. On the other hand, customizable applications are those software

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[2]Information extracted from Automate's Annual Report 1997.

[3]Under the NAICS coding system, this segment of the software industry refers to software publishers, code 51121.

that come in standard form, but can be enhanced to better fit end-users requirements. These applications are typically mid-range to high price, require more end-user training to use, and sold by resellers that provide product support. In some cases, consultant companies and developers may use customizable applications as building blocks to build solutions for end-users[4]. Examples are ACCPAC accounting package, and database applications. Finally, tailor made applications are those applications solely developed to meet a customer's need. Pricing of these applications may vary, but mostly lie in the high-range. Moreover, the software developers often sell these applications themselves[5].

The revenues from these three classes have undergone major changes in the past 30 years. Before the 70s, almost all software packages are tailor made applications. During the 80s, there have been more and more customizable and off-the-shelf packages. However, since computer literacy of the general public is still low, tailor-made applications and customizable products still dominate the market. The volume software business started to flourish from 90s onwards as Apple and IBM PC has broken people's barrier to using computers. As a result, there are more and more off-the-shelf software applications in the market. As people's computer literacy rose, tailor made applications started to be replaced by customizable applications.

Automate's flagship products lie in both the off-the-shelf and customizable groups. Some users may just purchase the products and use it as a standard application, while others may require more support and programming from dealers.

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[4]Under the NAICS coding system, this segment of the industry is referred to as 541512.

[5]Under the NAICS coding system, this segment of the industry is referred to as 541511.

Automate's Business Model - The Virtual Corporation

The concept of the Virtual Corporation was first put forward by William Davidow and Michael Malone in 1992[6], which states that, in order to cope with the current rapid changing technological and competitive conditions, business organizations need to be more flexible. One way to achieve high flexibility is to abandon the traditional reliance on internal hierarchy, instead, companies should continuously fashion relationships with independent vendors in the marketplace to provide downstream and peripheral products and services.

This idea best summarizes Automate's business strategy. Automate believes that one of the key factor of its success is the leveraging of the distribution channel. By relying on the dealer channel on providing sales and technical services to end-users, Automate can maintain a very lean company size, and thus a lower overhead than its competitors. As a result, whenever there is price pressure, Automate can still stay at the competitive edge.

There are three tiers in Automate's distribution channel, namely Automate, distributors and dealers. Automate ships its software products to the distributors, who then handle the logistics, broke the bulk and sell to dealers. The dealer then sells the product to end-users directly, who is also the user's direct contact point for after-sales service.

In order to secure the internal fit[7] of the virtual corporation, Automate has made clear that it wouldn't compete with its dealers, instead, it would depend heavily on the

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[6]Davidow, W.H. and M,S, Malone, The Virtual Corporation, New York; HarperBusiness, 1992.

[7]The term internal fit generally refers to the harmonic working environment inside a corporation.

dealer channel to provide hardware, product support and consultation services to the end-users. Automate would not engage in direct sales activities, all its efforts would be devoted to product development, marketing support and channel support.

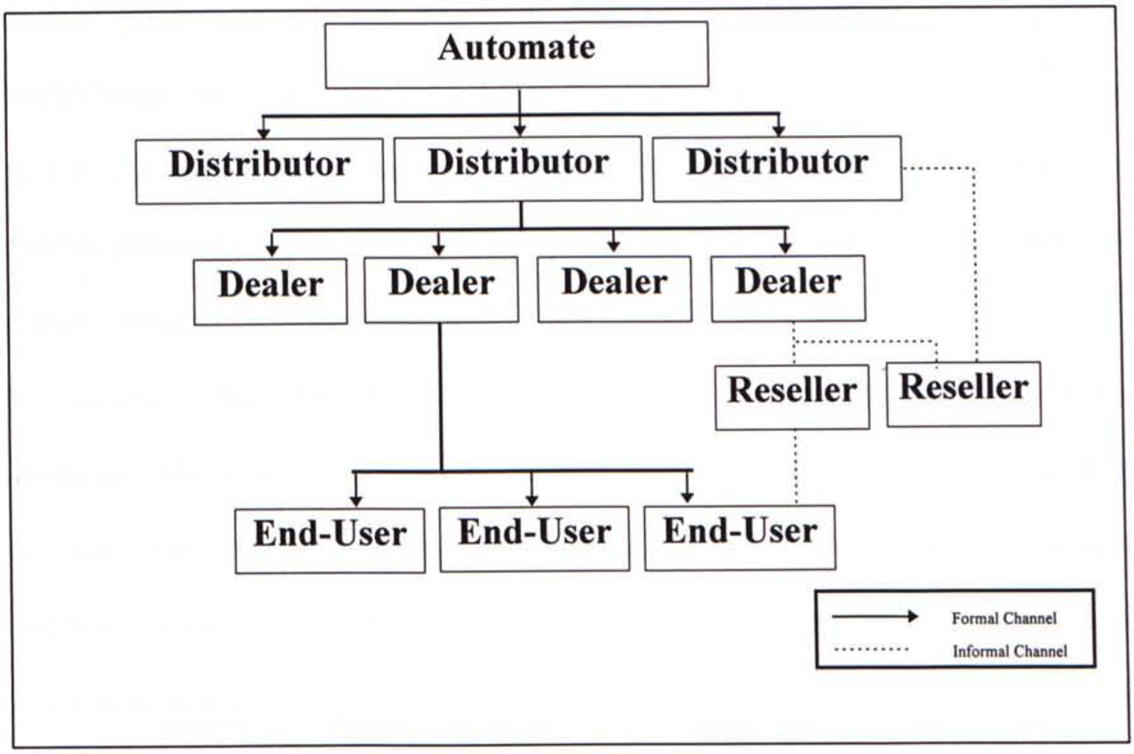

Figure 1 Distribution Channel Structure of Automate

Automate put forward the idea that, Automate itself is not a solution provider. Instead, viewing Automate and the dealer channel as a whole to serve end-users forms a virtual corporation. By 1997, Automate has over 4,100 resellers worldwide, and maintains a customer to employee ratio of over 1200[8]. An average of 80% of the revenue from AutoDraw related sales (including software, hardware and consultant service) was kept in the dealer channel, and Automate's profit only made up 20% of the revenue[9].

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[8]Information extracted from Automate Annual Report 1997.

[9]Information extracted from the keynote speech of Automate's CEO in the dealer conference CADCAMP '97.

Automate's strong commitment on the virtual corporation was rewarded by the dealer channels support. Feeling very safe that Automate would not steal their customers or compete with them in the future, resellers are very comfortable in promoting Automate's products to end-users. Moreover, since Automate has already made clear that it wouldn't step into side business of CAD in the future, independent vendors are willing to invest in developing and providing complimentary products, like teaching materials and utility software, for Automate's products. All these add up to enhanced popularity of Automate's products and dominant market share.

Besides selling new licenses of software packages, one forth of Automate's revenue comes from upgrades[10]. In order to maintain a high upgrade rate, Automate must ensure that users' software competence level must be improved constantly, so that they would demand more advanced functionality, as well as appreciate the added features in new software releases. Thus, Automate relies heavily on dealers to provide technical support to end-user in order to boost up user's technical competence.

Distribution Channel Development History in Hong Kong

During 1984 and 1986 Automate's presence in Asia Pacific is very little. There was basically no formal reseller channels in Asia Pacific, any company can purchase products from Automate in US and then resell to its customers.

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[10]Upgrade is a very special offer Automate gives its' existing customers. Existing customers can exchange their old version product to the latest version by paying only one-sixth of the software price.

In 1987, in view of the rapid growth of business opportunities in Asia Pacific, Automate setup a specific task force to look after business development in Asia. During that year Automate appointed distributors in all Asian countries, these distributors then signup their own resellers, thus a formal distribution network is formed.

Under the distribution agreement, distributors are bind to sell only to authorized dealers they have signed. Moreover, they also have to commit on revenue quota. In return, all distributors have exclusive dealership in their respective regions.

In early 90's, more then 10% of Automate's revenue were came from Asia Pacific. In order to sustain this rapid growth, Automate started setting up subsidiary offices in the region. By 1996, Automate has office in Japan, Korea, Singapore, China, Taiwan, Hong Kong, India and Australia. These offices are mainly marketing offices that never engage in direct sales. The major function of these country offices is to provide marketing and technical support to local distribution channel. Through these country offices, Automate can obtain a better understanding of each market, and thus has better control and monitor of the local distribution channel[11].

In 1987, Atoz, a local computer hardware trader, signed up its distribution agreement with Automate as the sole distributor in Hong Kong. At that time, Atoz recruited 10 dealers.

Automate's Hong Kong office was setup in 1993, staffed with 4 people. The first thing this office did was adding two more distributors into the existing channel, namely SiS and Laser Computer who are much larger than Atoz in business size. In 1993,

[11]Extracted from an interview with Mr. E. Cheung, Country Manager, Automate Hong Kong Ltd.

Automate's revenue in Hong Kong was around 800K US dollars, while in 1996, this number exceeded 3 million US dollars.

Today, Automate's channel in Hong Kong consists of 3 distributors, 25 authorized dealers and over 50 resellers. Automate does not sell direct in Hong Kong, and all sales are done through the channel. Authorized dealers are appointed by Automate, but can purchase freely from any of these three distributors. Resellers, on the other hand, are smaller companies that have no formal relationship with Automate or these three distributors. Resellers can also purchase software from the three distributors, but usually enjoy a discount less than authorized dealers.

In 1997, sales of Automate's products in Hong Kong are evenly spread through the three distributors. About 50% of the business are from authorized dealers, while the other 50% are from resellers. Among 25 authorized dealers, only 5 are active volume makers, and their sales totaled 40% of Automate's revenue in Hong Kong.

CHAPTER II

INDUSTRIAL ANALYSIS

In this section, we will use Michael Porter's five forces analysis model[12] to study the environment in which Automate operates in Hong Kong. After getting a macro view of the industry, we will then present analysis of each party in particular.

According to Michael Porter's approach, five forces have to be considered when analyzing an industry or company's competitiveness, namely, internal rivalry, entry, substitute products, supplier power and buyer power.

Software Market in General

Our discussion of the software market will be confined to the software publishing business. As we have mentioned before, this market began to flourish at the beginning of 90s due to the popularity of IBM PC and Apple computers. Moreover, we will focus our discussion in the Hong Kong region only.

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[12]Porter, M. Competitive Strategy, New York: Free Press, 1980. In his book, Porter presented a simple framework for exploring the economic factors (five) that affect the profits of an industry.

Internal Rivalry

The software market has undergone several evolutions during the past twenty years. During late 80s and early 90s the competition in the software market is severe. Customers are not so knowledgeable about computer at that time, and viewed software from each vendor as close substitutes. As a result, a few players in each market evenly divide market shares. For example in the word processing market, applications like MS Word, WordStar, Word Perfect and AmiPro divided the market almost equally. In the CAD market, the picture is even more fragmented.

However, as we stepped into mid 90s, the market converged to only one or two leading applications in each field. For example, MS Excel became the defacto standard of spreadsheet applications, while MS Word dominated the word processing market. However, in some areas battles are still going on. The major reason for this convergence is the wide spread of personal computer. As more people are using computer, the inter-exchange of electronic information becomes very frequent. Thus, people started noticing that a common file format is essential, which means, they have to compromise on using a unique application for each task.

Nowadays, the concentration ratio in the matured software market is very high; market shares are typically in the hands of one or two companies. By matured markets, we refer to areas like word processing, spreadsheet, personal databases, e-mails and network connectivity. Thus, we would say software vendors in these markets are facing little competition.

However, there are some emerging markets like desktop publishing, computer graphics and personal assistant, vendors are going through the early stage of the product life cycle.

Entry

The software business involves very low set-up as well as R&D costs. As a result, there are numerous new software coming out each year (examples are Netscape, Visio etc). Moreover, independent small developers also benefit from the excellent marketing opportunities offered by the Internet[13]; thus the entry barrier to the software market is lowered. However, as we have mentioned in the previous section, major players, like Microsoft and Lotus have already monopolized the matured software market, new entries are only possible in niche markets.

The reason for this is really simple, sizes of the installed base. Since most software uses its own proprietary file format[14], if a user has been using that particular software for a long time, the legacy data accumulated would naturally become a hindrance for him to switch to other applications. User's dependency would then shield a software from outside competition.

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[13]Small software developers can advertise and sell their software through Internet at a very low cost, but covering a very wide group of potential customers.

[14]In general, software developers would not publish the definitions of the data file format they use. As a result, it is almost impossible for other developers to design software that can read data stored in another application's format.

One common tactics for new entry to get into a matured market is to provide data compatibility to market leading software[15]. However, in emerging markets, the installed base is small and so the volume of legacy data is little. Thus the hurdle for users to try and switch between application is low. As a result, we can see many small firms competing in those markets. Also, using a software involves relation specific investment from users. Users have to spend time and money to get trained on an application before he can use it productively. The longer a user use it, the more proficient he would be, but at the same time the opportunity cost for him to switch to another application becomes higher. The same token would also be applicable to corporations, who may have to spend tremendous amount of money in re-training, and suffer long down time, if they decide to change a mission critical software application.

Substitutes

Software are automation tools, in a lot of cases, they are developed to streamline the way in which people perform repetitive tasks. Thus, it would be relatively difficult to find substitutes for them.

However, there is a thread from piracy, which serve as a substitute to legal software. Though a lot of efforts have been made in fighting against software piracy in Hong Kong, it is still a major issue to software vendors. In 1992, several software developers, lead by Microsoft, Lotus and Automate formed the Business Software Alliance (BSA), with the mission to fight against software piracy.

[15]For example, when Microsoft first introduced MS Word, Word provides users with the ability to read their existing WordPerfect data files.

Due to the efforts of the Hong Kong Customs and BSA, the piracy rate has lowered a lot during recent years, however, more than 70% of users in Hong Kong are still using illegal copies[16].

Buyer Power

Installed base is the greatest asset of software companies, thus for newly released software; they will do whatever they can to enlarge installed base. In this case, software vendors would provide great incentives to bait influential accounts like government departments and large corporations, to switch to their applications. In this aspect, we would say that buyers are very powerful.

If software vendors can plant their seeds in influential accounts, then that accounts downstream companies or sub-contractors would have no choice but use the same software, in order to maintain data inter-exchangeability with their client. If software vendors can achieve this goal, buyer's power is lost.

Moreover, after a user has adopted a software package, and created tons and tons of legacy data in that package's format, it would then be extremely difficult for him to switch to other packages. At this point, he has almost lost all his bargaining power.

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[16]Figure estimated by the legal counsel of Automate Hong Kong Ltd.

Supplier Power

Software are intangible goods, thus it is very difficult to identify who is the industry's supplier. However, there are two forces which affects the development of a software company, namely, human resources and government regulation.

Software is a very "labor" intensive industry; programmers, system analysts and development directors often represent powerful suppliers. A software vendor's success depends largely on the quality of its development team, as well as the validity of the vision of the development director. The skill set of these personnel are highly portable, though, they learn to work in teams, but seem to be able to adjust rapidly to new environment. Thus, it is not uncommon for talented system analysts to realize real annual wage increase of over 30 percent.

Government regulation is also a threat to the industry, like the Anti-trust law in US. Fortunately, these types of laws are non-existence in Hong Kong.

Table 1 Competitive Analysis of Software Industry

Forces	Threat to Profit
Internal Rivalry	Low/High
Entry	Low/High
Substitutes	High
Supplier Power	High
Buyer Power	Low/High

Automate

We will use a similar model in the prevailing section to analyze the competitiveness of Automate in the market.

Competition and new entrant

Automate has software product offerings in both matured markets and emerging markets. In the AEC (Architectural Engineering and Construction) and Mechanical and Manufacturing engineering field, Automate's flagship product AutoDraw is almost the defacto standard, having more than 80% of the market share. Major competitor in this market is MacroStation marketed by Intergraph Ltd[17]. The business model of Intergraph is totally different from Automate's. Automate sells through dealer channel, and most of its revenue comes from the volume market. On the other hand, Intergraph adopts a direct sales approach, targeted mainly at utility companies, government departments and large major accounts. Moreover, large corporate accounts also requires more sophisticated support service, as a result, Intergraph has to maintain a much larger technical support team than Automate.

Automate's concept of virtual corporation enables it to maintain a smaller head count and thus a lower overhead cost, whenever there comes price competition, Automate can still stay at the competitive edge. Moreover, Automate's huge installed base in the matured market serves as a strong shield against competitions and new entrant in this market.

However, in emerging markets like GIS (Geographic Information Systems) and FM (Facilities Management), Automate is an absolute newcomer. Automate shipped its first GIS software in 1996, as a complimentary product to AutoDraw. Sales in this market are insignificant to Automate, but growth in the GIS market is very promising. Automate's advantage is definitely the huge installed base of AutoDraw, while its weakness is lack of reference account and weak functionality. As we have mentioned below, new comers in emerging market are facing all kinds of hardship.

Threat of Substitutes

Like other software vendors, the major substitutes to Automate's products are pirated software. A rough estimation by Business Software Alliance (BSA) claimed that AutoDraw has more than 100,000 installed units in Hong Kong, while the number of actual legal license is only around 10,000.[18]

In 1997, the Hong Kong government passed an act against software piracy, such that using illegal software in business context is considered as a criminal act. As a result, the piracy problem should be under control in the coming years.

The Automate Hong Kong office also faces the problem of parallel imports. Due to different market conditions in Asia Pacific, Automate prices its software separately in different countries, for example, AutoDraw's retail price in China is only 80% of this price in Hong Kong, while in Thailand the price is even only one third of that in Hong Kong. As a result, some resellers or even distributors would import Automate products from other countries and sold them in Hong Kong.

Buyer Power

Buyers of Automate can be classified into two types, end-users and resellers. Due to the popularity of AutoDraw, Automate has great power over its dealer channel.

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[17]Information provided by Mr. E. Cheung, Country Manager, Automate Hong Kong Ltd.

To over 80% of the dealers, the profit from selling AutoDraw may not be too significant, however, a major portion comes from the business leveraged from selling AutoDraw, like hardware, consultant service and maintenance. To conclude, they would do their best to keep their status as an Automate authorized dealer.

On the end-user side, as we have mentioned earlier, the AEC and Mechanical market have been using Automate's products for more than 10 years. The huge installed base, the number of personnel trained, as well as the volume of legacy data secured Automate's position in these two markets.

In these two markets, we would conclude that buyer's power is weak.

However, in emerging markets like GIS, Automate is in a weak position. To enter this market, capturing a few influential accounts is critical. As a result, buyer's power here is very strong.

Supplier Power

Automate Hong Kong is reselling software products developed by Automate, Inc in US. Being a subsidiary office, it is not facing much supplier threat.

Table 2 Competitive Analysis of Automate

Forces	Threat to Profit
Competition and New Entrant	Low/High
Substitutes	High
Buyer Power	Low/High
Supplier Power	Low

[18]Estimates provided by Ms R. Durkee, Paralegal, Automate Hong Kong Ltd.

Channel - Distributors

In this section, we will use Automate's distributors as models to analysis the software distributor's business in Hong Kong.

Distributors lie in the middle layer of Automate's model of virtual corporation. The major functions of distributors in the virtual corporation include, credit advancing, warehousing and in-bound/out-bound logistics. They are also responsible for the recruitment of dealers and resellers, and according to their agreement with Automate, they are not allowed to sell directly to end-users.

Besides carrying Automate's products, these three distributors also distribute other computer hardware and software. But their agreement with Automate restricted them from distributing direct competing products from other software vendors.

Competition and new entrant

At present, Automate has three distributors in Hong Kong, and all of them are under the protection that Automate would not sell to anyone other than these three companies. However, they do complete severely among themselves. Since they do not provide any marketing and support functions, they usually compete on credit terms and price; as a result, scale of economy is the only key to win. Normally, they offer 30 days credits to dealers and resellers, while keeping a 3-5% gross margin for them. Their distributorship of other hardware and software also helps them compete for dealers and resellers.

As of 1997, market shares among the three distributors are not even, the two larger companies; Laser Computer and SiS got 40% each, while the smaller one Atoz has only 20% share of the market.

New entrants are prohibited in three ways. First of all, before their agreements with Automate expire, Automate cannot add new distributor. Secondly, major distributors in the market are often carrying other Automate competing products; if they are to switch over, they must give up their existing distributorship. Finally, their existing dealer and reseller network can serve as a competitive asset against other new entrants.

However, setting up the infrastructure for software distribution is easy. As we have mentioned before, no market specific investment is required, thus if anyone of the existing three distributors do not perform, it would be very easy for Automate to sign-up new ones as replacements. This can be a constant threat to the existing distributors to keep good relationship with Automate.

Threat of Substitutes

Subsidiary office of Automate in some countries does practice the two tiers channel structure, instead of the three-tier structure in Hong Kong. By two tiers, Automate subsidiary offices sell directly to dealers and resellers.

However, in Hong Kong, there is no incentive for Automate to eliminate this middleman. Firstly, the margin distributors keep is just 3-5%, saving from eliminating them are small. Secondly, Automate can maintain a steady revenue stream by controlling the inventory level of the distributors. Finally, by off-loading all the credit control and logistics to distributors, the operating overhead as well as head count can be kept at a minimal in the Automate Hong Kong office.

To conclude, threat from substitution is low. However, as we have mentioned in the previous section, distributors would also face the threat of parallel imports, especially from other distributors in Thailand and China.

Buyer Power

Since distributors don't sell direct, dealer and resellers would be considered as the buyers. Dealers and resellers are allowed to purchase from any distributor, and since the shop around cost is very low, so distributors do have to compete for dealers.

Currently, there are about 20 Automate dealers and over 50 resellers in Hong Kong. It is extremely easy for a distributor to contact and negotiate with each dealer, making the market very competitive. Moreover, in order to enjoy maximum bargaining power, dealers and resellers usually purchase from more than one distributor.

Buyer power is very strong for distributors.

Supplier Power

All distributors have a single supplier, Automate. Due to the huge installed base and popularity of AutoDraw, Automate is at a very strong supplier position compared to other software vendors. As we have pointed out earlier, Automate's cost of adding and deleting a company from the list of distributors is low, relationship specific investment made by Automate is little. Moreover, by having three distributors in Hong Kong, good balance of power is maintained by Automate, as a result bargaining power of distributor is thin.

In short, supplier power is strong.

Table 3 Competitive Analysis of Distributors

Forces	Threat to Profit
Competition and New Entrant	High/Low
Substitutes	Low
Buyer Power	High
Supplier Power	High

Channel - Dealers and Resellers

Dealers and resellers are the sales arms of the virtual corporation. They can be considered as the sales force for distributors and Automate. While viewing from the end-user's side, they are the agents representing Automate. Currently, there are twenty authorized dealers in Hong Kong, to be an authorized dealers, their marketing and support capabilities must pass the requirements lay down by Automate. Resellers, on the other hand, do not have any formal business relationships with either Automate or its distributors. They are either box-movers or small trading companies, the formers are software distribution companies who provide little or no technical support, but offers deep discount to end-users. For the small traders, their sales volumes are just too low to justify investing in Automate products. The estimated number of resellers is over one hundred.

Only authorized dealers are entitled to marketing and technical support provided by Automate, for example, they would be listed on all Automate's advertisements, they are entitled to technical support from Automate and they can participate in all marketing events organized by Automate. Resellers are not covered by any marketing campaigns of Automate.

Competition and new entrant

Dealers and resellers compete in different ways. Dealers differentiate themselves by industrial expertise and service, while resellers compete by cutting price. Dealers build up their industrial knowledge by specializing in different vertical markets, mainly AEC, mechanical, videographic, GIS, government and education accounts. By specializing, they can provide high value added service and consultation to companies in that market.

On the contrary, resellers would just compete by cutting price deeply, but provide no support service at all. Some dealers may match the price cut by reducing the amount of service provided, while others would emphasis the value of support services to customers, and charge premium on the services provided accordingly.

End-users are cunning enough to take advantage of both types of retailers. They purchase some licenses from dealers who provide support, and the rest from discount resellers. Thus, they can enjoy the savings from buying from box-moving resellers, while drawing support from premium seeking dealers.[19]

We would conclude that, if a retailer just sell plain AutoDraw box, he could only expect a very thin margin. The only way he can ask premium is providing add-on

[19]This type of free-riding is possible in software industry, due to the fact that it is impossible for the dealers to appropriate support services to individual pieces of software sold.

services, the harder are the services for others to match, the higher he can charge. As a result, some dealers don't focus much on software sales; instead, they devote all their efforts in providing custom made solutions, where they can charge high consultation fees.

Threat of Substitutes

In Hong Kong, Automate only sells through its dealer channel, unlike in the States where users can purchase through mail order or through Internet. Thus, the threat of substitutes is low.

Buyer Power

Due to user's investment in Automate's products, it would be difficult for them to switch to other software packages. Moreover, the budget on software spending when compared to the total project sum is often insignificant, so Automate clients are considered less price sensitive.

As BSA and the Hong Kong Customs are more active in software anti-piracy campaigns, piracy in the business context should be gradually improved. There is increasing pressure on end-users to abandon their pirated copies and convert to legal license. We can see that buyer's power in this market is weak.

Supplier Power

Supplier power is low. Since dealers and resellers are the sales arms of the virtual corporation, their relationship with the customers can be considered as a valuable asset. So dealers with larger customer base would be at a better bargaining position with the distributors. Moreover, the competition among distributors also lowered the bargaining power towards dealers.

Table 4 Competitive Analysis of Dealers and Resellers

Forces	Threat to Profit
Competition and New Entrant	High
Substitutes	Low
Buyer Power	Low
Supplier Power	Low

CHAPTER III

CHANNEL STRUCTURE

In this section, we will try to represent the Automate virtual corporation with structure models, in doing so; we aim to clarify the various relationships between different parties. We will also identify the types of competition they are facing.

The Product Line - A Economic Perspective

The value chain[20] of Automate's products can be summarized as follows. Automate sells software package to distributors, distributors then add values of in-bound and out-bound logistics, products are then passed on to dealers and resellers. Resellers sell the goods to users by adding values of sales activities. For dealers, they will add values like pre-sales and after-sales support to the product. In some cases, dealers also provide custom made solutions to customers; in this case, they add development (manufacturing) values to the final product.

Figure 2 depicts the value chain of Automate's products.

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[20]The concept of value chain is also developed by Michael Porter in his book *Competitive Advantage*. Porter uses the value chain to describe the activities within firms and across firms that add value along the way to the ultimate transacted good or service.

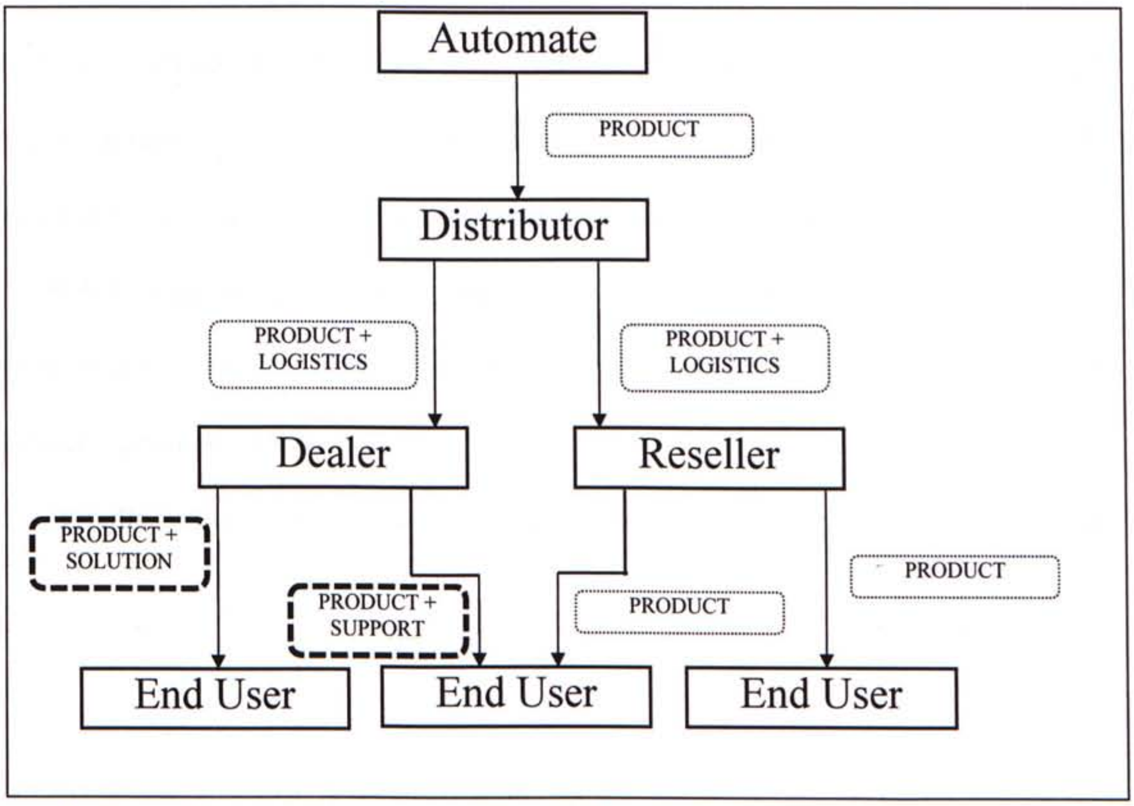

Figure 2 Value Chain of the Automate Virtual Corporation

The product offerings available to end-users can be classified into three types, namely, software package, software and support service bundle and complete solution. Currently, no dealer is selling support service alone.

As we have mentioned earlier, profit margin is the thinnest for strict product selling, typically 5 - 10% of the retail price. By adding support services, dealers can charge higher prices, usually 20% - 30% of the retail price. Finally, solution selling would be the most profitable business, profit margin ranges from 100% to 1000% of the software retail price. Needless to say, investment is directly proportional to profit margin.

Resellers who are just moving software boxes, don't need to invest much, usually they employ sales forces who sell a wide range of products including computer hardware and software. The marginal cost of adding a new item in the product mix is low. On the other hand, fixed cost involved in selling product support service is high. Investment in human resources is required in order to provide product support services. Moreover, this investment is relationship specific, a support personnel specialized in one software may not switch to support other software packages easily, while provides the same level of support quality. On the other hand, the variable cost of selling support service to additional customers is low.

Finally, solution selling provides the greatest earning opportunity. However,

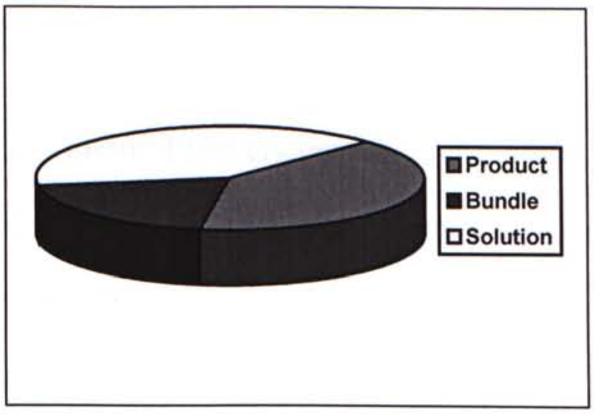

Figure 3 1997 Revenue Composition.

selling cycle of solution is much longer than software selling. Greater investment is also required.

In 1997, total revenue from the three different sales is depicted in figure 3[21]. We can see that revenue from solution selling is almost the same as that from product selling. However, this picture does not reflect Automate's interest.

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[21] Information provided by Automate Hong Kong Ltd.

Consider the profit Automate obtained from these three sales in 1997. Unlike distribution in the total revenue, most of Automate's revenue is contributed by support-

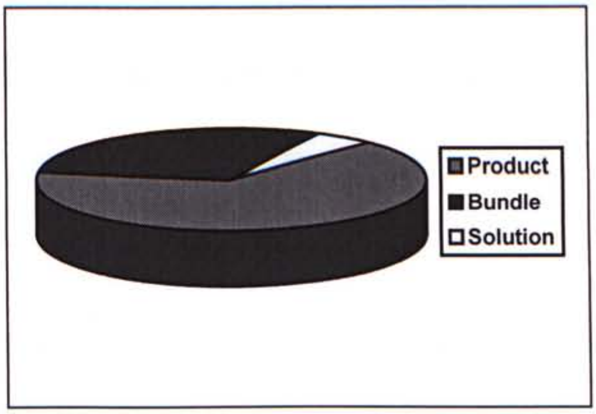

Figure 4 1997 Profit Composition.

stripped product sales. The reason of this discrepancy is due to the fact that, software costs usually take up less than 10% of the whole project sum in solution sales.

Due to this reason, if Automate is to increase its profitability, it should increase income from product sales instead of solution sales.

Market Structure and Competition

The organization of the virtual corporation has undergone major changes in the past ten years. These changes were responses to growth of Automate's business in Hong Kong and changes in customers' need.

Before 1988

Before 1988, Automate did not have any infrastructure in Hong Kong. Local architectural firms and consultants bought directly from Automate US, or dealers in US. Sales at that time are relatively small, around US$ 200K per annum.[22]

1988 - 1993

In 1988, Automate signed up the first distributor in Hong Kong, Atoz. Atoz was given an exclusive right to distribute Automate products in Hong Kong, and all dealers and resellers must order from Atoz.

Due to Atoz's exclusive distribution right, a monopolistic price is charged, and a profit margin as high as 20% was retained. Moreover, this channel structure has the typical double marginalization problem.

[22]Information provided by Automate Hong Kong Ltd.

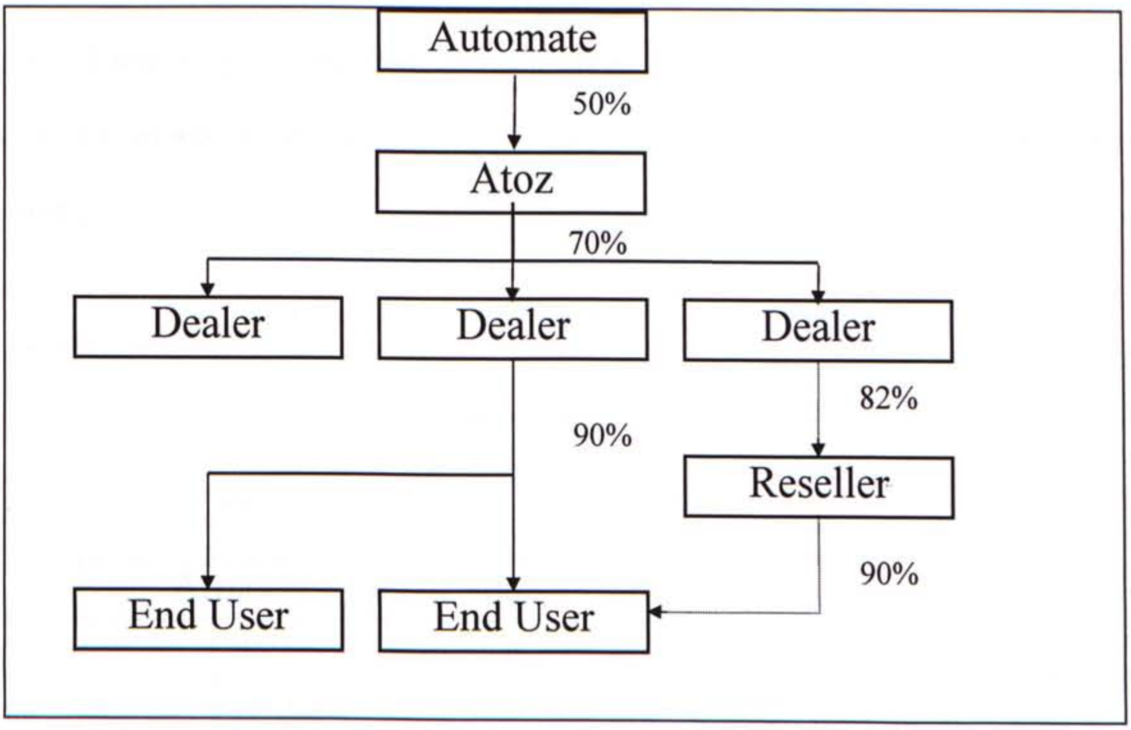

Figure 5 Automate's Channel Structure (1988 - 1993)

The average growth rate of sales during 1988 and 1993 was only 10% per year. The limited financial capacity and the narrow coverage of the dealer network were found to be the factors hindering sales growth[23].

1993 - 1996

In viewing of the bottleneck imposed by Atoz on the software sales growth. Automate set up its own subsidiary office in Hong Kong. The main purpose of setting up this office is to provide better marketing and technical support to the local channel, as well as assists headquarters to better understand local market conditions.

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[23]Comments made by Mr. E. Cheung, Country Manager, Automate Hong Kong Ltd.

The first restructuring Automate Hong Kong office did is opening up the distributing channel. In 1993, Automate appointed two additional distributors in Hong Kong. These two distributors are much larger in business size and have already established strong dealer network for distribution of other hardware and software products.

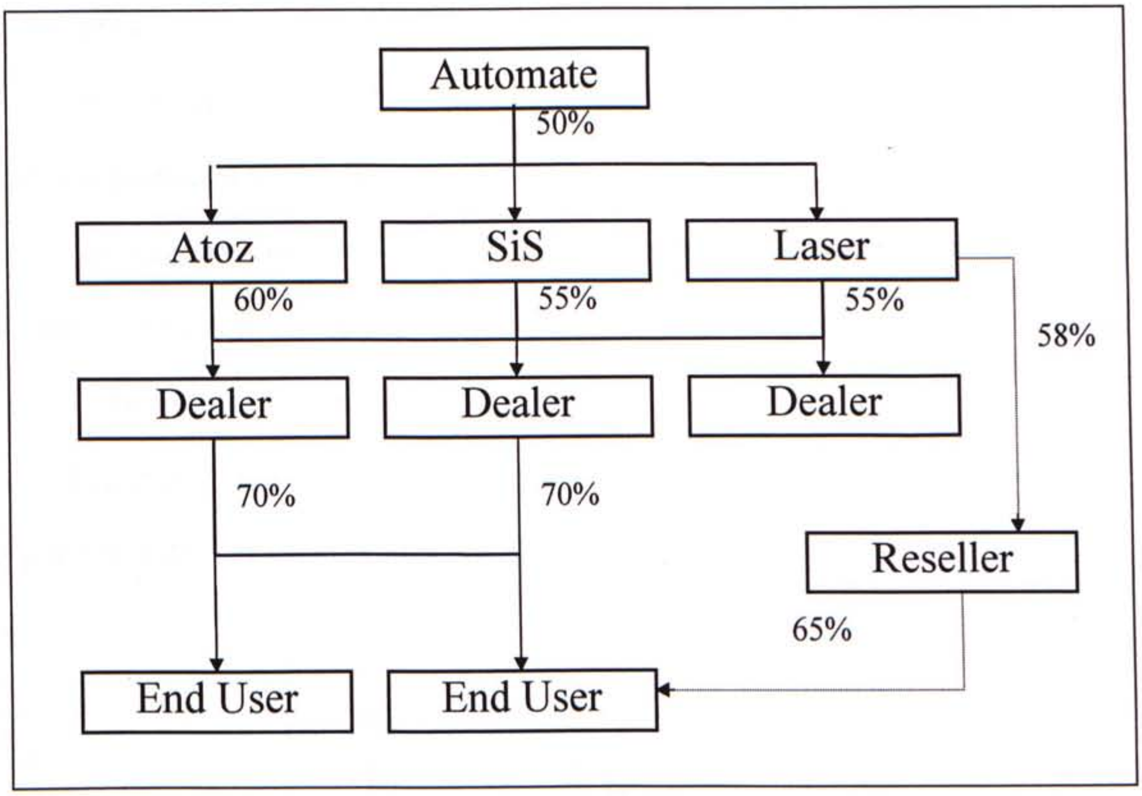

Figure 6 Automate's Channel Structure (1993 - 1996)

The new channel structure has brought significant pricing changes within the virtual corporation.

Due to competition, the profit margin of distributors dropped from 20% to 10 - 5% of the retail price. Being larger in business size, SiS and Laser were able to offer deeper discount to dealers than Atoz. As a result, market share was unevenly distributed among the three. SiS and Laser both got around 37%, while Atoz only has 25%.

As we have pointed out earlier, there is a difference in cost structure between resellers and dealers. Resellers provide no technical support to end-users, while dealers sell product and support services bundles. Due to this difference, resellers compete with dealers by lowering the end-user price, typically by 5%. As a result, dealers also have to cut their prices.

Dealers and resellers shared the market equally. Which reflected that there is a significant portion of users who would prefer support-stripped products.

Adding more distributors solves the double-marginalization problem. The effect is reflected by the fact that, Automate's revenue grew from US$ 800K in 1993 to US$ 3M in 1996, which means an average annual growth rate of 50%.

Distributor's business also changed from a monopoly to a Cournot competition[24]. Despite SiS and Laser are keeping a low profit margin of only 5% of the retail price, Atoz

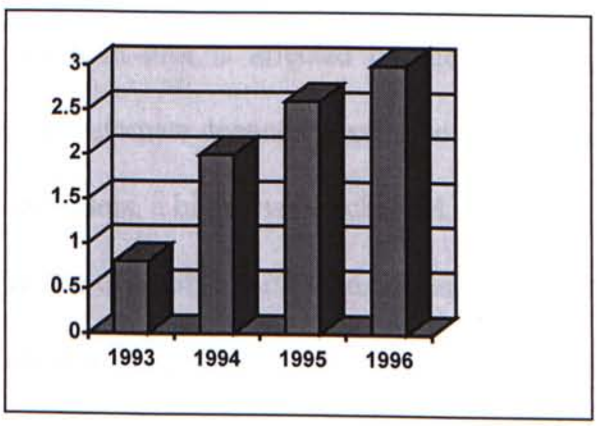

Figure 7 Revenue Growth of Automate

marks up by 10%, still Atoz got 20% of the market share. The reason is simple. When dealers have reached their credit limits in SiS and Laser, they started buying from Atoz thus still kept Atoz in business. Moreover, in order to maintain balance of power, both Automate and the dealers would like to maintain more than two distributors. So, in a lot of occasions, Automate should mention Atoz in front of major accounts.

Dealers business also changed from a monopolistic competition environment to a nearly perfectly competitive market. Dealers and reseller could only maintain a thin economic profit. The reason why dealers, with a greater overhead, still compete in such a low margin market is because they can leverage from Automate's dealership. By being Automate's authorized dealers, they can sell thick margin services like technical support, consultation and complete solution.

Although, during these three years, Automate experienced tremendous growth, there are new problems brought about by this new channel structure. First of all, as we have mentioned in chapter I, one forth of Automate's revenue comes from software upgrades. The volume of upgrade business is highly dependent on user's utilization of the software package, which in turn is affected by the knowledge level of user on Automate's software. Since Automate depends heavily on the channel to provide training and technical support to end-users, a high level of channel competence is preferred.

Moreover, Automate is also diversifying into the GIS and FM markets. More channel investment is needed in order to develop these emerging markets.

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[24]A competition model put forward by A. Cournot in 1897, which stated that the sole strategic decision of each firm in this model is the amount they choose to produce.

1996 onwards

Instead of aligning with Automate's objective, the current channel is hindering Automate's growth. Since dealers are facing perfect competition from resellers, very few dealers are willing to invest on Automate's products. As a result, deteriorating channel competence level is obvious.

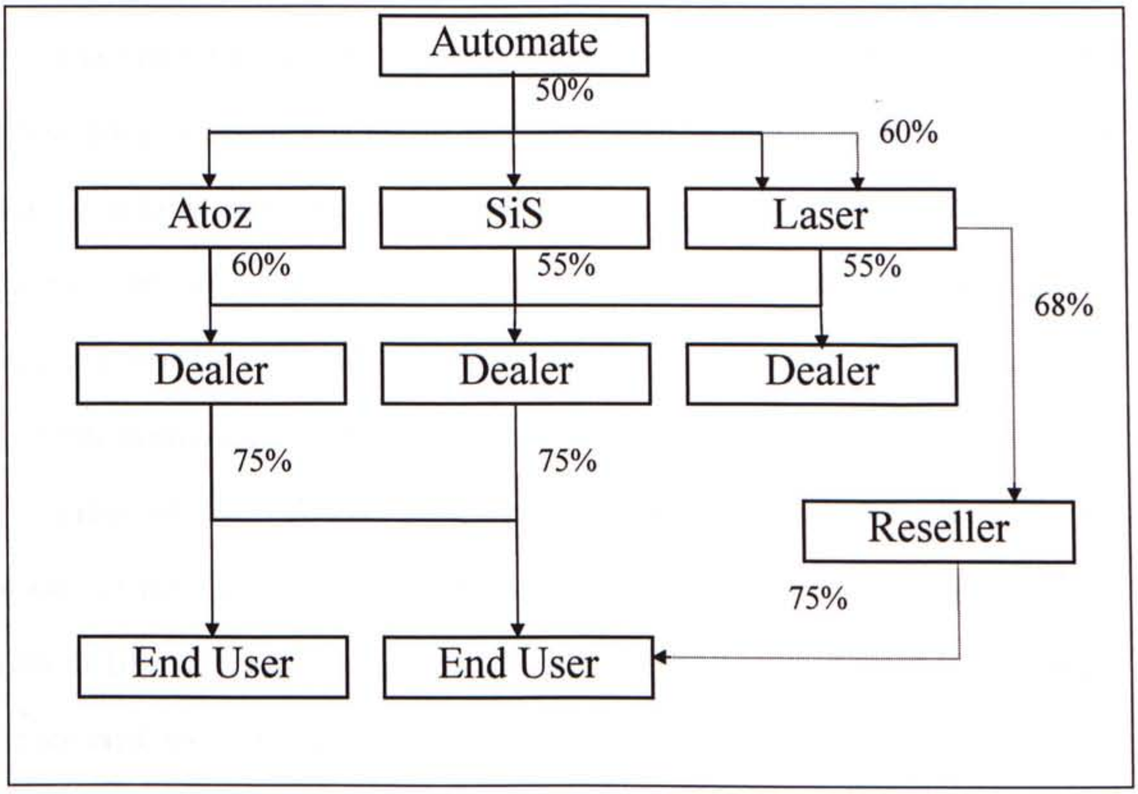

Figure 8 Automate's Channel Structure Since 1996

Automate intends to boost up channel's competence level by maintaining an abnormal profit for dealers. A special rebate of 10% of the retail price was given to all dealers, in doing so; they should still maintain a 15% profit margin when competing with resellers. With this extra cost advantage, Automate expects that dealers would increase their investment on supporting Automate's products.

From figure 8, we can notice that the 10% rebate is actually a 10% increase in distributor's price if the product goes to resellers. Automate required distributors to proceed dealer's purchase order when they order software from Automate, if they cannot show dealer's purchase order, then Automate would assume that the product ordered would be sold to a reseller, and thus would charge the dealer a higher price.

The first effect of this new arrangement was increased street price. Since the purchase price of resellers is higher now, they have to charge users' a higher price. Instead of offering users a 25% discount, they can only afford a 15% discount now. From the model we can see that by offering end-users a 20% discount, dealers are at a competitive edge over the resellers. However, due to intra-dealer competition, dealers are not able to raise their prices.

Financial results in 1997 showed that Automate's revenue is unaffected by this increase in street price. In 1997, Automate's total revenue was US$ 3.3M, an almost growth of 10% compared with the sales in 1996. This figure reflected that Automate users are price inelastic at this point. When we take a closer look at the ratio of dealer sales to resellers' sales, another interesting phenomena is revealed. In 1996, the revenue mix is 50% dealer and 50% reseller. In 1997, the ratio is only slightly improved to 60% dealer and 40% reseller, showing that even the retail price offered by dealers is 5% lower than that of resellers, only a small portion (around 20%) of resellers' sales were captured by dealers. This showed that, besides cost of goods advantage, resellers have certain infra-structural advantage over dealers. Some possible competitive strength of resellers over dealers are, better market coverage, higher quality sales force and synergy from carrying a wide scope of products.

Due to the fact that the new channel pricing can only shift 20% of reseller's sales to dealers, Automate's problem of low channel investment is still left unsolved.

CHAPTER IV

GROWTH OPPORTUNITIES

In this section, we will discuss various growth opportunities of Automate in Hong Kong, and what factors would contribute to Automate's success in capturing these opportunities. We will start our discussion by reviewing Automate's growth pattern in the past few years, then we will identify various external market changes, and finally, we will discuss how Automate can extend its product offerings to cope with the new market trends.

Growth Projections

Automate's revenue growth is shown in figure 9, we can see that for the past five years, Automate is able to maintain growth rates over 10% per year. However, the annual growth rate is deteriorating, from 250% in 1994 to 10% in 1997.

Automate has kept its products' prices constant over the past five years, thus we can conclude that the growth attained is through increased number of units sold. The growth in number of seats sold can be explained by a few factors.

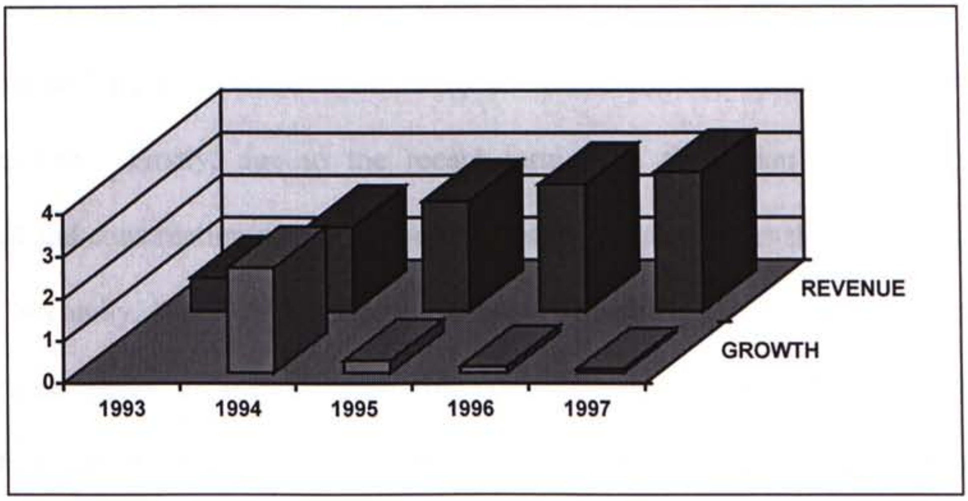

Figure 9 Revenue Growth of Automate

In 1993, Automate increased the number of distributors from one to three, as a result, in that year, the revenue boomed by 2.5 times. This boom was a direct result of the release of suppressed demand due to the double marginalization problem induced by the monopoly status of Atoz.

During 1994 and 1997, growth is due to both marketing and anti-piracy efforts. After opening a local office in Hong Kong, Automate is able to organize more pull marketing events. These events helped increasing demand on software as well as motivating users to upgrade from older releases to latest software release.

Increased software demand, won't necessary convert to increased revenue, unless piracy rate is under control. Automate's anti-piracy campaigns, including advertisements, targeted warning letters and end-users raids, have been very successful during the pass few years. An average of 15% of Automate's revenue is the direct result of anti-piracy efforts, and over 30% of new software purchase are conversion of illegal software copies to legal licenses.

However, it is easily foreseeable that the growth rate started flattening since 1996, and the projected figure in 1998 is under 10%. There are two main causes for this declined growth. Firstly, due to the recent turmoil in the Asian economies, the architectural and construction market (major market of Automate) has shown an extreme downturn. Secondly, over 70% of large corporate have already "legalized" most of their illegal software copies, the rest of the pirating population is expected to be less sensitive to legal action, and thus require more efforts to persuade them to purchase legal copies.

New Market Challenges

Recent decline in macro economic environment would certainly shift Automate's demand curve downwards, companies would be less eager to expand their business scale. Moreover, given the adverse economic conditions, companies would be more concern about cost savings, and thus even they have to add more software licenses, they may start evaluating the actual need of their users and start looking for low end CAD replacements.

As we mentioned in Chapter II, research and development cost of new software packages can be very low, thus entry barrier to the software market could be low. However, the volume of legacy data does serve as shield to new entrance's threat. In order to encourage users to switch to new CAD products, most of the new CAD products would provide files compatibility to leading CAD systems. One of Automate's competitors has just announced shipment of a low end CAD product, which costs only one-tenth of Automate's one, and claimed capable of fully read and write Automate files.

The economy downturn, on the other hand, has also brought along new business opportunities. In order to increase efficiency and productivity, more and more companies are planning to install computer-based management information systems. These systems can be classified into three groups, namely, workflow management, FM (Facilities Management) and GIS (Geographic Information System). The prime functionality of these systems is linking graphical data with textual attributes, and one of the pre-requisites of implementing these systems is sufficient volume of electronic data. After more than ten years of using CAD software to prepare technical drawings, most of the maps and architectural plans were in electronic forms, as a result, making computer based management system possible.

Product Line Extension

In order to cope with the changing environment, Automate has to adjust its product offerings, so as to secure growth opportunities. For better understanding of the existing strategic position of Automate, we will apply the BCG model on Automate's products.

From Figure 10, we can see that reasonable strategies of Automate would be prevent AutoDraw from dropping into the "DOG" category, while trying to upgrade GIS and FM related products to the "STAR" category. Thus resources should be allocated in maintaining AutoDraw's market position and upgrade rate, as well as promoting Automate's GIS and FM products.

With the introduction of file compatible CAD competitors, Automate can no longer reply on legacy data as a protection shield, it must encourage users to develop more relation specific investments on Automate's products. One example of this would be the customized add-on modules using Automate's products. Moreover, Automate should also promote uses of Automate's products to implement computer based GIS and FM systems.

However, in order to support these new marketing strategies, better product support is required, with the existing level of services provided by resellers and dealers, these targets are difficult to achieve.

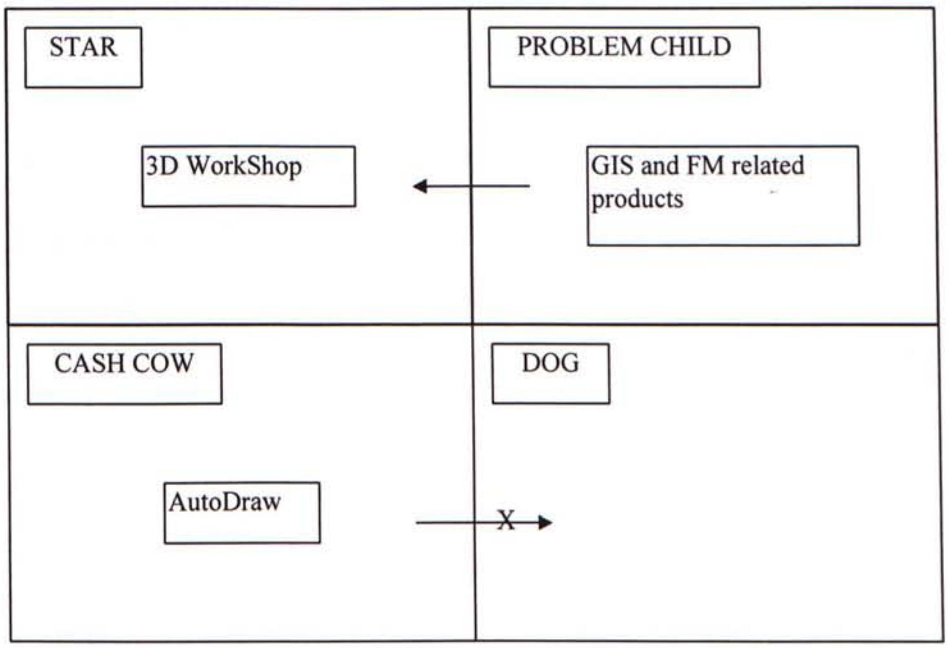

Figure 10 BGC Model of Automate's Products

CHAPTER V

CHANNEL RESTRUCTURING

In this section, we will explore various channel strategies put forward by different economists and study whether new structures would be beneficial to Automate. As we have mentioned in earlier section, Automate faces two challenges, firstly, it has to prevent its flagship product AutoDraw from falling into a "DOG" product, secondly, it has to migrate the GIS and FM products to the "STAR" class. Besides channel structures, we will also discuss different pricing strategies.

Economic Models

We will begin our discussion with how to secure the position of Automate's flagship product AutoDraw in the market. Before we investigate the feasibility of various channel strategies, we would like to encapsulate the existing Automate virtual corporate with a simple model, in doing so, we try to increase our understanding on the problems.

Certainly, Automate's bottom line is to maximize its profit, which can be represented by equation (1),

$$\Pi_m = P_d * Q_d = P_d * D(P_s, S) \cdots\cdots\cdots\cdots\cdots\cdots (1)$$

where P_d is distributor's price, Q_d is quantity demand, D() is Automate's products demand function, P_s is the product's street price, S is the support service level resellers provide to the customers.

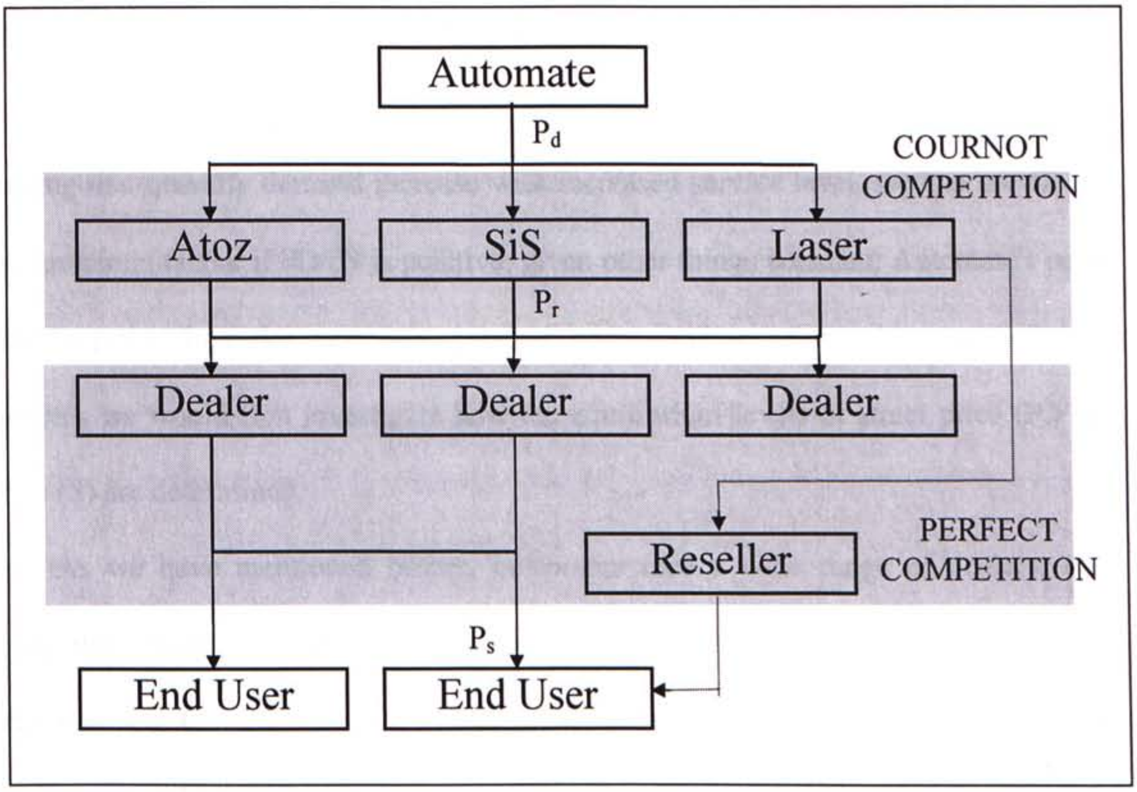

Figure 11 Economic Model of Automate's Virtual Corporation

The profit of the distributor layer can also be represented by a similar equation,

$$\Pi_d = (P_r - P_d - \Phi_l) * Q_d = (P_r - P_d - \Phi_l) * D(P_s, S) \cdots\cdots\cdots\cdots (2)$$

where P_r is the dealer's price and Φ_l is the in/out bound logistic costs.

Finally, the profit made by dealers and resellers equals to,

$$\Pi_r = (P_s - P_r - \Phi(S)) * Q_d = (P_s - P_r - \Phi(S)) * D_r(P_s, S) \cdots\cdots\cdots\cdots (3)$$

where $\Phi(S)$ is the unit cost of provide a service level of S to customers, and D_r is the specific demand function they face.

Taking partial derivatives of equation (1) against service, we have

$$\partial\Pi_m/\partial S = P_d * \partial D(P_s, S)/\partial S \cdots\cdots\cdots\cdots\cdots\cdots (4)$$

assuming that quantity demand increase with increased service level, we can see clearly from equation (4) that if $\partial D/\partial S$ is positive, given other things constant, Automate's profit would increase. In order to obtain a better understanding of the dynamics of these equations, we would first investigate how the equilibrium levels of street price (P_s) and service (S) are determined.

As we have mentioned before, customers face a wide range of dealers, each offering them different level of services and charges different prices. The customers will surely buy from the one who offers them the most preferred price and services package. Thus, the optimal price and service mix would maximize customers' consumer surplus.

$$\text{Max } CS(P_s, S) = \int_p^\infty D(x,S)\, dx \cdots\cdots\cdots\cdots\cdots\cdots (5)$$

On the other hand, resellers would never do business that lose money, so another condition we have to consider is $P_s > P_r + \Phi(S)$, or in a competitive environment, $P_s = P_r + \Phi(S)$. The first order condition for maximizing CS against service would then be,

$$\partial CS/\partial S = \int \partial D/\partial S(x,S)\, dx \cdots\cdots\cdots\cdots\cdots\cdots (6)$$

also, by envelope theorem, $\partial CS/\partial S$ can also be written as $\Phi'(S)D$, thus,

$$\partial CS/\partial S = \Phi'(S)D = \int \partial D/\partial S(x,S)\, dx \cdots\cdots\cdots\cdots\cdots\cdots (7)$$

The middle term of equation (7) is easy to interpret, the marginal cost of service times quantity demand, which would gives the cost of a unit increase in service level. The right hand side of equation (7) also gives the increase in marginal consumer surplus, which incorporates the increase in demand for all customers. This is an ideal picture for Automate, resellers invest in providing better services to customers, which increases the demand and satisfaction of all customers, and eventually shifting the whole demand function upward. However, the considerations of resellers may differ.

Determination of Service Level

According to Michael Spence[25], the competitive resellers would consider the reactions of its "marginal customers" before making a boost in service level. "Marginal customers" here refers to those customers who are now indifferent of buying the product from one firm or elsewhere; buying that product or not buying at all. On the contrary, "inframarginal customers" refers to those customers who has purchased the product already, who are royal to the product, and would continue buying the product even the service level changes.

[25] Spence, A.M., "Monopoly, Quality, and Regulation," Bell Journal of Economics, 1975, pp. 417-429.

Michael Spence argued that resellers may overprovide or underprovide services depending on marginal customers' valuation of the increased service level. If marginal customers are more willing to pay for additional service than is the inframarginal customers, firms would overprovide services, in order to attract more new customers. The satisfaction of existing customer, the inframarginal customers, is actually out of the picture when resellers decide whether to increase service level or not.

In reality, Automate's reseller channel provides a very low level of services to customers. The reasons can be summarized as follows. As we have mentioned in Chapter II, a large portion of Automate's customer are tied up by the huge volume of legacy data in hand, in addition, the investments in human resources also discourage them from switching to other applications. In this aspect, most of Automate's existing customers fall into the inframarginal category.

Moreover, $\partial D/\partial S$ depends largely on the precision with which customers observe services provided by different resellers. As pointed out by David Dranove and Mark Satterthwite[26], increase in service would bring in new customers only if marginal customers can appreciate the benefits of increased services. Currently, there is no independent resource that reviews service level provided by different resellers, unlike consumer products that have Consumer Council to publish unbiased reviews on, thus it would be very difficult for customers to judge the quality of services provided by resellers. As a result, customers can only rely on recommendations from peer customers, or focus on measurable attributes, like installation services, training and telephone support. This explains why all resellers at least claimed that they provide some sort of support services, but the services are indeed of very low quality. Resellers who offer high quality services will benefit only if they can convince marginal customers of their superiority or can generate good word of month from existing customers, thus reward of increased investment in service is not obvious.

Finally, Automate's marginal customers are usually small firms or individuals using illegal software. They are usually reluctant to pay high price for service, since they event don't want to pay for the software itself. The low reservation price that marginal customers are willing to pay for service would surely discourage competitive resellers from boosting up service level.

To conclude, incentive for resellers to provide better service is low.

Free Riding

Even when the resellers are motivated by the manufacturer to boost up service level, the nature of software product itself would also discourage resellers from doing so. The reason is simply due to the horizontal externalities among dealers and resellers. Unlike other goods, support services of software cannot be appropriated to a particular piece of product. The service a reseller provides to a particular box of software would easily spill over to other copies. For example, if a company owns fifty copies of one particular software, but only purchase one copy from a service providing reseller. Whenever any of the fifty unsupported users encountered usage problem, he can still ask

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[26] Dranove, D. and M. Satterthwaite, "Monopolistic Competition When Price and Quality are Not Perfectly Observable," RAND Journal of Economics, Winter 1992, pp. 518-534.

the reseller for support, and reseller have to serve him since the latter can never distinguish whether the user is using the copy he sold or not, and the solution is equally applicable to other copies.

A dealer who invests and incurs the cost of providing better product support to end-users must charge a higher price than a retailer who does not provide support. However, end-users have the incentive of taking advantage of the former dealer by just purchasing only a minimal amount of products from them, and then purchase the rest from the latter at a lower price. In this case, some dealers can free-ride on the demand created by the increased level of support provided by other dealers, and this picture would not be possible if the dealers are monopolies, or if the manufacturer sells direct.

Consider equation (3) again. A support providing dealer can only survive if $(P_s - P_r) > \Phi(S)$. However, since they are competing in a perfectly competitive market, it can easily been seen that $P_s \approx P_r$, in other words, $(P_s - P_r) < \Phi(S)$, as a result, in the long run, no dealer would provide services at all.

Following this conclusion, since $\partial D/\partial S$ is positive, if S deteriorates then demand of Automate's products as well as Automate's profit would also deteriorate.

Channel Structure

The horizontal externality among dealers and resellers is similar to a classical public-good problem, dealers just free-ride on each other. In order to encourage an adequate provision of services by dealers, this kind of unhealthy competition must be reduced or completely eliminated. To serve this proposes, there are two common competition-reducing restraints, namely retail price maintenance and exclusive territories.

Retail Price Maintenance

Given such a small place as Hong Kong, exclusive territories is not quite feasible. On the other hand, RPM seems to be a good solution. In theory, the choice of P_s and P_r fixes the competitive level of services, which becomes $\Phi(S) = P_s - P_r$, with RPM, emergence of discount stores are prevented, users are encouraged to buy where the services are provided, since they are not able to shop for a better price elsewhere.

However, with Automate's experience, simple RPM may not be enough. In 1996, Automate raised the price selling through resellers by 10% of the retail price, which effectively increased their street price by the same amount. As a result, the end-user price is maintained at a level of 25% discount. The annual results of 1996 and 1997 showed that even with RPM, around 40% of the sales are still in resellers' hands, that means 40% of the users were buying at a premium, but receive no support services! This phenomenon reflects that either resellers have better market coverage or they have superior selling skills.

Financial results of 1996 and 1997 showed that resellers are indispensable sale force in the virtual corporation, thus if Automate wants to drive demand upwards, simple RPM is not enough. Referring to equation (1), Automate can provide part of the service S. If the increase in quantity demanded by increasing Automate's service level out weights the additional cost incurred, then Automate should boost up its service level. Moreover, if Automate can find additional way to finance the spending on support service, then it should be better off.

Vertical Integration

If Automate increase the distributor price, and re-invest the additional revenue in providing free support services to end-users, the value chain structure would then be re-organized as shown.

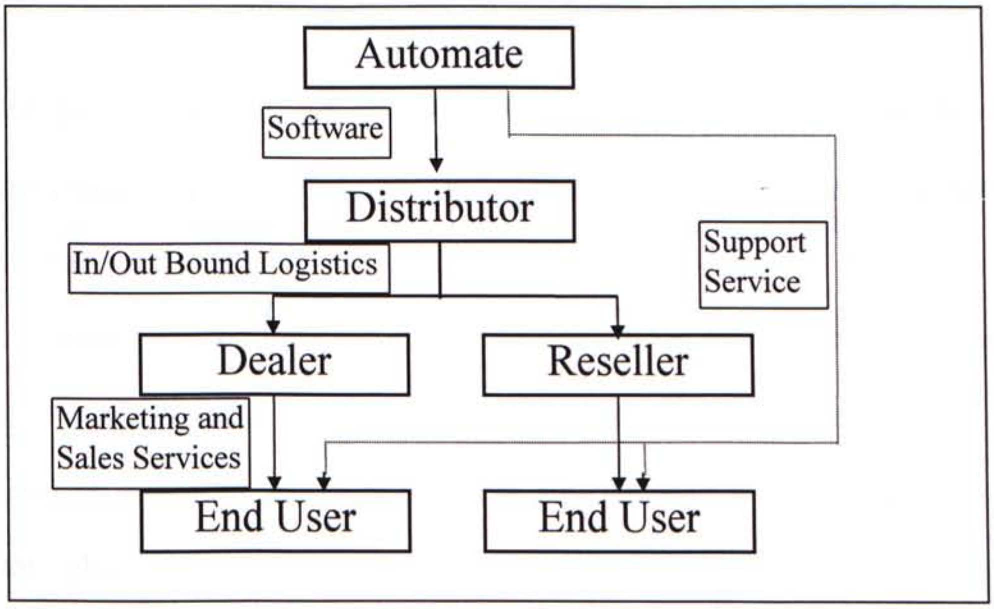

Figure 12 Channel Structure After Vertical Integration

The new setting can be considered as an un-bundling of service from the software product. The "product" part would continue to be sold through the existing dealer channel, while Automate would sell the "service" part directly, the cost of the "service" part would be charged to each user as a fixed per license royalty. Through un-bundling, the "product" part and "service" part should be considered as perfectly complementary goods. As Automate pushed up the street price by 10% in 1996, and still can maintain the same revenue level, 10% should be a good estimation of the price for the "service" part.

One of the draw back of un-bundling is losing the benefit of "one-stop" shopping. After the restructuring, users would have to obtain software and service from two different sources, this would be translated to additional cost to users. Since "service" itself exhibits free riding properties, the restructuring can be justified.

Distributor's Role

In the previous section, we arrived at the conclusion that Automate should provide direct product support to end-users, however, can Automate rely on distributors to provide this service instead?

One possible proposal is to out-source the support function to distributors, and pay them in form of wholesale price discounts. The benefit of doing so is reduction in fixed overhead of Automate, and Automate can still maintain a thin company size. However, this plan also has drawbacks. First of all, since all end-users would be supported by this support center, thus this distributor would have access to all end-user information, and results in conflict of interest with other dealers and distributors. Secondly, the quality of service is relatively hard to maintain.

Thus Automates should be better off, if it out-source the support service to an independent company, or provide the end-user support service directly. Direct user support is made possible by the recent advancement in Internet technologies, Automate can dissimulate information to and channel questions from end-user through low cost network media.

The Problem Child

We have just addressed part of our mission, protecting AutoDraw's "CASH COW" position. Next we will have to solve the GIS and FM product's "PROBLEM CHILD" issue.

After the vertical integration, Automate would be the provider of support services to end-users, and all dealers selling Automate's products would strip the support part and compete in a perfectly competitive manner. The dealers are not providing a full bundle of channel functions, as a result, the dealers won't be able to charge a premium on product selling and fund their investment on emerging market development. This give rise to a channel compensation problem.

Under this situation, dealer motivation becomes a serious problem. As we have mentioned before, most dealers are also selling other computer products. Suppose now their margin on selling Automate's products is cut, they are very likely to over-allocate their resources to selling other products, where profit margin is higher.

One common approach is to demarcate products by channels. Automate should restrict the sales of support intensive products, like the GIS and FM products, through only a few specific dealers. In this case, those privileged dealers would then be able to charge an abnormal margin, which serves as incentive for them to invest in developing these markets.

<u>Cournot Competition Among Distributors</u>

After we have completed our discussions on the dealer's level, we will continue our discussion with analysis on the distributor's level. According to economic theories, the equilibrium industry output in a Cournot competitive environment does not maximize industry's profit, in other words, Automate's profit is not maximized.

There are three competition structures that would induce higher profit to Automate, namely vertical integration, prefect competition and Bertrand's oligopolistic competition[27]. The main functions of distributors include, credit advancing and in/out bound logistics, and thus the economy of scale required in these three areas would prevent the distribution industry from developing into perfect competition. Moreover, this is not a preferred scenario for Automate, the greater the number of distributors to handle, the higher is Automate's administration cost.

In addition, vertical integration by eliminating the distributor tier would involve daunting upfront investment and high risk of bad debts. As a result, a two-tier model doesn't seem like a good move for Automate.

Bertrand competition on the other hand differs from Cournot in two basic assumptions. Bertrand's model assumes that competing firms are able to meet all the demand generated due to its price cut, however Cournot's model is constrained by the feature that capacities are fixed in the short run the equilibrium capacity is achieved in the long run. Moreover, in Cournot's model, firms are not able to "steal business" from others by directly controlling cutting price, since other competing firms would match by cutting price as well. Within Automate's virtual corporation, distributors do have limited capacities, which is the total credit they can give to dealers[28]. It is also reasonable to

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[27]This model is proposed by J. Bertrand in 1883, which stated that competing firms would select a price to maximize its profit, based on their expectations on other firms price level.

[28]It would make business sense for distributors to increase dealers credit limit, with their profit margin fall below the cost of fund. However, they may wish to drive other distributors out of business by temporarily lowering their profit margin.

expect that price cut of one distributor can easily be matched by others. So, it is less likely that distributors' competition would develop into a Bertrand form.

Following these arguments, Cournot competition is a better description of Automate's competitive environment. Then how can Automate maximize its interest? In general, the average percentage contribution margin of a firm competing in a Cournot environment is governed by $PCM = H/\eta$, where H denotes the Herfindahl and η is the price elasticity of demand. In this case, minimizing the PCM of distributors would maximize Automate's profit. One way to achieve this target is by reducing H, which means lowering the concentration ratio. Thus it would make more sense for Automate to maintain more distributors.

However, as we have mentioned before, Automate cannot handle too large the number of distributors, thus the existing number of three distributors should be a good size.

In order to maintain the existing balance, Automate should avoid Atoz from going out of business. One way to achieve this aim is to control the credit limit Automate give to each distributor.

Pricing

Besides maintaining the service level in the market, Automate also faces the constant challenge from piracy. The hard way to tackle this problem is by legal actions, but the soft way is to encourage users to forfeit their pirated software copies through trade promotions. Automate can employ two trade promotion strategies, either push or pull. By a push strategy, Automate offers incentives like trade discounts and bonus to the dealer channel, and push them to promote Automate's products in the market. By a pull strategy, Automate offer incentives directly to end-users, including discount coupons, rebates and trade premiums to pull customers to purchase Automate's products. In this section, we will discuss each scenario in turn, and study what would be the best strategy for Automate, and for simplicity, we will not consider distributors in the model.

Before we continue with our discussion, we will partition the market into two groups of users, referred as the "high"s and "low"s. The "high" segment is users who would have high opportunity cost in using pirated software, examples are government departments, utility companies and large corporations. On the other hand, the "low" segment are those uses who prefer using pirate copies, examples are small companies and factories in southern China. Since the majority of Automate's customers lie in the "high" segment, in order to sustain growth, Automate must expand sales in the "low" segment.

Price promotions, no matter push or pull would be applied to both "high" and "low" segments, unless Automate can separate these two groups. In reality, some software manufacturers tried separating legal users and illegal users, then formulate specific promotion campaigns to target illegal users. In some cases, software companies provide special discounts to users who are willing to forfeit their pirated copies and then purchase legal software. However, these actions give rise to ethical issues. If special discount is only given to users using illegal software, then are software manufacturers encouraging users to use pirated software? Or encourage users to at least claim that they are using pirated copies? Obviously, these actions are unfair to users using legal copies. Instead of offering discount to encourage illegal users to purchase back legal licenses, software companies should charge them higher price as penalty, but obviously, this won't be feasible in business context. Following this argument, we would assume that in practice Automate cannot partition the "low" and "high" segments of users, all trade promotion would be offered to both segments.

Push Pricing Strategy

Consider a typical push pricing strategy that the manufacturer offers a reduction in wholesale price. However, dealers' participation in passing this reduction or part of this reduction, to end-user is required in order to made the push strategy effective.

Assuming that the "high" segment has a reservation price of P_h, while the "low" segment has a reservation price of P_l. The highest price dealers can charge is P_h, so if dealers don't participate in the trade promotion and pocket whatever cost savings offered by Automate, they would just charge end-users P_h, and continue selling only to "high"s. In this case, Automate should set the wholesale price at P_h as well, so as to maximize its profit.

In order to induce the "low"s to buy, the wholesale price should be set no higher than P_l, or if Automate wants to sell at a higher price, he must push up the reservation price of the "low"s, one way doing this is by using anti-piracy campaigns to threaten the "low"s and increases their cost of using pirated copies.

Let α be the proportion of "high", then if dealers price the product at P_h, then their profits would be $\alpha(P_h - P_w)$ where P_w is the wholesale price. If dealers now decided to sell to all users, and charge a price of P_l, then the profit would be $P_l - P_w$. So at what level of P_w will made the profit of dealers equal in both cases? Setting their profits in both cases equal, solving for P_w, we have,

$$P_w = (P_l - \alpha P_h)/(1 - \alpha) \cdots\cdots\cdots\cdots\cdots\cdots (8)$$

The extra discount Automate has to offer is then equals to $P_h - P_w = (P_h - P_l)/(1 - \alpha)$. Automate's profit would simply equals to P_w, while dealers' profit would be equal to $P_l - P_w = \alpha(P_h - P_l)/(1 - \alpha)$. Automate would prefer a trade discount if and only if the revenue obtained after the trade promotion is greater than selling to "high"s alone, i.e. $\alpha P_h < (P_l - \alpha P_h)/(1 - \alpha)$, or

$$P_l > \alpha(2 - \alpha) P_h \cdots\cdots\cdots\cdots\cdots\cdots (9)$$

Pull Pricing Strategy

Consider if Automate uses pull pricing strategy instead. Although dealers don't involve directly in the campaign, they still play a key role by reacting to the rebates offered by Automate. They may participate and set their price such that the "low"s would buy with the rebate, or they may object to the campaign by setting a price that only "high"s would buy.

Suppose Automate now offers a rebate R, then the "high"s would buy if a price is set lower than $P_h + R - T$, where T is positive is the cost of "high" in redeeming the rebate. This redemption cost T is the result of the artificial barrier Automate setup to discourage the "high"s from using that rebate, in other words, T is the tool for discriminating between the "high"s and "low"s. For the "low"s, they would buy if the retail price is set at $P_l + R$. If dealers participate, then their profits would be $P_l + R - P_w$

or $P_l + R - P_h$ as we have mentioned earlier P_w would be set by Automate at P_h in order to maximize its profit. On the other hand, if they don't participate, their profits would be $\alpha(P_h + R - T)$.

What rebate should Automate offer if it wants its dealers to participate in the rebate program? The required rebate R can be obtained by setting the dealers profits of participating equals that of not participating, i.e. $P_l + R - P_h = \alpha(P_h + R - T)$. Solving for R, we have

$$R = (P_h - P_l - \alpha T)/(1 - \alpha) \cdots\cdots\cdots\cdots\cdots\cdots (10)$$

The retail price would then be $P_l + R = P_l + (P_h - P_l - \alpha T)/(1 - \alpha)$. The retail price must be higher than the wholesale price P_h, otherwise no dealer would sell the product. Thus, $P_l + (P_h - P_l - \alpha T)/(1 - \alpha) > P_h$, rearranging, we have $T < P_h - P_l$. Automate's profit would equals to $P_h - R$, i.e. $P_h - (P_h - P_l - \alpha T)/(1 - \alpha)$, or

$$(P_l - \alpha P_h)/(1 - \alpha) + \alpha T/(1 - \alpha) \cdots\cdots\cdots\cdots\cdots\cdots (11)$$

"Push" or "Pull"

Since the first term in equation (12) equals to Automate's profit in a "push" pricing campaign, while the second term is either positive or zero, thus we can conclude that Automate always prefer "pull" strategy to "push" strategy. For this condition to be true, all users must buy from Automate after the trade promotion plan is implemented.

Moreover, the equations (9) and (10) must hold. Equation (9) is the condition under which "push" is preferred to the existing strategy (selling only to "high"s), while if equation (10) doesn't hold, retailers would not participate in the rebate campaign.

Under these conditions, Automate would prefer a "pull" to "push" pricing strategy. Moreover, from the second term of equation (11), we notice that in order to maximize its profit, Automate would make T, the redemption cost, for the "high"s as larger as possible; in other words, Automate would make "highs'" barrier of using the rebates as high as possible.

There are a few campaigns that can increase the value of T. For example, Automate can offer first-time users a special discount, since the majority in the "high" segment is existing customers, they cannot enjoy this benefit. Moreover, Automate can take advantage of the budgeting cycle of large corporations and government departments. Special offers can be made, after large corporations and government department has submitted and approved their budget plans, say after April each year. Moreover, normally the sales to large corporations rises in the first quarter each year. The reason is quite simple, since the computer divisions of large corporations have to spend all their remaining budgets before the end of the current fiscal year. So, the second and third quarters of each year would be the tough of corporate sales. Since smaller companies are more flexible in budgeting, thus it would be easier for them to buy extra software than large corporations in response to sales promotions.

Also, as we have mentioned before, Automate can offer special discounts to users who give in their pirated software. In this case, only small companies can enjoy the discount, because large corporations and government departments dare not admit that they have been using pirated software. However, this kind of campaigns would involve ethical issues.

Moreover, the smaller the rebate R, the less expensive is the rebate program to Automate. From equation (10), in order to reduce R, Automate can either increase T, or increase P_l, one effective way to push up P_l is by increasing anti-piracy efforts.

CONCLUSION

It is obvious that, if Automate is to sustain its growth rate, a right channel restructure is critical. The major issue in Automate's channel is the low level of investment and product expertise, which result in a deteriorating support service level to end-users. The main reason behind this decline is identified to be dealer's free riding on the support services provided by other dealers.

In order to boost up the service level, we would recommend Automate to increase the wholesale price of its software, and then provides product support services directly to end-users. In this case, supply of the public goods, "service" is ensured, and the problem of free riding is eliminated.

Moreover, if Automate is to increase the demand of its software, we would recommend a "pull" pricing strategy instead of a "push" pricing strategy. A "pull" strategy would increase Automate's profit over a "push" strategy by an amount proportional to the redemption cost of the "high" segment in enjoying the trade promotion offered by Automate. The more expansive is the "high" segment's cost in enjoying Automate's promotional deals, the higher is Automate's overall profit in the promotion campaign.

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