

# Strategy and supply chain management: the website as a distinctive competence

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## **Abstract**

In this paper we present a preliminary study of a business that is operating within a high velocity supply chain, and has applied web based technologies to survive and prosper through the last seven years. We discussed aspects of success, and some determinants of strategy that can contribute to success. In our discussion of ComputerShop we have outlined parts of its history, how it services the needs of customer, manages its supplier relationships, and how it has incorporated web based technology at the heart of its transaction and order fulfillment processes. We have discussed our findings and note that the business appears to have developed a distinctive competence, but we reflect on the possibility that the distinctive competence has some risk attached to it, and it may be so well adapted to a particular supply chain configuration that it may have sacrificed flexibility for efficiency.

## **Introduction**

IT lies at the heart of ComputerShop's internal structure and processes. The company has evolved in the presence of the internet, and its internal processes are structured around what our informants referred to as the website. IT has been seen as a source of strength and also as a liability for firms as they apply it to their organization (Carr 2003, Jenkins 2002). Part of the risk incurred by IT is in the allocation of decision power in the structures that are installed as new IT replaces old systems. If for example management is perceived as a planning task, then the adoption of IT that does this task may create the impression that substantial sections of the management team are redundant or no longer important. If we perceive the management role as more directed at an organizing function (Johnston and Brennan 1996) and this may lead to a different perception of the things that IT has to offer. Johnson and Brennan (1996) suggest for example that managers should seek to position agents in effective relationships and to use IT for the provision of effective communication systems in the overall organization. Planning is still carried out within the IT application, but roles for managers are now directed at creating responsive and effective organizations.

This view resonates with the view proposed by Winograd and Flores (1987) writing well before the period where the Internet was used for business based communication. Winograd and Flores (1987) were expressing a critical view in the face of a burgeoning IT industry. They argued that IT could restrict the domain of knowledge considered legitimate by managers, that it could transfer power in undesirable manner within an

organization, and importantly, it could obscure responsibility for decisions in the organization. They developed a strong argument that the computer should be considered an intermediary, between two agents, with the communicative act being made by the computer, as a surrogate for the designers of the system. The communicative act develops the commitment which is inherent in the discourse, and this is between the designer and the user of the system. The risk is that the computer becomes seen as the creator of the communicative act, and thus of accepting the commitment inherent in the communicative act. But this communicative act has been made without context, the commitment may be inappropriate, many problems may ensue.

ComputerShop has been formed from its genesis with specific vision of IT as its core process. The IT is referred to by the company informants as the web-site, and we will use that term in this paper. We wish to review the way in which communications are mediated in this business, how the presence of the website has shaped strategy, and to what degree the website is critical to the success of the company.

### **Business success**

We will adopt a simple view of business success. We will assume that the business will be attempting to sell for a price that allows them to cover costs and make a profit. We also assume that they can grow the market at a pace sufficient to allow them to continue to reap improving benefits from scale, the allocation of fixed costs to an increasing revenue stream. We do not intend to quantify these dimensions at a detailed level, in fact we do not know to what level these measures are known by the managers of the company.

We will review two key factors, sales and inventory. There are of course other factors that will influence the overall profitability of the business, labour costs, facility charges, logistics costs and so on. For the purposes of this study we will review approaches to sales and the management of inventory, these two factors are key tasks for this business, we will argue later in the paper that if these factors are poorly managed the business will fail.

A key tension in the management of inventory is of course the problem of service level. Excessive stock leads to high costs, too little stock leads to stock-outs and lost sales. Work in the retail area indicates that when an item is out of stock a retailer can lose over half of the intended purchases during a stock out. This problem, Corsten and Gruen (2004) claim, translates to sales losses of 4% for a typical retailer. In their survey they found that stockout rates were lodged at about 8% across the wide range of stores surveyed. About 70% of these stockouts were related to the processes of the stores; practices that can be changed and improved.

### **Supply chain strategies**

While this paper is more directed at the way in which one company has approached the management of one level in a supply chain, it is useful to set out some views on what might constitute a framework for effective supply chain strategies. Teece, Pisano & Shuen (1997) suggest that in environments with high rates of change we can use a perspective that gives prominence to a dynamic capabilities approach. Dynamic

capabilities are 'the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments.' (Teece et. al. 1997, p. 516) These distinctive competencies are rare (drawing on the resource based view of the firm) and thus not readily available, they are "intriguing assets as they typically must be built because they cannot be bought." (Teece et. al. 1997, p. 518) Achieving success therefore in this environment is not going to follow from the fact that you have applied MYOB or SAP/R3 to the management of your business flows. Competitive success is not simply a result of the fixed assets accumulated and placed within the organizational domain; they also depend on the way in which they are used to support the transformations important to the organization. The way in which these assets are coordinated and focused may provide a distinctive competitive advantage. The routines that are important here are not the routines of repetitive tasks. They are the routines for adapting to unpredicted and new externalities. The work of Teece et al (1997) was directed at the general area of business strategy, but there are similarities in the work of Lee (2004) writing on the strategies and problems of supply chain management.

Lee has recently argued that 'top performing supply chains possess three very different qualities. First, great supply chains are agile. They react speedily to sudden changes in demand or supply. Second, they adapt over time as market structures and strategies evolve. Third, they align the interests of all the firms in the supply network so that companies optimize the chain's performance when they maximize their interests. Only supply chains that are agile, adaptable, and aligned provide companies with sustainable competitive advantage.'(Lee, 2004; p. 104) Again, we have an emphasis on speed and agility, the key to success in dynamic markets is the ability to adapt to unpredictable externalities. Teece et al (1997) are focused on ways of achieving outcomes, Lee (2004) is more directed at the outcomes themselves. In our study we will attempt to make observations that illustrate both dimensions setting strategy.

While Teece et. al. (1997) and Lee (2004) take a global perspective; it is also possible to look at supply chain issues at a more tactical level. One way of doing this is to review conclusions drawn from the Beer Distribution Game. Again, Lee has written about the lessons to be learned from this game. The most pronounced symptom of poor supply chain management is the pattern of ordering that is generally referred to as the bullwhip effect. Lee et al (1997) outlined a number of factors that contributed to this effect, the most important being nervous forecasting and order batching. In the Beer distribution game students normally suggest issues such as the number of sequential agents in the supply chain, the suppression of data on customer demand, and the delays in transferring information and material along the supply chain. Strategies for improvement are normally directed at disintermediation, global availability of point of sale (POS) data demand, and the elimination of information and shipment delays. Lee et al (1997) concluded that the bullwhip effect can be ameliorated by a less frequent updating of demand forecasting and increased weight to the demand of the final consumer rather than to agents within the supply chain and strategies to reduce the benefits of batching. We will use observations grounded in ComputerShop to illustrate how some of these issues are found and responded to in their market and organization.

# **ComputerShop.com**

## **History**

The ComputerShop web site describes itself as a supplier of Personal Computer (PC) hardware components to PC hardware enthusiasts. A typical ComputerShop customer is an individual who is employed as a computer technician or a person who is otherwise sufficiently skilled to be able to assemble their own PC from individual components. Annual turnover for ComputerShop is \$12 Million. Profit margin on most sales is in the order of 5% to 8%. The PC component market is very competitive, and margins are slim throughout the industry

There are twelve people employed in the business, they operate out of a light industrial estate, have a combined warehouse and office facility, and have an overflow warehouse located elsewhere. The facility is small and fully occupied by either open plan office space or storage and goods processing areas. There is no visible public reception area with any sense of making a presentation of the company to outside agents. The general appearance of the facility is that of a business that does not expect to impress external agents with its physical appearance.

ComputerShop has grown to its current size over a period of seven years. The question of growth rates came up a few times in the interview and a typical response was:

*Started at zero, seven years ago. Came from nowhere, the business didn't exist, it was an idea, we are doing nearly \$1 million a month now.*

It became apparent that Martin did not have an explicit knowledge of growth, it was more of

*Oh, I have never actually measured it, but it feels like maybe between 5 and 8% pa.*

...

*But the last six months hasn't had a huge growth, it is difficult to measure because there is a big dip in the middle, because of xmas....*

To have achieved sales of about \$12m pa over a period of seven years from a zero start will have required growth rates much higher than that stated. For example, if they started with sales of \$1m then a rate of growth of 40% pa. would have barely delivered their current size.

## **Serving the customer**

This business is operating in a very demanding environment. Martin noted that in this business:

*everybody expects this rapid, you know, I want to order it this morning and be picking it up by midday are not have to do it this afternoon*

The customer can poll any number of websites or small retail stores for availability and so:

*So the first bloke that's got it in stock, he gets the sale. There are so many supply shops, they are everywhere. ... the margins are 10% or less, so the variance between retailers is small.*

Product is sourced at a few large distributors, sold by a large number of retailers.

Margins are small, price therefore is tightly bunched, and sales will be determined by access and the speed with which the customer can be supplied.

The products are often sophisticated and of relatively high value. Returns are therefore a significant cost to the PC component industry. ComputerShop manages return costs by first managing customer expectations, and second keeping close track of individual product items. When ComputerShop sends its electronic mail message to a customer advising that their order has shipped, they cite specific serial numbers for all of the products. At the same time, the ComputerShop web site clearly explains their return policy. Items will only be accepted for return where the serial number matches that which was originally shipped to the customer. ComputerShop does accept 'change of mind returns' where goods arrive in a resalable condition, but cautions that where goods are returned because the customer claims they are faulty, a fee will be charged if the item is assessed to be not faulty by ComputerShop staff. A strict return authorization process is implemented for all returns.

Compstore appears to have an ambivalent view on their customers. It is suggestive of the work done by Schein (1996) who argued for the existence of an engineering culture within some organizations. This culture has a shared view that preferred solutions do not include people. There were indications that ComputerShop distances itself from direct contact with customers, and that it has some strong views on some customers. Martin problem expressed the lament of many retailers as he described his perceptions of one type of customer, the one with a problem:

*Returns are about eight to 10% of sales.*

*Of those returns two or 3% are*

*I ordered the wrong thing, or I don't want it any more; kind of return*

*Perhaps another two or 3% are actually faulty*

*About 50% of that 8% to 10% is not faulty.*

*They think it's faulty, but it is not.*

*They don't know how to install it, they got it with something else, they didn't read the instructions.*

*Instructions are the thing you get to after you have installed the thing, stuffed around with it for a few hours, complained about it bitterly on the forum saying what a piece of rubbish it is, abused the retailer and demanded a refund,*

*and then read the instructions.*

*[laughs]*

*That's what we find anyway.*

One way of dealing with the customer is to attempt to get the website to mediate all communication, ideally, to effect the full transaction with no human intervention in the communicative act:

*You don't hardly ever hear the phone ring around here do you.*

*...*

*A phone call almost never results in an order, it's usually a question.*

*Oftentimes it's a stupid question, like:*

*Is it in stock?*

*What does the website say?*

*The website says it's in stock*

*Then it is in stock!...*

*I try to make everything possible, so that you should never need to phone me to ask about product.*

*Everything is there to enable a decision to purchase, and that is why we don't like the phone, because invariably the phone does not result in a sale. The website results in a sale.*

Walk in customers are regarded in much the same light, and Martin suggested that a number of his competitors would even berate customers that walked into the front office of the facility expecting to get service.

While it is possible to suggest that Martin would be happy if the customer relationship was fully mediated via the website, it is also important to note that the organization has set very high standards of service for its customers. This starts with offering a facility that ComputerShop considers important in choosing its own suppliers; and that is a valid, real time web based display of whether or not stock is available to promise. Compstore is honest with its customers. If the web site says an item is in stock, it really is in stock. Individual stock items are committed to customers at the time the customer places his order, so even if physical stock is on ComputerShop's shelves, it won't be shown as available if it is committed to a customer.

## Products

ComputerShop lists a product range of between 3000 and 4000 items for sale on its web site at any given time. Stock is typically turned at least twice per month, and many items are rotated more often than that. Very few, if any, stock items stay in the ComputerShop inventory for more than twelve months. As with any retailer, ComputerShop needs to achieve a balance between service and costs. In this industry the balance is particularly difficult to set. Two factors drive this situation, customer expectations discussed above and short product life cycles.

Stock on hand can be a very expensive luxury in this business. Across many industries the penalty for holding stock is seen as an asset problem. Woolworths for example will see assets bound up with stock as simply related to the degree to which they can make their capital productive. ComputerShop have a very different problem. Individual lines typically have very short lives. A specific model of central processing unit (CPU) will typically have a product life of four to five months before it is superseded by a new model that is usually faster and cheaper than its predecessor. CD and DVD burners (known collectively as 'optical drives') are products that have an even shorter life cycle - a new model will supersede any given example as often as once per month. Martin and Adam noted that the hard drive was a typical example of how technological development affected the supply chain;

*A hard drive that is two or three months old is hopelessly out priced compared to all the others. So we try not to keep stock, more than a few days to a week's worth.*

*Adam*

*So as soon as they get to a week-old, or probably even two weeks old, we start marching the price down.*

This is not the only aspect of the problem; other agents in the supply chain are subject to imperfect information, rumors and misinformation:

*Monitors have just had a big price drop; monitors have had a 50% price drop since December.*

*...At a lot of these things are driven not my technology but by nervousness of the manufacturer: the guy in a factory in China reckons he has overproduced, and his mate has too So; let's slash the price this month. And that's what happens literally.*

Product held, subject to a price change higher up in the supply chain will be problematic. Martin noted that a typical manufacturer will announce price reductions several times

within the lifetime of any given product. Intel, a large CPU manufacturer, was cited as an example where 25% price reductions are often made and where the retailer receives no official prior notice of the impending price cut. Wholesalers are able to claim rebates from the manufacturer on stock that they have on hand when a price reduction is made, retailers do not have access to the same support. A retailer holding stock, the subject of a price cut, is forced to sell it at a loss. While it may be possible to recover some of this loss as noted below in the section on supplier relationships, it is clearly preferable to avoid being exposed to the risk in the first place. Low inventory is of course the simplest response, and with this response is the potential for stock-outs and consequent loss of sales.

Short product life and expectations by customers of very short deliver lead times drives the structure of ComputerShop's process flow. Short product life cycles also drive the way in which Martin's spends his time. We asked if he used the Internet to keep abreast of new products in the field;

*Yes, yes, I do that every night, I go home and keep working, I don't go to bed till midnight, I sit down and watch the forums, I look and to see what people are talking about, and I spot trends in hardware interests,*

He cited another example where active engagement in the domain of his customers created a business opportunity

*You know those flash memory guides you can put you put in your computer, plug it in.*

*I saw some people chatting about a brand called Corsair, we don't sell that yet.*

*Called the local distributor; they do, but the local distributor hasn't got them ye.*

*So I gave them a bit of a poke, I said:*

*People chatting about this apparently it's a big deal in America.*

*Two days later, they got it in, here's your price.*

*Ok -- bang it on the website, now they are buying five and ten a day.*

With a product life cycle measured in months and weeks, early sales of a product are going to lead to superior profits and the development of an attractive image in the mind of this market.

## **Supplier relationships**

Excellent relationships with suppliers are critical to the success of the business. Martin noted, for example, that retailers typically receive no official notice of an impending price cut to Intel CPUs. In a situation where a retailer is left holding devalued stock, a good relationship with his supplier means that he might be able to return the stock, and then buy it back on the same day at the new lower price. These transactions are, of course, made on paper only but the fact that they happen at all means that the retailer is somewhat protected from price variations and that the risk associated with keeping stock is reduced. The payback for good relationships can also be in the form of information. Martin observed that official notifications of price cuts and new model releases rarely reach retailers; the information is often visible somewhere in the system. While bulletin boards and general web chat are important sources it clear that good relationships with suppliers will bring informal access to better information. This information of course is commercially sensitive and will not be revealed in formal systems of communication.

As a significant part of maintaining excellent supplier relationships, ComputerShop makes a strong point of being an excellent customer. Whilst they have thirty day credit

terms with most suppliers, they pay most of their outstanding accounts within seven days. Martin cited examples where suppliers granted them access to far better pricing structures than their competitors as a direct result of their good account maintenance. In one case Martin was in the store of another supplier and had noticed:

*something they were pricing, and I am going 'oh yea, how much did you pay for that?' I pay \$10 less, for the same item. So they have just created a special category for us where we automatically receive the highest discount structure available for any quantity we purchased,*

With margins of 5 and 10% this can have a critical impact on bottom line performance.

Two issues drive the selection of suppliers for ComputerShop. The first is location. With only one significant exception, ComputerShop's major suppliers are all within a five to ten minute drive by car from ComputerShop's facility. Martin was of the view that this region was the "Silicon Valley of Sydney". Whilst ComputerShop advises its customers via the web site that out of stock product is available within "1-2 days", they typically order stock from suppliers and ship to their customers on a timeframe only marginally longer than it would have been had the item been in stock. Customer testimonials regularly express surprise at the short delivery times on stock items that were apparently out of stock, and Martin stated that "the only calls we receive from customers enquiring about stock levels are from people who haven't bought from us before".

The second factor that influences supplier selection is web based visibility of stock availability and ordering processes. ComputerShop strongly prefers to buy from wholesalers who allow them web based access to information about their stock levels and pricing. Martin stated that the greater degree of transparency offered by a supplier, the more likely he was to buy from them. Martin has a strong preference for electronic interaction with suppliers over telephone communication, even if the electronic and web based interactions are still essentially manual. Martin cited one particular supplier that he strongly preferred to buy from because that particular supplier offered unfettered electronic access to stockholding and pricing information

## **Processes and technology**

It is appropriate to repeat comments made earlier in the paper on distinctive competencies. Dynamic capabilities are 'the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments.' (Teece et. al. 1997, p. 516) These distinctive competencies are rare and thus not readily available, they are "intriguing assets as they typically must be built because they cannot be bought." (Teece et. al. 1997, p. 518) The web site used at ComputerShop illustrates many aspects of the concept of a distinctive competency. We asked Martin about the IT applications used in the business, he started to tell us about the website;

*We don't have an accounting package. The web site is the accounting package.*

*Customers have transparency through to the back end, they can see stock levels, they can see everything is going on with the orders; they can change everything about the orders, complete customer management. The only thing the customer can't do is to cancel the order after we have started building or shipping the goods. Everything else they can change.*

*Nobody else in this industry has quite that level of transparency.*

*Some get close, a nobody else.*

Roger

*How much of the web site is your own.*

Martin

*He wrote it, by hand. Done by hand.*

*There is no commercial package that can do this job.*

...

*We had an accounting package, and they had the usual limitations like they ran out of product codes after 10,000 or something.*

...

*We have 30,000 to 40,000 sales per year. They aren't designed to deal with this quantity of data, they eventually have problems accessing data and keeping it all working and not mish mshed.*

Adam

*A lot of the SME side of accounting packages are designed for return customers where you have two or three or 4000 customers that keep buying off you, so you don't grow. A lot of our customers might buy off us once, so we end up with 20,000 customers that are in our data base.*

Martin

*Accounting packages can't cope with that.*

*We have just extended the website into a backend process that we used to run everything.*

*The website charges people's credit cards, it produces the shipping label that gets stuck on goods, it handles all aspects and communicating with customers as far as email and stuff.*

*There are supply chain guys above us, who are like ten or 15 times our size, but haven't got anything with that level of flexibility.*

Roger

*Do you market, will you try to sell your software?*

Adam

*No, we have sort of built the golden shovel, and it is sort of the tailored tool to suit our business. We could sell it, but we're not in the business of making golden shovels, we're in the business of digging holes.*

The website is the dominant interface between customer transactions and all internal transformations of the organization. Nothing takes place without interacting with the website. The system has been constructed in-house, using a range of technologies that are predominantly Open Source. There is then very little proprietary technology at the building block level. However at the application level, where the technology interacts with the physical transactions of the organization, the technology is unique, and providing the organization with a unique advantage. An instance of the functionality of the website can be seen in the way ComputerShop has approached the problem of fraud.

ComputerShop's approach to order processing means that fraud has not been a substantial problem for them. Each and every customer order receives human attention at the order acceptance stage. Either Martin or one of his staff members will view each customer order before it is accepted for fulfillment. The website at ComputerShop presents the assessor with summarized information about the customer's previous activity in addition to the current order. A list of data points including previous order count, previous return count and an overall 'customer rating' assist in the quick assessment of a repeat customer. New customers are subjected to a simple address check, the website makes a simple comparison of the address details the customer provides with an external provider's database of all known names and street addresses in Australia. A match means that the order will likely be accepted, and a failure will of course require further investigation. Martin said that Harvey Norman, a very large Australian computer retailer, experienced fraud levels as high as 40% of all on-line orders, and that they withdrew from on-line

sales of computer and computer components after only a few months as a result of the high level of fraud. When asked about the level of fraud that his business had experienced recently, Martin was able to cite, specifically, each incident of fraud and attempted fraud that had occurred in the past year. Losses in this area were not considered to be a problem.

Once a ComputerShop customer's order has, prima facie, been accepted by the ComputerShop staff member, a charge against the customer's credit card is executed by a single click on the order assessment web page and, assuming that the credit charge proceeds, the order is accepted into the ComputerShop system for fulfillment. The customer address check and the electronic processing of the credit card transaction were the only examples of Electronic Data Interchange (EDI) that we observed at ComputerShop

The website is also used to direct and monitor internal product flow. Most stock items at ComputerShop are uniquely identified at the time they are taken into stock. Wherever possible, unique serial numbers applied by suppliers are used and, in cases where items are not already serialized, ComputerShop bestows a unique identifier to each and every item at the time it enters their store. A bar coded label is applied to each item and thereafter the item is tracked throughout its life by that number. At time of order acceptance, specific products are assigned to the customer. The customer receives an advisory electronic mail message that cites specific serial numbers for products that are en-route to them, and customers are advised that returns will only be accepted if serial numbers match those originally assigned. Low priced generic items such as cables and mounting brackets are not uniquely identified. A bar code label that identifies the product by supplier and batch is affixed, and assignment of a particular product to a customer simply reduced the stock count of the individual item by one.

The website is an integral part of order fulfillment, and of the processes used to monitor and manage business transactions. The market values rapid response, the website enables that goal. The website is a medium familiar to the customers in this market, and the website facilitates the rapid flow of items through the ComputerShop part of the supply chain. In a supply chain where ComputerShop sells product from wholesalers willing to supply anyone, speed and availability are the order winners. The website supports these two key attributes of the business.

A surprising observation was that despite the fact that they deal daily in high technology, the industry appears to us to be unexpectedly devoid of electronic interactions in its supply chain. When we raised this point with Martin, he stated that the vast majority of his suppliers were not nearly as technically advanced as ComputerShop is. Those suppliers that did use computer systems for stock control were typically using very old systems. Suppliers see no financial benefit to proceeding with EDI. Only one ComputerShop supplier has on line access to information about ComputerShop's stockholding of their products. That supplier manually checks stock levels at ComputerShop on a daily basis, and ships product into ComputerShop's store without any prompt by ComputerShop. A principal from this supplier however sits on the board of

ComputerShop, and this relationship is considered special, not only does the supplier initiate resupply, but they also are located more than 5km away. All other suppliers ship stock only on the basis of a purchase order from ComputerShop, and in most cases, those purchase orders are paper based.

### ***Concluding remarks***

The core technology at ComputerShop, the website appears to be an exemplar of the distinctive competency. We can observe a unique piece of technology that is providing this organization with the capability of satisfying two key needs of its market, speed and availability. The distinctive capability may, or may not contained within a system that has dynamic capabilities however. The website has coevolved with a particular set of conditions in the market. As suppliers in particular take on more sophisticated applications, as product life cycles become ever shorter, the demands on the website will become more onerous. ComputerShop have adopted the website via the agency of a single programmer, and appear to rely on a single agent for environmental scanning for new products, this has allowed them to create a unique resource, but they are also exposed to all of the risks that are inherent in being dependent on individuals.

What is also clear is the relevance of the lessons of the Beer Distribution Game and the arguments of Lee (2004) on the Triple A supply chain; one that is agile, adaptable, and aligned .

The supply chain is certainly agile, they are prepared to use different modalities of transportation at different parts of a product life cycle and they are certainly willing to respond to weak signals coming from the market. The elimination of delays in the supply chain is an imperative. The sourcing of timely information on demand and new products is imperative. ComputerShop have achieved high levels of capability in this dimension. There appears to be some support in this case for alignment of incentives along the supply chain. ComputerShop have been given price discounts without seeking them, their supplier has recognized their importance and has proactively responded. It is not clear from our work that this supply chain is adaptable. It is not even clear how this capability would be expressed within the existing supply chain, it may involve a process of creative destruction, the driving force of free market economies; the 'fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' good, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates.' (Schumpeter 1954, pp. 83-84) In this process ComputerShop would join the company that created it in the first place, victim of a new, as of yet unimagined set of capabilities and products.

Has supply chain management literature and research anything to offer ComputerShop? It is interesting to observe the way in which the culture of the ComputerShop appears to be well described by Schein's (1984) concept of the Engineering culture. We do not know however if this is a culture that is shared by all agents in the supply chain. Relationship based trading of this nature is normally considered to be subject to distortions in the presence of agents with much higher power, and we would expect to see opportunistic behaviors affect the relationships. Should ComputerShop be taking a more

proactive stance with respect to product pricing from its suppliers. Martin notes that some discounting was allocated to ComputerShop at the initiative of the supplier! Can ComputerShop recognize when it should be initiating this review. With margins as tight as they are in this industry, this would provide them with significant benefits.

We also were intrigued by the dependency on short term, and localized information. Inventory management was highly informal, and the website was not set up to provide any real support for alerting managers to inventories that were too low or too high. Four thousand SKUs is a large number of data points to manage without support from inventory management systems. Categorization of SKU's as belonging in some particular class of product on life cycle factors may enable routine analysis of inventory policy for a significant proportion of the product range. Analysis of recent variability and levels of sales may enable some categorization such as described by Fisher et al. (1994). There appeared to be a view that the environment for the business was simply too volatile and fast paced to allow for embedded policy and strategies for forecasting. We believe that this may be useful areas for study in this business. Support for this belief is based at least partly on the fact that ComputerShop's customers will buy from suppliers with available product, and therefore ComputerShop should show stock available if it is to increase its sales within this market. Once it commits to that policy then it requires some form of professional framework to ensure that it has effective outcomes. Over the next two months we hope to gain ComputerShop's support for analysis in this area.

Finally, we also note that there is a place for abstract measures of process performance. We have noted that ComputerShop relies on direct measures of performance, measures that responded directly to the events that happened day to day in the company. There was limited explicit visibility of abstract (state based?) measures in our discussions with managers from ComputerShop. Measures based on the levels of more slow moving aspects of the process, for example; growth rate; trends in the number of products; aggregate sales. At some stage it is useful to develop state based measures. These measures such as the overall sales, and trend data, can help agents immersed in processes better understand the pressures they feel as they cope with the stresses the growth brings. We hope to be able to discuss these issues the next phase of this project.

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