Enabling Long Term Value Added Partnership in the Healthcare Industry

by

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Abstract

The USA healthcare industry has recently undergone significant pressure to become competitive and think innovatively due to its increased growth as a percentage of the GDP, which was as much as 14.1% in 2001. Additionally, hospitals are faced with an estimated nursing shortage of 600,000 by 2020, and with an aging patient base that demands better quality at a lower cost. Specifically, hospitals tie up as much as 35% of their budgets in inventory and in the required labour to manage it. Moreover, future improvements will necessarily require a solution beyond statistically sound inventory policies and software packages.

The contribution of this thesis is to provide an analysis of “Long Term Value Added Partnerships” and their role in enabling innovative and trust based vendor – hospital inventory supply relationships as a suggestive solution for the healthcare industry. The study included two hospitals leading the way in such relationships with a leading healthcare vendor in the USA market.
The conducted literature review helps understand the benefits and implications of attempting to establish long term value added partnerships in the healthcare industry. From describing the pressures and the traditional mindset of hospitals towards inventory practices, the study moves on to explain two inventory management methodologies widely used across different industries, and it finally provides an account of the drivers and potential pitfalls of strategic alliances which are information intensive in nature. The research framework is followed by a detailed description of the methodology used while conducting field observations, 47 interviews and data analysis of the visited hospitals. Subsequently the research findings are presented and supported by graphical representations of both the soft and hard data collected. Finally the thesis conclusion is given in the form of a list of recommendations to be adopted by both healthcare vendors and hospitals.

Thesis Supervisor: Jonathan Byrnes
Title: Senior Lecturer
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Introduction

Competitiveness in any industry drives organizations to improve what they are currently doing in terms of cost, quality, speed and efficiency. Companies or industries are also driven to be innovative in the processes they use for the manufacturing of their product or the generation of their service. A core value in the industrial world is to develop more efficient ways to produce a product or service with the result of improved quality. To be competitive, it is required to search for improved processes to produce a product or service.

The healthcare industry is one which has recently undergone significant pressure to become competitive and think innovatively. Healthcare expenditure has increasingly been growing as a percentage of the GDP of several developed nations and it is feared that it will soon become unbearable. A cost analysis of the healthcare industry indicated that the highest source of expenditure exists in hospital care (Pfrang, 2003). Hospitals, regardless of their ownership or management structures (e.g. public, private or both), tie up as much as 35% of their budgets in inventory and in the required labor to manage it (Nathan and Trinkaus, 2002). As such it makes sense to improve competitiveness for hospitals through improvements made to their inventory management practices that ultimately enable increased quality of care while using the same amount of resources. However, among other factors, hospitals are increasingly faced with the threat of nurse shortages and also a patient base that demands better quality at a lower cost, and
therefore improvements will necessarily require a solution beyond statistically sound inventory policies and software packages.

The contribution of this thesis addresses precisely the above mentioned problem statement by providing an analysis of “Long Term Value Added Partnerships in the Healthcare Industry” made possible by innovative and trust based vendor – hospital inventory supply relationships.

The thesis has greatly benefited from the involvement of JAFKO Enterprises, disguised name of a major vendor in the USA healthcare industry, which provided the means and access to two of its existing client hospitals that have been implementing JAFKO Enterprises’s future generation inventory management program called One4all.

One4all has been an instrumental tool to allow JAFKO Enterprises to reposition itself strategically in the marketplace while providing added value services beyond those offered by mere distributors and doing so through win-win long term partnerships with its client hospitals. However, the implementation of One4all has not been without its problems and understandably so given the fundamental paradigm change it introduces. Ultimately there is much to be learned from the One4all initiative, as will be demonstrated from the data gathering and analysis herein provided.

The basis of this research rests on four literature review topics which together help understand the benefits and implications of attempting to establish long term value added partnerships in the healthcare industry. These are “Nursing Shortage and Patient Care”, “Stockless”, “Vendor
Managed Inventory”, and “Strategic Alliances”. From describing the pressures and the traditional mindset of hospitals towards inventory practices, the study moves on to explain two inventory management methodologies widely used across different industries, and it then finally provides an account of the drivers and potential pitfalls of strategic alliances which are information intensive in nature.

The research framework is followed by a detailed description of the methodology used while conducting field observations, interviews and data analysis at each of the visited hospitals. Subsequently the research findings are presented and discussed while supported by graphical representations of both the soft and hard data collected. Finally the thesis conclusion is presented in the form of a list of recommendations to be adopted by both JAFKO Enterprises and other players in the Healthcare industry, while leaving also some thoughts on future avenues of research work to be pursued.
2 Literature Review

The basis of this research rests on four literature review topics which together help understand the benefits and implications of attempting to establish long term value added partnerships in the healthcare industry. These are “Nursing Shortage and Patient Care”, “Stockless”, “Vendor Managed Inventory”, and “Strategic Alliances”.

2.1 Nursing Shortage and Patient Care

In 2001, healthcare costs in the US accounted for 14.1% of the GDP (Levit et al, 2003). In 2002, an article in the Wall Street Journal read “Serious Health Risks Posed by Lack of Nurses” (Johannes, 2002) as it described the findings of a study published in the New England Journal of Medicine which determined that a positive impact is given by nurses on hospitalized patients.

A study reported in the Journal of the American Medical Association has projected that a nursing shortage greater than 600,000 will take place by the year 2020 (online 1). Similarly, a publication from the US Department of Labour indicated that registered nurses were the third most demanded category of professionals by 2010 (online 2). However, the National Council of State Boards of Nursing reported that between 1995 and 2001 there was a 29% decline in the number of graduates taking their national license exam (online 1).
According to a study published in Health Affairs (Stevens, 2002) more than 40% of the 43,000 inquired nurses reported to be dissatisfied with their jobs. Furthermore one in three nurses under the age of thirty were said to be planning to leave their jobs within 12 months (online 3).

The specific impact of a nursing shortage can understandably be difficult to measure however there have been studies that indicate how a nurse’s role is related to a patient’s safety and ultimate health. One such study determined that a nurse who takes care of 7 patients instead of 4 may contribute to a higher risk of 21% on patient death after surgical procedures (Aiken et al, 2002). The higher risk identified may be related to the errors that revolve around the administration of medication which is a function largely undertaken by nurses. In fact according to a report in 1999 published by the Institute of Medicine in the US preventable medical errors are responsible for more deaths per year than auto accidents (online 4). The report relates the large amount of errors to the growth in new drugs and their specific uses for a small range of symptoms where the five rights taught in nursing school increase in importance, namely right patient, right drug, right dose, right route and right time.

2.2 Stockless programs in the Healthcare industry

Recognizing the burden of inventories in hospital operations, both vendors and hospital administration boards have looked to reduce the cost of inventory. Several inventory management methodologies already existed in other industries however for healthcare one
needed to factor the loss of life resulting from an inventory shortage, therefore making the problem more complex.

The 1980’s witnessed what has been referred to as the “stockless craze” (Marino, 1998) which aimed at reducing the inventory held at hospitals and giving vendors complete responsibility in monitoring and managing inventory levels and flow beyond hospital stockrooms and into points of use. Initially there were visible positive results from such initiatives, including for instance the significant reduction of materials management employees (Wilson, 1992) and also the reduction of inventory itself by as much as 80% in a 427 bed facility (Kerr, 1991).

However, by the early 1990’s interest in stockless agreements between hospitals and vendors had begun to fade (Marino, 1998). Some argued that vendors leveraged their position by raising the prices of their products by as much as 15% therefore increasing once again inventory related activities at hospitals. Raising prices increased inventory related activities because stockless programs were defined as service fee percentage related to the price of each individual product. Others identified that stockless arrangements were not suitable for everyone due to geographic dispersion (Marino, 1998).

More recently Nathan and Trinkaus (2002) said that Healthcare regardless of which inventory methodology in place should be improved by nurses spending less time with inventory and more time with patients.
2.3 Defining Vendor Managed Inventory

Vendor Managed Inventory (VMI) which is also known as continuous replenishment or supplier managed inventory became popular in the late 80s by Wal-Mart and Procter & Gamble (P&G) (Waller et al, 1999). VMI became one of the key programs in the grocery industry’s pursuit of “efficient consumer response” and the garment industry’s “quick response”.

It is said that retailers have been the main drivers for VMI given their constant pressure on vendors to provide more variety, lower prices, improved quality, and increased customer service (Wexler, 2000). However, unless a manufacturer is able to perform reliably and according to demand it will need to build up its safety inventories in order to accommodate requirements of its customers (Robinson, 1999).

Therefore suppliers are pressed to find ways to satisfy their customer demands. P&G saw VMI as a way to extend its visibility and control of the supply chain and bring market information back into its planning and manufacturing processes (Cooke, 1998). In the healthcare industry specifically, vendors estimated that for every dollar hospitals spent on supplies, they spent an additional 40 cents on supply chain logistics (Kontzer, 2003) while ordering, tracking, using and discarding products. As such VMI was additionally regarded as a vehicle to lower the customer’s costs of handling and managing their inventory (Taylor, 1998) and as a potential new business opportunity.
With VMI a vendor manages inventories at a retailer’s location or distribution centers. Typically in a VMI environment a manufacturer is responsible for maintaining a certain level of inventory and service level for its customers (Wexler, 2000). This means the vendor monitors the customer’s inventory levels (physically or via electronic messaging) and makes periodic resupply decisions regarding order quantities, shipping and timing (Waller et al, 1999), usually based on receipt of retail point of sale and inventory data. In addition the vendor delivers material, handles the receiving function, counts and puts away material, and performs any necessary on site counts such as cycle counting or “wall to wall” counts (Geetingen, 2001).

Traditionally, infrequent large orders from consuming organizations force vendors to maintain excessive finished goods inventory, which is a very expensive solution, to ensure responsive customer service (Waller et al, 1999). By increasing visibility into the demand patterns of their partners, a vendor has the ability to better respond to its customers, suppliers and partners, ultimately increasing customer service levels and revenue (Wexler, 2000). Through VMI the vendor gets weekly, or even daily, inventory and sales reports from the customer, then ships product and fine tunes its inventory plan on the basis of these reports (Owen, 2002). All in all, by implementing an innovative operational program both the vendor and the customer are able to improve their respective businesses (Taylor, 1998).

2.3.1 VMI Implementation

A customer deciding that it wishes to pursue a VMI arrangement where inventory management control is given to a vendor is only the first step of a long process. Customers need to engage
themselves in a detailed planning phase whereby they decide who the right vendor is, what the key benefits they are interested in are, and what are the potential sources of risk and failure.

Generally customers have been open for vendors to provide them with the technology infrastructure given that they were driven initially by need to find someone who was able to do it properly (Kilarski, 1999). The operational benefits of VMI are very attractive (Waller et al, 1999) when considering the initial investment required in technology and change processes which have become dramatically less expensive than in the day and age of EDI (Ubois, 1997).

Schein Pharmaceutical Inc. is a recognized leader in the manufacturing and distribution of generic pharmaceuticals, with more than $.5 billion in revenues and over 2000 employees. Three years after implementing a VMI initiative Schein saw its efforts being described as a successful logistics case study in multiple magazines.

One of such case studies described the following benefits for a Schein customer (Taylor, 1998):

- Reduced inventory levels from $119,000 to $40,000
- Improved inventory turns from 5.9 turns to 23 turns per year
- Enhanced cash flow due to increased inventory turns
- Achieved service levels of 99.5%
- Sales increases due to elimination of stock out situations
- Reduced warehouse costs due to optimal order quantities
- Decreased product returns
- Savings realized by elimination of purchase orders
- Total overall reduction in cost of goods
However it is important to note that vendors often work with organizations that have poor or non-existent monitoring systems in place. Without any historic data to begin with vendors will find themselves “juggling to prevent stock out” (Geetinger, 2001). As a result, vendors find themselves making more frequent shipments to maintain the agreed upon inventory levels at the customer’s distribution center or store (Cooke, 1998).

### 2.3.2 Retailer and vendor specific risks and benefits

Therefore when considering VMI one should regard the perspective of both the vendor and customer to better understand the alignment of each group’s perceived benefits and risks.

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<tr>
<th>Retailer VMI Benefits</th>
<th>Vendor VMI Benefits</th>
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<tbody>
<tr>
<td>• Reduced inventory and cost</td>
<td>• Increased market share &amp; sales</td>
</tr>
<tr>
<td>• Fewer stockouts</td>
<td>• Increased inventory flexibility</td>
</tr>
<tr>
<td>• Improvement of fill rates</td>
<td>• Consistent ordering pattern</td>
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<tr>
<td>• Increased service levels</td>
<td>• Reduced transportation costs</td>
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<tr>
<td>• Early detection of product trends</td>
<td>• Warehouse efficiency</td>
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<tr>
<td>• Effective promotion management</td>
<td>• Real time access to information</td>
</tr>
<tr>
<td>• Increased inventory turns</td>
<td>• Relationship competitive advantage</td>
</tr>
<tr>
<td>• Reduced transactional costs</td>
<td>• Controlled product phase out</td>
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<th>Retailer VMI Risks</th>
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<tr>
<td>• Information visibility allows for parties to learn too much</td>
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<tr>
<td>• Vendor will be able to impose his own merchandise</td>
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<td>• Switching costs</td>
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<th>Vendor VMI Risks</th>
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<tr>
<td>• Customer does not let go of its ordering process completely</td>
</tr>
<tr>
<td>• Initial substantial technology investment</td>
</tr>
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<td>• Unclear technology integration effort</td>
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*Figure 1: Benefits and Risks of VMI for both Vendor and Retailer*
2.3.3 Sources of VMI failure

Investments of a large scale are prone to failure not only because of the risks involved but also because of the methodologies applied while rolling out those investments.

One of the reasons often quoted for the failure of generalized application of VMI across vendors in different industries is the incremental nature of the changes introduced which avoid making overall changes to the incumbent supply chains (Robinson, 1999).

Jonathan Byrnes (Byrnes, 2004) reports an internal study conducted by General Electric whereby it was concluded that project return on investment was related to project size. In other words, the study found that smaller investments had much smaller returns than those achieved by larger investments mostly because of the “tuning up” mindset of project managers who refrained from conducting “paradigmatic change”.

Yet another reason held for the majority of failures of VMI has been the disagreement between customers and vendors with regards to performance measures and goals where, in the retail industry specifically, some say it should be measured solely on retail terms, meaning inventory turns, sales per square foot, service levels and dollar contribution to retail (Kilarski, 1999).
2.3.4 Enablers of VMI success

When implementing a VMI arrangement the customer needs to be actively involved in the process, and it is the vendor’s responsibility to allow the customer to feel comfortable about the prospect of sharing information so openly given the likely benefits of doing so (Ericksen, 1997).

To that effect, trust between the partners is critical from the outset, and that trust should grow as the partnership develops (Geetinger, 2001), promoting the practice of sharing data (Ericksen, 1997), and of establishing common goals and measures (Surden, 2000).

One vehicle suggested for the building of trust is the use of showcase systems. Jonathan Byrnes reflects on the successful introduction of VMI in the Canadian hospital supply industry as a result of meaningful and well planned showcase systems (Byrnes, 2004). A working solution with concrete results was used as a trust bridge with the senior executives of other companies which visited the showcase site.

However trust needs to happen at multiple levels of an organization and not only at the senior executive level. As previously noted VMI systems rely on accurate demand data to be able to function efficiently and therefore the slightest discrepancy introduced by humans can jeopardize the overall objectives (Geetinger, 2001).
Trust building as partnerships evolves.

- **Promote practice of sharing data**
- **Establish common goals and measures**
- **Showcase systems: get buy-in early**

Sources of Failure

- Organizations refrain from carrying out "paradigmatic change"
- **Disagreement** of performance measures and goals between vendor and customer

Figure 2: VMI Success and Failure

Trust is important to alleviate those discrepancies which may be a result of customer employees not trusting the system and keeping their own private inventories which are not accounted for.

2.3.5 **Beyond moving product**

VMI is a mechanism to gain a competitive advantage and differentiate an otherwise commodity product (Taylor, 1998). Successful VMI vendors will have the strategic advantage of being able to compete on price but also on service, which is not so readily available to the competition (Bernstein, 1997), and doing so whilst ensuring a long term relationship with their customers (Geetingger, 2001).
2.4 Strategic Alliances

Throughout their existence manufacturing organizations have had to deal with competitive pressures and high levels of uncertainty. They were aware that flexibility and speed of response to market changes, as well as the ability to innovate in both product and process technologies and methodologies, were determining factors for their survival (Smithson, 1994). Organizations realized that very few of them could ‘go at it’ alone any longer (Teece, 1992) and thus focused on building complex forms of cooperation which were believed necessary in order to face their market’s continuous change and globalization trend (Zuboff, 1988). To that effect “value-adding partnerships” (Porter, 1985; Johnston and Lawarence, 1988) deemed of a strategic nature (Johnston and Vitale, 1988; Morton, 1991; Galliers, Swatman et al. 1995), began to take place between various clients and suppliers throughout supply chains.

2.4.1 Strategic Alliances Rationale

Strategic Alliances (SA) are characterized by a shared commitment of two or more partner organizations to reach a common goal, entailing the pooling of their resources and activities (Teece, 1992). For that reason suppliers often find that SAs are advantageous in that they are given access to building and operating world class manufacturing facilities that were previously unavailable. Manufacturers in turn realized that supplier efficiency largely determined their own output and thus decided to invest in suppliers via newly formed SAs (Reekers and Smithson, 1996). As a result many manufacturers are changing their relationships with component suppliers away from traditional arm’s length relations and towards new settings based on a cooperative
logic (Bensaou, 1997). Thus one could say that an organization’s boundary can no longer be assessed independent of the cooperative relationships which it may have forged (Teece, 1992).

Upon establishing SAs organizations saw that their functionality drew on common or very similar inputs, thus further expanding an alliance purpose. For this reason, and because of the importance of externalities and “knowledge spillovers” (Porter, 1998) the breath and depth of a supply chain network (Holland and Locket, 1997) rather than the size of individual organizations within the network, are considered to be more relevant.

In order to fulfil the projected benefits of SAs an Interorganizational Information System (IOS) of some sort was needed so as to be able to bring close together business processes and control over scarce resources from the various organizations involved. Soon systems such as Electronic Data Interchange (EDI) became a pre-requisite for either newly formed or already established alliances between clients and suppliers in manufacturing industries.

Since then the Information Systems literature has grown knowledgeable in areas such as strategy, strategic information systems, organizational change, new organizational forms, the role of Information Technology (IT), and various others.

While recognizing the diminished costs made possible by IOSs, authors have referred to theories such as resource dependency theory. Within manufacturing relationships specifically it has been said that the initial enthusiasm felt throughout alliance negotiations is short lived and soon enough organizations find themselves trapped within ventures which they themselves helped to set up. For that reason EDI has often been held as the prime culprit for granting large
organizations the capability of further extending their existing power and control over their trading relationships with small and medium sized companies.

In 1994 Smithson pointed out that the benefits of a new organizational form such as one implied by a SA could be diminished "due to inappropriate, too little, or too much management and control" from within. His argument calls upon Mintzberg' (1983) emphasis of organizations with different values and objectives coming together without the benefit of 'political rules' that normally within an individual organization are able to contain emergent conflicting views. This indicates the need to include some form of external mechanism able to harmonize possible sources of conflict within organizational networks.

SAs required major investments in Information Technology (IT) in order to increase Interorganizational information processing capabilities, reduce task uncertainty (Bensaou and Venkatraman 1996) and stabilize inter organizational linkages through formalised inter firm linkages (Van de Ven and Walker, 1979). EDI is an example of one of such formalized links and it comprises the transmission of standardized data representing business documents, such as purchase orders, invoices and shipping notices, between the computer of an organization and its customers and/or suppliers (Ketler, Willems et al, 1997). Studies in the 1980s of these electronic commerce links coincided with a growth of interest in strategic information systems (Madnick 1987).

IT has been seen as what Bain (1956) broadly defined a 'barrier to entry' as anything that allows firms to earn supra normal profits stemmed, for instance, from preferential access to scarce
resources. Brynjofsson and Hitt (1996) describe two ways in which IT value is related to barriers to entry. The first is that in industries with existing barriers to entry, it may be possible for organizations in a particular industry to increase profits through the innovative use of IT, provided the barriers to entry remain intact. Second, the use of IT may raise or lower existing barriers or create a new one, thus changing the profitability of individual organizations and industries.

Technology cannot be relied upon to produce always the same effects (Angell and Smithson, 1991). Internet Business-to-Business applications for instance, provide organizations a low cost technology platform to participate in previously technological expensive markets. In these cases technological capability has thus decreased in importance for pre entry market requirements (Plant, 2000).

IT is also said to build exit barriers that may contribute towards an increase of an organization’ confidence while dealing with another. The reason for that, among other things, is that many systems raise the costs of switching to a new partner because of the disruption, the initial technological investment and retraining required, thus promoting long-term relationships. Therefore IOSs such as EDI tend to tie organizations more closely to their buyers and suppliers (Reckers and Smithson, 1996).

The effective use of an IOS is related to the extent of internal computing integration within organizations (Hart and Estrin, 1991). The greater the integration, the greater the opportunity for selecting specific information to facilitate interorganization coordination. However this leads to
individualized systems which may then be difficult to integrate with others and thus require a new IT platform design and deployment altogether (Angell and Smithson, 1991; Venkatraman, 1991). For this reason it has been common practice for manufacturers to require a minimal level of internal computing integration that relates to their own system from the start (Browne, Hunt, et al, 1999).

Furthermore the transaction cost perspective (Williamson 1975) provides a useful theoretical framework for understanding the impact of information technologies (Ciborra 1987), and IOS in particular (Malone, Yates and Benjamin, 1987), on the relationship between coordination and cost. Malone (1987) emphasizes that IT provides an increase in efficiency which ultimately increases the pool of available suppliers and eliminates existent market inefficiencies which enable firms to maintain a degree of monopoly over their customers (Bakos 1991). Bakos and Brynjolfsson (1993) are not of the opinion that reduced search and coordination costs result in an increase of available suppliers. Their empirical findings illustrate the contrary, in that manufacturers are reducing the number of their suppliers. Their explanation is that manufacturers want their suppliers to invest in underlying specific assets, and in order to motivate them to do so, they make them preferred suppliers.

Another reason for the decrease of the number of suppliers is that manufacturers themselves want to reduce their buying costs while interacting with large pools of suppliers. In fact the number of suppliers is not changing, what has changed is the number of direct suppliers (1st tier suppliers) who in turn have had to manage the indirect suppliers (2nd tier – onward suppliers) (Womack, Jones et al., 1990).
Furthermore IOSs have also allowed for an emerging globalization trend whereby the boundaries set by geographical location are being withdrawn and with them too the limitations once imposed by time “thanks to the virtuoso ways in which information can be managed and manipulated in the contemporary period” (Webster, 1995). Thus by improving the speed of communication between geographically distant locations, feedback time can be reduced and the possibility of convenient iterations between parties engaged in complementary tasks is introduced (Hart and Estrin, 1991). More discrete tasks carried out by different organizations now become stages along a more seamless process. Zuboff (1988) identified the role of IT in making events and processes visible and knowable, thus enabling them to be shared in new ways. And by adopting these new information sharing techniques, the contributions of partners are more appropriately characterized as reciprocal and interleaved (Adler 1989). Task chains that were once performed by a single firm may be broken up according to the expertise and resources of collaborating firms located at different points in the globe (Venkatraman, 1991).

Altogether chain reaction alliances have taken place within manufacturing industries in an attempt to achieve lean production mechanisms. While doing so these SAs have come to rely on IT to shape their businesses and achieve maximum levels of operational effectiveness, sometimes questioning the very reasons which made them take place in the first place. The study of SAs should go beyond visible outcomes and try to detect unforeseen implications for participating organizations in order to determine their true strategic value, as will be analyzed in following sections.
2.4.2 Intangible and unforeseen costs

While some economists recognise that alliances don’t always work and organizations have to solve the problems of co-operation, they limit their discussion within the scope of transaction cost (North, 1990; Williamson, 1985). According to Gerlach (1992) alliances should be characterized by an emphasis on relational rather than transactional exchange, wherein the focus is towards the actors participating in rather than being the objects of exchange.

Organizational theories such as resource dependency theory (Pfeffer and Salancik 1978) suggest that, regardless of previous strategic agreements, organizations will try to minimise their dependency on others while at the same time maximise the dependency of others on themselves (Reekers and Smithson 1996). There are those who hold the underlying technology as the one responsible for most of the unforeseen results (Dosi 1982; Nelson & Winter 1977; Sahal 1985; Hughes 1987; Callon et al 1986, Pinch & Bijker 1984). They say technology has come to be treated as a ‘black box’ where only inputs and outputs are known, thus emphasising the need to understand issues other than operational effectiveness. This leaves one with the need to unravel some of the unforeseen intentions and consequences hidden beneath alliance thrusts which could in the long term jeopardise their inception.

It has often been the case where an organization disregards the implications of implementing particular alliance technology requirements, while focused on achieving promised mutual benefits at no matter the cost (Ketler, Willems, et al., 1997). The apparently simple decision to invest in a given technology sets off a dynamic of learning and accumulation which rapidly leads
to uncertainty (Smithson, 1994). Simplistic assumptions about technology have made organizations concentrate much of their resources on getting the right technologies in the right place at the right time, ignoring the ‘right’ use for them (Orlikowski, 1999). The chosen technology becomes increasingly attractive and profitable, not by virtue of its intrinsic qualities, but because substantial investments have been devoted to its improvement (Callon, 1998) and environment of application. Organizations are thus left with fewer choices and have no alternative but to renew them time and time again while remaining trapped in networks from which they have neither the resources nor the desire to escape.

The establishment of long term collaborative relationships is thought to provide some protection against the risk of opportunistic behavior (Clemens and Row, 1992), however, some argue that under conditions of environmental complexity and uncertainty, organizations may behave opportunistically indeed while seeking self interest (Kumar, Van Dissel, et al., 1998). Knowing that technology is able to provide a deeper level of transparency within organizations (Zuboff, 1988), and that a formalized link such as EDI enables external computer access, one realizes the possibility of misconduct (Ketler, Willems, et al., 1997). Such behavior needs only to happen a few times for the SA’ purpose to be questioned (Smithson, 1994).

Furthermore, while technology simultaneously generates information about underlying production and administration processes, manufacturers become more involved in their suppliers’ production. At some point they may even realize that their orders have been downgraded in priority and require explanations for unexpected shifts in order status (Hart and Estrin, 1991). Yet another source of uncertainty stemmed from EDI is the possible unhealthy
dependence between supplier and manufacturer (Pfeffer & Salancik, 1978) that ultimately shifts the balance of power and control (Reekers and Smithson, 1996). Manufacturers for instance have been known to use their suppliers as an uncertainty buffer thus enabling them to change their planning frequently at the cost of suppliers’ own planning (Idem; Malone, Yates et al., 1987). The opposite would be the case when a manufacturer’ improved ability to schedule scarce resources becomes routine thereby reflecting an increase in dependence on a particular supplier (Hart and Estrin, 1991).

Given the implications that a particular electronic system implementation might have, the corporate advocate is essential, not only because it will impact the relationship between the organization and its clients, but also because of the way it will affect internal organizational procedures.

Specific boundaries between organizations become irrelevant (Smithson, 1994) and thus managers are required to become adept at managing not just their own organization, but also their relationships and alliances with other organizations (Rockart and Short, 1991; Teece, 1992).

The initial trust which helped set up an IOS for the purpose of SAs (Karahannas and Jones, 1999) should be constantly nurtured so as to promote more confidence and eventually higher levels of cooperation (Bensaou, 1997).
Ultimately one can say that sociopolitical issues, such as personal chemistry and interaction between corporate leaders, and compatibility between the organizations on broad cultural, philosophical and strategic grounds determine if the alliance will come into existence and mature (Moss-Kanter, 1994). Thus all three perspectives — rational/economic, technical, and sociopolitical— should be pondered on to help create and maintain truly strategic collaborative alliances (Kumar and Van Dissel, 1994).
The rationale behind establishing close partnerships between vendors and hospitals in the healthcare industry necessarily entails quantitative and qualitative factors, therefore dictating the nature of the research methodology adopted for this thesis.

Case studies are a particularly useful strategy when the phenomena of interest cannot be clearly separated from the social, technological and organizational environment in which they occur (Yin, 1989). With the intent of understanding the decision process and relationship evolution between stakeholders, I conducted a case study on two individual hospitals that are currently leading the way in next generation vendor partnerships.

A cornerstone of the case study research method is the use of multiple data sources (Yin, 1989) which allow the phenomenon of interest to be examined thoroughly and reduce the limitations of any single data source. With the support of JAFKO Enterprises two of its client hospitals were identified according to the following criteria:

- Hospitals would provide access to both CEO and lower operational levels
- Hospitals would release relevant financial records
• The contractual agreements established between them and JAFKO Enterprises would reflect fundamentally different characteristics with regards to consignment, inventory buyout, risk sharing clauses and other factors

• The hospitals would be at different stages of the implementation of JAFKO Enterprises’s One4all program allowing for an assessment of change management processes in place and their relative success

• The hospital functions (e.g. Cath lab, nursing floors, pharmacy, etc) addressed by the One4all program would follow different plans from each other with regards to their respective implementation schedule

Consequently California Hospital and Omaha Hospital were the selected hospitals for the purpose of this research. Each of the onsite visits lasted two days and were separated by a month. Subsequent to each visit, extensive follow up calls and emails took place therefore enabling the compilation and verification of the collected data before engaging the subsequent research entity.

The data collection strategy was to interview individuals at all levels of the hospital organization that were part of or impacted by the decision of implementing One4all. Additionally, field observations were carried out as well as gathering of data (e.g. project proposals, annual reports, internal assessments, deliverables, point of sale data).

Interviews were conducted in an informal way while using an evolutionary protocol (Merton et al, 1990). The interviewees allowed for audio recording to be done thus avoiding noting down of responses and not affecting conversational flow (Oppenheim, 1992). In between sessions
extensive documentation was provided and allowed to leave the building premises. This was useful since in following sessions, semi structured questions were used to elicit information on specific issues while giving ample room for interviewees to recount their experience. Sensitive issues that could give room to biased recollections were also triangulated (Jick, 1983).

The interview sets included 26 people from the hospital organizations as well as 14 people from JAFKO Enterprises which had been involved with the hospital organizations in the negotiation or/and implementation of One4all. For a specific schedule of the interviews conducted please refer to Appendix B.

Furthermore interviews were conducted with experts from various perspectives, including the Director of the Supply Chain 2020 Project at The Massachusetts Institute of Technology, a Vice President of Information Systems at one of the two main competitors of JAFKO Enterprises, a Vice President of Healthcare at JP Morgan, and executive officers from 4 hospitals other than the ones provided by JAFKO Enterprises.

Data analysis was carried out on the collected data contained in electronic format while using Microsoft SQL Server 2000, ultimately allowing for the verification or not of the information captured via the interview format.
4 Analysis

The analysis framework is structured in 10 segments whereby each describes individual action triggers and corresponding consequences, which took place between participants and ultimately contributed towards the functioning of the established vendor – hospital long term added value partnerships.

4.1 Healthcare Industry Characterization

The Healthcare industry comprises a large percentage of the US GDP and yet it is characterized as a cottage industry by one of the interviewed CEO’s as he described the free standing and independent nature of hospitals.

Historically hospitals have been unable to set “best practices” as has been the case of other industries such as the automotive which has led the way with lean manufacturing and six sigma initiatives. The lack of a best practice mindset in healthcare is particularly evident in the way it has disregarded the materials management function which after all drives as much as 30% of the costs of a hospital. Additionally, the career path of those individuals responsible for such function normally entails a lengthy progression with various roles that range from house keeping, to a supply tech position, onwards to purchasing, etc.
The opportunity of operating inventory supply chains in an efficient manner can signify a reduction of 2% to 3% from the annual $80 to $90 million dollars spent in pharmacy and medical surgical supplies, as mentioned by the researched hospital institutions. Notably however several obstacles exist in the path of reaching such potential savings.

Specifically, when hospitals face financial challenges they do not tend to focus on the supply chain overall but rather only on some parts of it. Instead of measuring benefits resulting from supply chain level changes, hospitals focus on aspects that are easier to act upon, thereby changing product lines, cutting labor, cutting services, without care of the intricate long term effects of such changes.

Additionally, hospital departments are known to be very protective and particularly so around inefficient niches that were created internally. One such niche often mentioned in this study is the use of “secret inventory stashes” by any number of nurses that have in the past been verbally reprimanded by a physician because of stocking out on a particular item, therefore holding secretly in some closet as much as 2.5 years of supply.

Finally, hospital senior management can meet considerable internal resistance to change and all too often the path of least resistance is the one chosen. Such was the case accounted for at the researched hospitals where the product portfolio included as many as 80,000 different items at one point in the past so as to accommodate the individual needs of everyone. As will be demonstrated in subsequent sections, the leadership of both hospital and vendor is a critical
element in devising the appropriate change management plan that will ultimately nurture project ownership from key organizational individuals and lead to a successful outcome.

4.2 Stockless Inventory Management at Researched Hospitals

The healthcare industry has an inherently complex supply chain fueled by the multiple vendors needed to supply the different supplies used by the hospitals, which have to handle distribution channels supporting both direct manufacturer shipping and distributor transit. Additionally, for the product to go from the hospital dock to the “point of care” it must flow through the hospital’s own internal logistic network which comprises multiple users, functions and patient care units.

In the literature, stockless systems were said to be an attempt to blend the common external supply chain with the hospital’s internal logistic network. Materials management directors at the researched hospitals however, found that stockless failed to materialize its promises precisely because it stopped at the hospital dock and did not go beyond it.

Supply techs would go up daily at 8 AM to the nursing units to try to determine what the nursing staff of each unit had used the previous day. Theoretically these counts would be made by comparing hand written records that indicated what was meant to be at a nursing unit with what was indeed there, and the difference would be the order amount.
After performing the counts supply techs would return downstairs to the general store room and key punch their orders, a task that would extend throughout the day, as they were not sophisticated computer users and also were prone to data inputting errors. The order was then sent at 8PM by EDI to the vendor, who would then pick it, put it in plastic tote bins, load a trailer, and drop them on the dock. Therefore the same supply techs which handled the counting and ordering, also had to be available to collect the bulk shipments received at the dock, take them to the storage room, break them, replenish the nursing units, and finally be on call in case a stockout took place and a nurse needed for an item to be sent from the general storage room to the nursing floor, a walk which could take as long as 15 minutes if it was at the far end of the hospital.

Stockouts were said to be the result on several occasions of non organized inventory layout and also of private stashes kept by nurses that would further distort the inventory counts or provoke items expiring.

In stockless, supply techs were meant to count everything everyday however the interviewed materials managers contested that such was an impossible task to do by hand. Understandably there was no visibility on whether an item was low in inventory or not, and worse yet item PAR levels were being set without the aid of mathematical formulas as there was no ready available and accurate data to drive them. As a result, there was either product in abundance or product requiring continuous crisis management, which invalidated the stockless inventory management methodology as it still required a local general store room to serve as a buffer. Furthermore,
vendors would use a “fill & kill” policy at their DCs which potentially meant that several of the items ordered would not reach the dock and a hospital could go days without a critical item.

Supply techs did not necessarily handle all inventory related activities within the hospitals internal logistic network, as there are specific departments, such as the Cardiac Cath Lab and Radiology, which are more sensitive in nature and prompt a more zealous and expert monitoring and ordering activity. As such there was the significant burden of conducting inventory management within these specialized hospital departments.

For instance, Radiology would have an item charge master comprised of 14 thousand billable items with unique charge codes which due to data redundancy led to significant losses. Specifically, Radiology would only update its item charge master upon receiving instructions to do so by the financial department. Meanwhile, a change to a product’s price could go unnoticed for as long as 2 years and during that period Radiology would be undercharging patients.

Another example was that of the Cath Lab on one of the hospitals whereby highly trained staff clinicians would spend as much as 4 hours a week in an asynchronous format handling inventory related tasks. Purchase orders would be written down by hand for each separate lab and each separate vendor. Clinical staff would then have a handheld voice recorder in order to keep track of the required orders and at the end of the week would place the order by faxing it to the purchase department who would then in turn process the orders. Original purchase orders were kept in order to check against what was received and also to maintain a hand written backlog. As a result the Cath Lab which has inventory items as expensive as $24,000 was said to be
overstocked most of the time in order to avoid stockouts. Another inventory driver were the physicians themselves who would request a product they had seen at a conference and it would be ordered without first checking whether a similar product was still in stock. At an extreme, clinical procedures were being cancelled even when patients were already on the table due to the required tools not being available.

Ultimately the clinical staff neither had the time nor the expertise and instruments to manage inventory effectively and effortlessly.

Understandably the financial controller of one hospital reported that its Cardiac Cath Lab did not manage perpetual inventory and as a result incurred large expenses due to the expiry of products which would cost on average $.5 million annually. Similarly, the Pharmaceutical department’s inventory was not tracked and an average monthly order of $3 million would be expensed and assumed to be consumed in total during the following month.

Finally, on the financial aspect of stockless’ agreements it was said that vendors could charge as much as 9.25% markup service fee on top of the price charged per item which gave the vendor a strong incentive to drive up the individual cost of non contracted items. Moreover, hospital financial controllers felt that their stockless agreement lacked an alignment of their interests and incentives with those sought by the vendor.
4.3 Beyond Stockless and onto One4all

The CFO of one hospital reflected that the primary driver for change was the need to figure out ways to drive down cost and become more flexible to perform capital investments. Even though an appropriate inventory monitoring system was not in place he said that visibly “a lot of waste was lying around”.

Furthermore, there was the added pressure of addressing the issue of patient safety which for one of the hospitals was costing as much as $9,000 on average to accommodate the adverse effects caused in patients. Worth noting is that the calculated cost did not include any losses of potential lawsuits, but rather the required extra patient days, extra drugs, extra tests and extra labor to rectify a mistake.

Such was not acceptable at either one of the researched hospitals as both were found to be in financial distress and at a time which coincided with the decision made to engage JAFKO Enterprises in its One4all proposition.

4.3.1 Omaha Hospital

On one case the hospital’s senior management approached its main vendor at the time and bluntly requested for it to consider “applying a supply chain model similar to that of Wal-Mart”. During the subsequent 18 months the vendor struggled hard to come up with a model, but
ultimately it was unable to meet the hospital’s expectations with regards to risk sharing and established performance measures.

When setting out to find a new vendor the hospital made the decision that it would not want to maintain contracts with as many as five different vendor companies. JAFKO Enterprises at first was not very receptive of this requirement as it was not its customary business practice; however with the proper involvement of senior level management from both institutions a decision was made where JAFKO Enterprises agreed to change its practices accordingly. Contractual negotiations lasted a lengthy 18 months yet they were said to be filled with plenty of opportunity to set the foundation for the parties’ trust based relationship.

After all the hospital was taking a leap of faith by ceasing the relationship it had with an organization for the previous 20 years, and was willing to “turn over the keys” to a different organization with which it had had no previous dealings with.

4.3.2 California Hospital

On the other case it was more of a matter of the hospital being given notice that its vendor was going to markup its cost structures a full 5% without adding any services. Essentially the hospital did not have sufficient volume in order for the vendor to consider it a profitable account. The CIO of the hospital felt that there wasn’t any room for negotiation with the vendor and therefore decided to look elsewhere. He did not have to look for too long as the hospital shared a
relationship with JAFKO Enterprises for the previous 8 years for pharmacy supply and secure inventory cabinets.

4.4 Selecting JAFKO Enterprises

The thought of establishing the next generation supply chains by themselves was only briefly considered by the studied hospitals as they both considered it financially prohibitive and even under normal circumstances they would be unable to accommodate the required set up costs both in terms of hardware and software, as well people expertise. Specialized functions like the OR initially engaged themselves in product standardization initiatives of their own, however they were short lived for even though they yielded positive results, they were far too labor consuming or unattainable due to a lack of bargaining power with separate vendors.

Therefore, upon selecting a new vendor both hospitals were looking for market intelligence and clinical expertise that would help them reduce supply expenses and improve patient care safety. Hospitals no longer wanted to have a distributor relationship with their vendors but rather a "logistics partnership".

Even though several of the vendors enquired were strongly interested to serve the studied hospitals none of them, other than JAFKO Enterprises, was wiling to accept the risk sharing considered fundamental for the contractual agreements to be struck. However most vendors would understandably refuse such a setting for they did not hold internally the necessary
relationships to address in a cost effective and integral manner the supply chain goals set by hospital senior management and would therefore have to build from scratch new external relationships.

As such, in both cases JAFKO Enterprises was the selected vendor mostly due to its wide range of services enabled by what was considered a sufficiently vertically integrated organization given its availability of a corporate technology company, a distribution company and also a consulting company.

The One4all proposition was regarded as a “great opportunity to iron out all the inconsistencies of the stockless system and allow for a significant reduction of the inventory held”. However from the start hospitals were perhaps unaware that the transition to One4all would entail a loss of control (e.g. inventory management) in the areas that were not part of their core competence so that they could indeed benefit from the potential added value services offered by the vendor.

Ultimately, JAFKO Enterprises without knowing had to become proficient in nurturing trust based relationships where a hospital’s initially perceived loss of control eventually evolved to a notion of “gain in control which was previously unattainable”.

4.5 Strategic vs. Transactional Supply Chain Clients

Generally JAFKO Enterprises’s hospital clients can be segmented into two groups, namely the transactional focused and the strategic thinkers. It is important to notice the subtle difference between both types as they determine the initial groundwork and subsequent management of change needed to set in motion a successful One4all implementation.

<table>
<thead>
<tr>
<th>Transactional</th>
<th>Strategic</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Price sensitive</td>
<td>• Transactional phase successful</td>
</tr>
<tr>
<td>• Box moving</td>
<td>• Recognizes value of information</td>
</tr>
<tr>
<td>• Early phase of implementation</td>
<td>• Long term perspective</td>
</tr>
</tbody>
</table>

**Figure 4: Transactional vs. Strategic Hospitals**

Regional JAFKO Enterprises directors responsible for establishing new client accounts don’t follow any template with regards to how a particular contract should be devised for a hospital. The hospitals under study in this research are an example of this practice whereby they share some common contractual elements but also have fundamentally different clauses. As such each client is considered to be different and an effort is done by JAFKO Enterprises initially to find the “hot buttons in order to lure them into an account”.

Transactional clients are those hospitals that are essentially price motivated and regard One4all only as a vehicle of inventory distribution (e.g. “box moving business”), whereas strategic
thinkers perceive the overall added value potential which goes beyond mere distribution and onto the intangible benefits of information visibility and patient care. The difference between both models does not entail a functional distribution at a hospital department level, meaning that one is likely to find hospitals with a transactional pharmacy department and a strategic cath lab, and vice versa.

<table>
<thead>
<tr>
<th></th>
<th>Omaha Hospital</th>
<th>California Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMI</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Consignment</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Buy back inventory</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Prior Cardinal relationship</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Implemented Pharma</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Implemented Cardiac Cath Lab</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>

Figure 5: Omaha Hospital and California Hospital contractual agreements

Specifically, one of the researched hospitals initiated the One4all program by addressing the medical surgical supply for its nursing floors. It was initially thought that this reflected a conscious risk mitigation decision whereby a stockout was less critical than one felt in pharmacy or in a cath lab. However, the other onsite visit demonstrated clearly the opposite given that the hospital had first introduced One4all at the pharmacy level. After some probing it was determined that a prior relationship with JAFKO Enterprises was in place at the pharmacy level and therefore the hospital was readily willing to move in that direction. Had such a relationship not been in place the One4all program would have probably not been initiated at the pharmacy level.

Despite the clear distinction of a transactional mindset and that of a strategic thinker, very seldom (if at all) does JAFKO Enterprises come across an organization that is strategic overall.
In fact most hospitals first begin as transactional clients wanting to assess whether the vendor is indeed the right partner and gradually evolve to a more strategic perspective. The good results achieved in an individual department are used as inputs for successful showcases aimed at generating buy in from the remaining departments within a particular client.

JAFKO Enterprises representatives said they were perfectly able to operate concurrently both kinds of supply chains (e.g. transactional and strategic) within the same client hospital. The main disadvantage was felt by the clients who would be unable to unlock the full potential available in the One4all suite of services. This was particularly self evident between departments that followed different supply chain mindsets and were generating internal conflict with regards to the selective capital investments made by hospital senior management which accrued from the gains made available from the strategic department thinkers.

### 4.6 Building a Trust Relationship

The One4all program is one which introduces significant change at different levels into an organization with regards to its people, processes and technology. Like any other large scale “paradigmatic change” initiative the program has met significant resistance to change from the hospitals staff as well as from the healthcare industry in general which has followed a very traditional evolution as previously noted.
The healthcare industry is not one which can be simply comparable to that of the automotive industry which, among others, is supported by lean manufacturing and *kanban* practices that act upon precisely defined vehicle assembly schedules that enable suppliers to package their different products according to the assembly line order on the automotive plant. Admittedly there are economic disciplines, notably Cost -Effectiveness Analysis, which enable one to determine the cost of a stockout including the resulting loss of a sale or production stoppage, regardless of the industry and context they take place in. In the healthcare industry specifically such analysis allows to determine the worth of an extra year of life according to the frequency and quantity a patient must be checked upon and/or medicated. However, such analyses will not do much good for a hospital when the result of a critical product stockout may potentially lead to the death of a patient.

Therefore the extenuating factors of “paradigmatic change” are even more so present in a One4all implementation, therefore calling upon significant effort to nurture and develop trust based relationships between the vendor and the various levels within a hospital, ranging from senior management to the very nurse which is stationed at the tip of the supply chain, namely the point of care. Ultimately one cannot go without quoting a leading supply chain strategy advocate at the Massachusetts Institute of Technology, namely Professor Jonathan Byrnes, whose motto is that “supply chains are about people”.

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JAFKO Enterprises were found to be able to build trust relationships while relying on their “4 R’s” “Readiness to Respond”, “Readiness to Share”, Readiness to Reveal”, and “Readiness to Change”, which together establish a solid platform for a strategic alliance.

### 4.6.1 Readiness to Respond

JAFKO Enterprises representatives admitted on more than one occasion that the One4all implementations under study for this thesis could be resembled to lab experiments given their unprecedented nature within JAFKO Enterprises.
Essentially the vendor has learned to a large extent by doing and interacting with the different functions within the client hospitals. As a result, these relationships have not gone without their stressful times however the vendor was said to possess specific traits that helped alleviate tensions and continue to strive for a successful partnership.

The aspects most often quoted by client hospitals during the interviews conducted were the following:

- **Rapid expert availability**: Within one week of implementation a nurse informed the hospital CEO, during one of his regular floor walks, that there were problems with recently installed secured cabinet machines (e.g. inventory dispensing units). The CEO in turn told JAFKO Enterprises “we’ve got problems” and by the afternoon of the very same day, three people from the vendor had been flown in to help solve the problem. Even though the problem was not solved on the same day, the rapid expert availability allowed the hospital client to feel that the vendor was committed to make things happen.

- **Vendor senior management availability**: In the event of a deadlock originated from fundamental disagreement between a hospital and a vendor corporate division, the ability to escalate issues to the vendor headquarters and address them with the CEO himself, was key to surpass some critical hurdles (see ‘Readiness to Change’ below).

- **Opportunity development**: The vendor was said to be willing and able to closely engage hospitals in the process of understanding their contextual dynamics that often led to the
identification of previously unnoticed opportunities which were then conveyed in a clear and supportive manner to the hospitals.

### 4.6.2 Readiness to Share

Earlier it was noted that hospital financial controllers felt that their former stockless agreements failed as they lacked an alignment of hospital interests and incentives with those sought by vendors. In other words, the more a hospital ordered the more a vendor would earn.

With the misalignment in mind JAFKO Enterprises developed the notion of a “Value Model” whereby supply chain related cost drivers are implicitly related to the financial bottom line of a client hospital. As a result the vendor earns more and proportionately to the cost savings it brings to the hospital.

The “Value Model” is fine tuned throughout the contractual negotiations of a new account and together the vendor and hospital representatives agree upon which financial items the vendor is specifically accountable for and in what measure it would impact its reward.
The following are some of the features commonly noted by client hospitals during the interviews conducted:

- **Pricing**: Hospitals are less concerned of issues that might stem from ill intentions from JAFKO Enterprises (e.g. overpriced substitute items) given that both entities are directly and proportionally affected.

- **3rd party product tracking**: Hospitals purchase 3rd party items through JAFKO Enterprises and should any of those expire the hospital would have to absorb the cost. However, since JAFKO Enterprises receives its rebate according to the hospital bottom line calculated in the “Value Model”, it is concerned with the hospital potentially losing money on 3rd party items that expire and therefore makes sure that they are continuously tracked.

Ultimately, hospital boards are traditionally comprised of people who are non clinicians and don’t understand most of the clinician language being discussed. However JAFKO Enterprises’s “Value Model” being tied in to financial performance allows the hospital board to vouch for the feasibility of One4all. One of the hospitals in particular had had a worse case scenario planned to such a degree that the hospital would not lose any money given the risk guarantees provided by JAFKO Enterprises that are embedded into the “Value Model”.

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4.6.3 Readiness to Reveal

Often time’s hospitals begin building their trust relationships from a transactional mindset and gradually progress towards a strategic thinking setting. Understandably, the interviewed financial controllers and CFO from the researched hospitals, expressed a willingness to “turn over the keys” only in the presence of adequate tools to measure the vendor’s outcome on their operations. Therefore audit report tools with the necessary “checks and balances” were set in place to allow for hospital management to concern themselves less with transactional matters.

4.6.4 Readiness to Change

JAFKO Enterprises has grown considerably in recent years through non-organic growth which understandably has given rise to issues of operational nature but more importantly of a cultural one too.

In particular client hospitals noted a fragmented culture built around JAFKO Enterprises’s several different corporations which “are struggling individually to meet their own priorities” and visibly disagreeing among them and potentially jeopardizing the relationship with the client. Eventually it reached such a degree that one of the hospitals had a “standard joke about the secured cabinet sales rep which would show up once a month and ask how many boxes” the hospital wanted to order just as “if it was IBM”. The hospital management in turn would tell the sales rep that they were not interested in ordering any boxes, but rather in paying a fee for service and abstracting themselves from the operational details. On more than one occasion...
issues had to be escalated to the headquarters of the vendor in order for them to sort out the disagreement with individual divisions.

Having spoken with two vice presidents from different divisions at JAFKO Enterprises a potential source of the fragmented cultural fabric was identified in the lack of a shared profit and loss reporting practice that would bring visibility while spanning across the multiple divisions and allowing for transfer pricing and profit allocation incentives to be established.

The fragmented corporate culture at JAFKO Enterprises was said to still be a problem at the time of the interviews. However, both of the researched hospitals’ senior management interviewees reported a clear commitment from JAFKO Enterprises to establish and nurture trust based relationships with the intent of enabling long term value added partnerships, and the hospitals in turn considered themselves to be committed to JAFKO Enterprises.

4.7 Managing Resistance to Change

"There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things."

Niccolo Machiavelli, The Prince (1532)

The Onc4all program is one which introduces significant change at different levels into an organization with regards to its people, processes and technology. Like any other large scale
“paradigmatic change” initiative the program has met significant resistance to change from the hospitals staff as well as from the healthcare industry in general which has followed a very traditional evolution as previously noted. Notably both hospital and vendor have undergone a learning curve of their own whilst introducing and accommodating change into the organization.

4.7.1 Understanding sources of resistance

Several of the benefits that have been made available by a closer relationship between hospitals and a vendor, have equally generated a source of resistance within the organization.

The standardization of the item file has enabled the reduction of variability in demand and also larger orders per item which lead to better contractual prices. However, the standardization may also mean that a physician has to let go of his individual preference for an item given that it is not commonly shared by other physicians in the same hospital.

The transparency of information made possible through the equipment that dispenses supplies allows for better charge capture, identification of consumption trends, improved stock visibility, and many other benefits. However, transparency will prevent nurses from keeping secret inventory stashes which in their mind are fail safe mechanisms that work and allow them to provide better patient care.

The streamlining of processes has reduced the redundancy of tasks and amount of labor required to operate inventory management. However, streamlining ultimately dismantles power niches
that may have settled themselves over the years at key functions within a hospital. For instance, an employee commended for his efforts and unknown workarounds to make an inefficient system work may no longer find himself needed in the organization, or at least differentiated in a favorable manner.

Several other “yin yang” sets exist where a benefit brings with it an immediate perceived disadvantage into an organization, and with the “paradigmatic change” observed by this thesis, it is of particular interest to analyze how change was managed in an attempt to lessen resistance.

4.7.2 Process vs. Task

A difficult obstacle occurs when a task needs to become more complicated for the sake of improving an overall process, and especially so when an employee affected at a task level does not feel directly any process level improvement.

Open inventory technology is often referred in the healthcare industry as inventory that is accessible in an uncontrolled manner whereby any person who has access to a room which hosts open inventory may easily remove or replace items from stock. A critical element of enabling an enhanced supply chain for a hospital is the implementation of secure inventory dispensing cabinets which is precisely the opposite of open inventory technology. Specifically, nurses are required to identify themselves by means of an identification card swipe and also a biometric check (e.g. thumbprint) before gaining access to inventory. Additionally, nurses need to interact appropriately with the inventory cabinet by “letting it know” which items have been removed,
the respective quantities removed, and the patients to which those items need to be billed to. As a result, nurses feel that their task has been further burdened without any benefit for them.

Achieving the nursing support of such inventory cabinets is key to allow for the accurate information to be captured and therefore enhance the overall supply chain process.

4.7.3 Direct vs. Indirect Impact

As previously noted, secure inventory cabinets allow for enhanced supply chain management as well as improved patient care as in the case of pharmacy where drugs can only be dispensed if they have been prescribed by a physician and inserted into the system. Yet, staff perception of secure inventory cabinets has not been the same throughout hospital functions.

On one hand, nurses from the nursing floor don’t regard themselves directly better able at providing patient care given that in their mind they are still fetching inventory from a designated area and carrying it to the patient location to administer them. After all, the secure inventory cabinets “simply” replaced the previously used open technology locations which were already managed and replenished by an inventory supply technician and not by a nurse.

On the other hand, clinicians in the Cardiac Lab or the Radiology Department, which often have to share their time between practicing what they were trained for and managing inventory, find at the very minimum an increase in job satisfaction. A department manager went as far as finding a direct correlation between improved inventory management and better patient care given that she
could monitor the performance of clinicians without giving them the benefit of cumbersome inventory tasks which might have hindered their abilities in the past.

4.7.4 Compliance Reports

Contractually JAFKO Enterprises is required to meet specific performance measures. However its ability to do so is directly tied to the validity of the information being captured at the points of inventory dispensing, which are used by the hospital nursing staff. As such, the vendor devised a “compliance report” whereby it shares the onus of supply chain performance, or rather miss-performance, with the hospital staff.

A “compliance report” is an inbuilt report available at the central computer unit which controls the status of all inventory dispensing units. Immediately one is able to determine by functional department what has been the total number of item takes, stockouts, null transactions, and discrepancies during any given period:

- **Stockout**: It is understood that a stockout occurs whenever upon removing an item it is no longer available at that inventory location

- **Discrepancy**: A discrepancy occurs whenever an item is removed from a secured cabinet and the system is not updated to indicate that change. However the discrepancy is only accounted for whenever the inventory count for an item is updated. It is the responsibility of the human user to update the system.
- **Null transaction**: A null transaction occurs whenever a door of a secured cabinet is opened and no button is pressed. A null transaction may or may not generate a discrepancy, depending on whether or not an item was removed or the cabinet door was simply shut without any item being removed.

<table>
<thead>
<tr>
<th>Department</th>
<th>R Square</th>
<th>Correlation Coefficient</th>
<th>Total Takes</th>
<th>Total Stockouts</th>
<th>Total Discrepancy</th>
</tr>
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<tbody>
<tr>
<td>CATH</td>
<td>0.4488</td>
<td>0.670</td>
<td>24885</td>
<td>1151</td>
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<td>0.542</td>
<td>90979</td>
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<td>8014</td>
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<td>0.472</td>
<td>68652</td>
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<td>6206</td>
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<td>7OHSCU</td>
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<td>0.465</td>
<td>73044</td>
<td>452</td>
<td>5379</td>
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<tr>
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<td>0.450</td>
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<td>0.426</td>
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<td>0.385</td>
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<tr>
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<td>8-TELE</td>
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<td>0.077</td>
<td>41213</td>
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<td>0.042</td>
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<td>PULM</td>
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<td>0.025</td>
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<td>6WEST</td>
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<td>0.014</td>
<td>60362</td>
<td>1864</td>
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<td><strong>SUM</strong></td>
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<td><strong>829171</strong></td>
<td><strong>9789</strong></td>
<td><strong>107746</strong></td>
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</table>

Figure 7: R Square for Stockouts and Discrepancies in 2004 across different hospital functions
## Station: 5W

<table>
<thead>
<tr>
<th>MONTH</th>
<th>Stock Out Percent</th>
<th>Disc. Percent</th>
<th>Total Takes</th>
<th>Total Stock Outs</th>
<th>Total Disc.</th>
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<tbody>
<tr>
<td>JANUARY</td>
<td>1.36%</td>
<td>8.76%</td>
<td>7852</td>
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<td>688</td>
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<td>FEBRUARY</td>
<td>0.90%</td>
<td>10.79%</td>
<td>7366</td>
<td>66</td>
<td>795</td>
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<tr>
<td>MARCH</td>
<td>0.66%</td>
<td>11.42%</td>
<td>7370</td>
<td>49</td>
<td>842</td>
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<tr>
<td>APRIL</td>
<td>0.49%</td>
<td>9.60%</td>
<td>7325</td>
<td>36</td>
<td>703</td>
</tr>
<tr>
<td>MAY</td>
<td>0.44%</td>
<td>9.57%</td>
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<td>669</td>
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<td>JUNE</td>
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<td>9.43%</td>
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<td>30</td>
<td>654</td>
</tr>
<tr>
<td>JULY</td>
<td>0.34%</td>
<td>9.30%</td>
<td>7139</td>
<td>24</td>
<td>664</td>
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<tr>
<td>AUGUST</td>
<td>0.50%</td>
<td>8.63%</td>
<td>6544</td>
<td>33</td>
<td>565</td>
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<tr>
<td>SEPTEMBER</td>
<td>0.30%</td>
<td>8.42%</td>
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<tr>
<td>OCTOBER</td>
<td>0.41%</td>
<td>10.37%</td>
<td>6608</td>
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<tr>
<td>NOVEMBER</td>
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<td>5.56%</td>
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<tr>
<td>DECEMBER</td>
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<td>5.83%</td>
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<td>15</td>
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</table>

Figure 8: Station 5W 2004 Stockout and Discrepancy record

![2004 Station 5W Stockout and Discrepancy graph](image)

Figure 9: Station 5W 2004 Stockout and Discrepancy graph
<table>
<thead>
<tr>
<th>MONTH</th>
<th>Stock Out Percent</th>
<th>Disc. Percent</th>
<th>Total Takes</th>
<th>Total Stock Outs</th>
<th>Total Disc.</th>
</tr>
</thead>
<tbody>
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<td>11.35%</td>
<td>925</td>
<td>27</td>
<td>105</td>
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<tr>
<td>MARCH</td>
<td>3.07%</td>
<td>9.39%</td>
<td>1204</td>
<td>37</td>
<td>113</td>
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<tr>
<td>APRIL</td>
<td>3.80%</td>
<td>8.64%</td>
<td>1053</td>
<td>40</td>
<td>91</td>
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<tr>
<td>MAY</td>
<td>2.69%</td>
<td>12.28%</td>
<td>782</td>
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<tr>
<td>JUNE</td>
<td>2.98%</td>
<td>50.87%</td>
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<td>495</td>
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<tr>
<td>JULY</td>
<td>6.54%</td>
<td>22.01%</td>
<td>2385</td>
<td>156</td>
<td>525</td>
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<tr>
<td>AUGUST</td>
<td>4.47%</td>
<td>14.61%</td>
<td>2615</td>
<td>117</td>
<td>382</td>
</tr>
<tr>
<td>SEPTEMBER</td>
<td>4.22%</td>
<td>12.15%</td>
<td>2511</td>
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<td>305</td>
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<tr>
<td>OCTOBER</td>
<td>4.75%</td>
<td>18.93%</td>
<td>2525</td>
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<tr>
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<td>11.48%</td>
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<td>10.82%</td>
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</tr>
<tr>
<td>JANUARY</td>
<td>4.70%</td>
<td>17.07%</td>
<td>2981</td>
<td>140</td>
<td>509</td>
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</tbody>
</table>

Figure 10: Station Cath Lab 2004 Stockout and Discrepancy record

2004 Cath Lab Stockout and Discrepancy
(monthly average of 1914 picks)

Figure 11: Cath Lab 2004 Stockout and Discrepancy graph
Figure 12: Regression analysis (Y: Stockouts | x: Discrepancies) for Station 5W in 2004

Figure 13: Regression analysis (Y: Stockouts | x: Discrepancies) for Station Cath Lab in 2004
One would think that the better performance of a department made evident by such compliance reports would make other departments want to improve their own performance. However some departments consistently generate less favorable results (see figures above). Also, as of yet, these reports are unable to determine which staff member is contributing to the larger part of discrepancies given that he or she may have only provoked a null transaction, therefore limiting the ability to target improvement.

Nonetheless, across managerial functions on both of the studied hospitals, the nursing staff discrepancy rates were held as the primary culprits for the continuing stockout rates observed. However upon examining discrepancy and stockout rates across multiple functions in both hospitals a statistically sound correlation was not identified.
Ultimately, these compliance reports can be effective change management mechanisms when used appropriately. Departmental managers were grateful for the ability to track their individual department’s performance and discuss with the vendor’s onsite operational manager what should be done to further improve.

### 4.7.5 Introducing and Managing Change

Given the inexistence of accurate data pertaining to inventory consumption prior to the introduction of One4all, there was increased likelihood of the sources of resistance being heightened.

The following were the mechanisms noted to help manage the change process:

- **Learning curve and ownership:** Amid the lack of an inventory log the vendor teams responsible for setting up the secure inventory cabinets first consulted with the nursing staff to determine what were the items in their view that were mostly used. As such, nurses participated actively in the process of establishing product re-order points (e.g. PAR levels) and arranging them physically within the cabinets themselves according to what they thought was their usage pattern (e.g. fast items should stay close to the main unit, whereas slow items can stay farther away). The active role solicited from nurses allowed them to take ownership of the change process during the unit initialization.
However, on the downside the following took place:

- The suggested PAR levels were found to be inappropriate and during the initial stages significant increases of stockouts took place raising concerns and providing motives for more vocal (e.g. resistant) staff to diminish the likelihood of the project’s success. On one particular occasion there was a stockout of a bandage and rather than requesting replenishment from the hospital’s general stockroom, the nurses decided “let’s go to Safeway because at least they don’t stockout on something as [basic] as a bandage!”

One could easily hold the nurses solely accountable for the incorrect PAR levels however it was noted that even though the implementations are already well under way, therefore meaning at least 6 months worth of inventory usage data, no formal process exists to optimize PAR levels other than a supply technician who, based on his assumptions or consulting with a nurse, adjusts manually the PAR levels. That said one of the hospitals visited was indeed in the process of optimizing PAR levels however the adopted methodology indicated that re-order points were being determined by simply multiplying by four the peak demand occurred in any given day during each month. Clearly, such is not the most appropriate methodology given that a product which may be used on average once a day, might have had a peak demand of 7 units, therefore triggering the stockholding of 28 units (e.g. peak usage x 4 days), which is almost a month’s worth of inventory for that item.
The suggested storage locations within the secured inventory cabinets were found not to be the most appropriate according to the usage data collected. Therefore supply technicians commonly proceed with “re-profiling” initiatives which change the storage location of items. However, if such changes are not communicated in an efficient manner they may generate frustration in the nursing staff, who in turn feel that their tracked performance may be unjustly hindered by this “re-profiling”. When enquired about “re-profiling” initiatives done upon open technology locations, respondents said that they were not much of an issue given that products moved within visual range of their original location.

- **Training**: The introduction of the secured inventory cabinets took place in a phased approach. Each hospital unit would in turn attend a training session where he or she could interact with the cabinets and retrieve candies for the purpose of illustration. Subsequently nurses were examined on their ability to interact appropriately with the machine (e.g. login, removing an item, updating stock count for an item, etc). Cabinets were then installed at the intended usage location and during the first two weeks operated with their doors open, therefore mimicking the previously available open technology inventory method. Despite this phased approach hospital departmental directors and nurses agreed that there was insufficient training to accommodate for the required learning curve.
• **Product fairs:** As information about product usage gradually became available the vendor was able to suggest opportunities to reduce the variability and cost in the item master file by identifying products that performed exactly the same function. A showcase would be organized and the relevant clinical staff would be called to attend and provide their thoughts on the suggested product exchanges (e.g. cease to use product X given that product Y is also currently used and is cheaper). Empirically product fairs were said to reduce the likelihood of resistance to change given that people felt that they were part of the decision process. Nonetheless product fairs can be a long and tedious process as was noted by a materials manager who said that it took as long as 12 months to make a decision on a glove change. As a result, decisions were sometimes forced upon the clinical staff and that was when the most resistance was felt.

• **By the numbers:** It is often noted that physicians are the most difficult individuals to accept to change their practices. There are manufacturers that follow physicians from “cradle to grave” whilst making sure that they develop a “feel” for their product that ultimately justifies continued spending even though a cheaper and similar product might exist. However, equipped with the value of information a materials management director was able to confront physicians with the variable cost associated to the exact same procedures carried out by different physicians, which was entirely due to their individual product preferences. Generally, regardless of tenure, physicians were said to show concern and curiosity towards learning why other physicians were able to perform with comparable success and at a lesser cost. Names needed not to be named as the materials
management director believed that physicians should be given the opportunity to admit learning from other physicians.

- **Crash carts**: As the name implies, crash carts are used to accommodate emergency situations when a critical item is stocked out within a given hospital function. Before the introduction of the One4all program these crash carts were said to be used almost every day at a hospital. Nowadays crash carts are no longer part of the equation and more often than not the items that are stored within them expire before being used. A similar mechanism took place during the first six months of a hospital implementation where the vendor’s distribution center nearby was said to maintain a trailer readily stocked with a complete emergency supply which in the end never left the parking lot. Nonetheless, both trailer and crash carts were said to play an important role as a “psychological safety net” during the implementation and cultural transition phases.

### 4.7.6 Lessons Learnt of “Paradigmatic Change”

The methodology opted for the introduction of change is vital to ensure the project implementation success. Care should be taken to accommodate the required learning curves from hospital organizations while promoting awareness of the overall project benefits and accepting to listen to the concerns of key individuals. Specifically, one executive noted that he does not expect to see discrepancies to go down to zero at any point in time, given that the nursing staff functions at very stressful emergency conditions at times and is bound not to be able to comply with the standard.
Ultimately two critical factors need to be considered for assessing the potential success of a One4all implementation:

- **Vendor learning curve**: It can be said that JAFKO Enterprises engaged itself in a learning curve of its own for it had not done such a wide scale implementation before. It is expected that subsequent implementations will run more smoothly, however an effort should be made to take into account the issues described above and establish a specific methodology to be shared across regional implementations and therefore avoid “re-inventing the wheel”.

- **Hospital readiness to change**: Assuming that the change agent (e.g. the vendor) has a complete understanding of the task at hand, there is still room for failure due to a hospital’s level of readiness to change.

Admittedly, organizations are complex systems with multiple arrangements comprised by different people, processes and technology. The potential for failure is even more evident when a VMI arrangement is not set in place, thereby meaning that the hospital intends to keep inventory management responsibilities and collaborate with its vendor. An intangible implication of the non VMI arrangement is that the hospital may not have the required systems in place nor the necessary level of systems integration to allow for the vendor to reach its promise. Such is a potentially dangerous implication which may be perilously disregarded amid the intent of hospitals embracing the financial benefits promised by their future single vendor partner.
In both VMI and non VMI settings, “paradigmatic change” requires the highest level of commitment from hospital leadership in order to support the vendor in the difficult process of changing the organization. In return the vendor needs to be able to clearly explain the supply chain evolution concept so that executives may understand the rationale behind it and truly believe in the long term benefits entailed by the required change. Additionally, the vendor should be able to equip executives with a list of incentives tailored to each hospital department so that they may actively participate in the building of wide organizationally buy-in for the project.

4.8 Benefits

The “bullwhip effect” is a term often mentioned when describing how the loss of supply chain coordination has its origin in the increase of order fluctuations, as they move up the supply chain from retailers, to wholesalers, to manufacturers, and finally their suppliers. Likewise, as captured in the literature review, extensive documentation has been written on how vendor managed inventory and closer vendor – client relationships are generally accepted mechanisms to successfully diminish the bullwhip effect.
Therefore, the focus of this subsection is that of describing the benefits and issues perceived by clients (e.g. hospitals), when engaging themselves in single sourced vendor relationships in the healthcare industry.

4.8.1 Visualization of results

Figure 15, on the next page, allows for a visualization of the correlation between perceived benefits and issues across the multiple functions present within hospitals. A direct correlation was found between the benefits and issues across the common functions of the studied hospitals. As such, the results visualization aggregates common functions and augments independent functions, as was the case of pharmacy and the cardiac cath lab which were not engaged in One4all simultaneously in either of the studied hospitals. A cell left blank indicates that the function representatives ultimately did not find that there was a significant correlation between either benefit or issue and their specific function.
### Figure 16: Benefits and Issues perceived by hospitals in relation to One4All

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<thead>
<tr>
<th>Benefit</th>
<th>CEO, CFO, CIO</th>
<th>Financial Controller</th>
<th>IT Director</th>
<th>Support Systems Director</th>
<th>Materials Management Director</th>
<th>Radiology Lead Technologist</th>
<th>Resource Control Director</th>
<th>Surgery and Emergency Services Director</th>
<th>Nursing Resources Director</th>
<th>Medical and Surgical Director</th>
<th>Cath Lab Manager</th>
<th>General Stores Supervisor</th>
<th>Nursing Floor Manager</th>
<th>Pharmaceutical and Clinical Director</th>
</tr>
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<tbody>
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4.8.2 Interpretation of benefits

A powerful example of the value delivered by their close partnership with JAFKO Enterprises was summarized by a hospital CEO whereby he said he to have asked a head nurse “How many nurses would I have to layoff in order to save $1.3 million in a year?” which was precisely the calculated supply chain related cost savings achieved within a year of implementation.

4.8.2.1 One4All benefits

The following is an unordered listing of benefits mentioned that were supported by examples with strong evidence of interviewee personal experience and also by collected data (e.g. financial scorecards and point of sales information) when appropriate:

- Product availability above 98% according to hospital scorecard. In both hospitals product availability was not measured in the past however there is shared consensus that product availability has increased significantly

- Product standardization has allowed for one hospital to reduce its 80,000 individual item portfolio to 23,000 items. Additionally standardization was said to be largely accountable for the verified $1.3 million reduction mentioned after the first year of operation
• **Data visibility** allows for:
  
  o Trend analysis to be carried out on consumption behavior by individual departments and physicians
  
  o Non moving items to be identified therefore enabling a better management of products that are nearing their expiry dates
  
  o Business process realignment to ensure that supply technicians perform replenishment duties before the peak period of 8AM on nursing floors
  
  o Inventory security as was the case of AAA batteries increasing fivefold in demand by Xmas time
  
  o Audit tools (see charge capture below)

• **Charge capture** improved significantly allowing for both hospitals to have a more accurate understanding key performance measures in the management of hospital performance. At one of the hospitals the following was noted after a period of 5 months:
  
  o A monthly average of 16,300 patient days and 2,800 patient discharges
  
  o The total supply expense
    
    - per patient day decreased by 8.8%
    
    - per patient discharge decreased by 8.9%
    
    - as a % of net patient revenue decreased by 2.06%
  
  o The medical / surgical / lab inventory expenses
    
    - per patient day decreased by 10.4%
    
    - per patient discharge decreased by 10.5%
    
    - as a % of net patient revenue decreased by 1.4%
• Inventory management is no longer a labor intensive task. Ability for clinical staff to focus their attention on the tasks they were trained for and avoid losing time with inventory related tasks which used to be frustrating and time consuming (e.g. as much as 4% in the Cardiac Cath Lab). Additionally, clinicians felt an increased job satisfaction, and their respective managers thought that they were better able to provide patient care.

• Systems integration spanning across multiple departments allows for prices on item masters used by individual departments to be automatically updated therefore avoiding the charging of incorrect item prices to patients.

• Private inventory stashes were said to have been reduced significantly if not completely eliminated on nursing floors.

• Availability of vendor expertise to successfully handle negotiations with specialty vendors, as was the case with orthopedic procedures which resulted in annual savings of $1 million in total. The Cardiac Cath Lab was also noted commending the vendor expertise in its ability to provide detailed cost benefit analysis supported by an intricate knowledge of the industry.

• Substitute product verification is triggered whenever placing an order, signaling if similar products close to their expiry date are in stock.
• **Purchasing department** admitted to having more time to verify contractual prices established with 3rd party vendors given that their purchasing function had been significantly simplified.

• **Physician – nurse relationships** were said to have improved as a result of product availability reducing the occasions upon which a physician would express his impatience to a nurse due to a stockout.

• **Capital equipment investments** made possible by operational cost reductions allow for physicians to consider hospital as a valued provider and are therefore willing to collaborate to bring down expenses.

• The ability to **maintain the number of Full Time Equivalents (FTEs)** at one particular hospital was found to be a benefit of reduced supply chain related costs.

• **The vendor accountability** for supply chain related tasks provides “piece of mind” to financial controllers concerned with Sarbanes Oxley.
4.8.2.2 Contractual benefits

There were other benefits noted however these were found to be specific to the contract arrangement established on an individual basis with each hospital, and not necessarily the result of changing supply chain practices:

- **Inventory buy back** allowed for one of the hospitals to virtually increase their cash reserves by $4.8 million. The buy back would be processed by not charging new inventory replenishments made to the hospital dock.

- **Consignment** was considered a step beyond the benefit entailed by the “value model” as it allowed hospital management not to concern itself with higher PAR values set in the process of hedging against stockouts. It is important to note however that some departments are space constrained and therefore would not simply stockpile on a particular item. Additionally the nature of the product (e.g. shelf life) would also constraint the stock amount to be held.

- Unlike the stockless fee structure which marked up as much as 9.25% on each individual item price, the contract agreement set in place by the vendor charges a flat annual service fee for the following 5 years. Given that the service fee is not based on the individual item, the vendor does not have an incentive to drive up the item prices.
• An FTE reduction was felt indirectly by the hospital that opted to implement a VMI arrangement with the single sourced vendor, who took on 25% of the inventory personnel originally employed by the hospital
5 Conclusions

The rising expenditures and increasing nursing shortage of the healthcare industry are of major concern to a wide range of entities who in turn continuously demand for better patient care. In the context of this research, two types of entities were specifically engaged, namely a major USA healthcare vendor and two hospitals. The two hospitals were chosen for their early move towards closer supply chain relationships with the studied vendor.

5.1 Paradigmatic Change and the Enabling “4 R’s”

Paradoxically a knowledge intensive industry as healthcare is traditionally accompanied by poor information management practices where handwritten notes, prescriptions and orders are still the norm in place at hospitals. Understandably mere “tune ups” are inadequate to address the needs of closer informational and human relationships between hospital and vendor, therefore requiring hospital leadership to embrace “Paradigmatic Change” amid their existing financially strained context. However, deciding to undergo significant change is but the first phase of a long and intricate process during which many leaders are tempted to return to the path of least resistance upon clashing with rooted cultures that favor task over process.

Nonetheless, “Paradigmatic Change” has not been more widespread solely because of hospitals but also because of the vendors themselves who are not ready to provide the necessary
commitment to partnerships. The commitment from vendors entails a breadth of integrated services which is not commonly found in the industry. Indeed there are those who establish external partnerships to attempt to provide a single offering to hospitals however those vendors were described as unable to deliver reliably true value and ultimately unsuccessful.

Unlike previous supply chain management practices (i.e. stockless) within the healthcare industry, the One4All initiative was found to be an enabler of long term value added partnerships between hospital and vendor. However, the main conclusion of this thesis is that the potential delivered derives not only from the physical and informational supply chain platform, but also and perhaps more importantly, from the intangible relationships and incentive alignment developed before, during and after signing a contract. Specifically the researched vendor and hospital relationships were found to be successful as the vendor satisfied what was described in this thesis as the “4 R’s”: the “Readiness to Change”, the “Readiness to Share”, the “Readiness to Reveal”, and the “Readiness to Respond”.

Ultimately, the One4All picked up the “missing link” attributed to the general failure of stockless in the healthcare industry. Through the implementation of Vendor Managed Inventory the studied vendor was able to meet expectations of its client hospital while further enforcing its “4 R” capability. The vendor was willing to change its own organizational culture which was initially found unsuitable to address seamlessly the needs of the client hospital. Additionally the vendor had a prompt response to whenever a complication arose and allowed for issues to be escalated to vendor senior management if need be, therefore demonstrating full commitment in its partnerships. Also, the vendor set in place revealing mechanisms which allowed for client
hospitals to gain trust in the system and progressively shift from a traditional transactional mindset towards strategic value added horizons. Lastly, the vendor set in place a “value model” which allows vendor and hospital to share the results, good or bad, of the supply chain platform therefore ironing out previously existing misaligned incentives inherently present in stockless arrangements that were prone to generating opportunistic behavior.

5.2 Recommendations

Notwithstanding the strong success of the relationships in place the conducted research also identified room for improvement and further research.

The 27 interviews conducted at the two studied hospitals demonstrated that the perception of One4All’s benefits and issues varied considerably across the different hospital functions. Indeed it is understood that some benefits only concern specific functions and therefore rightly so are not shown across the remaining functions. Also, there is a clear buy-in from the senior management of the studied hospitals as they acknowledge over 90% of the total benefits made available. However, some benefits which the vendor traditionally thought were regarded as selling points were not at all perceived as such by the relevant functions within the hospitals. Similarly, there were several issues identified, some of which commonly acknowledged across all functions and hospitals, which were unknown to the vendor’s senior management.
In light of the uncovered benefit and issue perceptions the following main recommendations are made:

- **Assessing hospital preexisting infrastructure**: Bringing a hospital up to speed through the required “paradigmatic change” can be a very costly process. The unknown status of a preexisting infrastructure at the time of signing a contract can give ample room for later mismanaged expectations. It is recommended that the vendor’s account selection processes include the status of a hospital’s preexisting infrastructure. An initial field work should be done prior to negotiations taking place so as to assess the level of effort required to bring people, process and technology together at the hospital. The result of this field work will allow the vendor to better negotiate the contract (if at all), to schedule more accurately the implementation plans, to better manage client expectations, and also to establish initial contacts vital for subsequent buy-in from key individuals at different functions within the client.

- **Coaching hospital senior leadership**: Firstly, the level of involvement from senior leadership varied at the two visited hospitals, and notably the hospital which had visible presence from both CEO and CFO was relishing stronger buy-in across the hospital. Secondly, once a hospital’s senior leadership is indeed onboard, it is recommended that the vendor equip them with the necessary knowledge on how to adapt the value proposition to each of the internal functions, therefore allowing them to become effective and successful project champions themselves.
- **Placing an effective change manager onsite:** The level of buy-in of the required changes can also be correlated to the quality of the vendor’s onsite manager. Given the different results captured and the different skill sets demonstrated by onsite vendor managers, it is recommended that the vendor only make available on site managers who are knowledgeable of the solutions in place and who also have significant business and people skills to address appropriately the needs at both senior and operational levels within hospitals. In essence, the appropriate manager onsite will be the first link available for the vendor to troubleshoot and/or realign a particular benefit offering within a specific hospital function.

- **Aligning inter divisional incentives:** The non seamless service offering made by the vendor’s different divisions was found to be mostly due to conflicting key performance indicators in place. It is therefore recommended that the vendor react accordingly and implement mechanisms such as transfer pricing and profit and loss visibility so as to strengthen its seamless and diverse offer. For instance, the incentive structure of the sales force should be tied to each account’s operational results, which are after all accounted for in the “value model”, therefore prompting them to draft better contracts and nurture the relationship still long after the contractual ink has dried.

- **Establishing template and sharing intra regional learning:** From inspection the vendor did not have in place a template on how to implement the One4All program and was therefore generally perceived as unaware of the full scale implementation resources required. Such is understandable given that the studied hospitals were early adopters of
the program and the vendor was undergoing a learning curve of its own. However, for subsequent implementations it is not sufficient to claim that each implementation is unique. A template should be devised including previously implemented One4All best practices which will be useful for training, guiding onsite vendor managers as well as enabling them with a “proof by example” toolset for triggering change, and ultimately establishing a more accurate and appropriate project timeline.

- **Implementing targeted training sessions:** Any training should not be provided solely upon initialization of a given process. Information is available pertaining to the compliancy rate of individual departments, and it should be used to signal specific departments and/or individuals that require further training sessions on how to use the secured inventory cabinets in place.

All in all, a significant opportunity was identified for vendors to differentiate themselves not only in terms of their product and supply chain offerings, but also in terms of a newfound change management capability that would enable hospitals to reap exponential partnership benefits within shorter timeframes and at a lesser cost.
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# Glossary

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## Interview Schedules

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<td>Nursing Staff</td>
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<td>California Hospital</td>
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<tr>
<td>CIO</td>
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<tr>
<td>Director, Materials Management</td>
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<td>Director, Pharmacy</td>
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<tr>
<td>Clinical Director, Cardiac Cath Lab</td>
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<tr>
<td>Director, Radiology</td>
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<td>Pharmacy Buyer</td>
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<td>Pharmacy Supply Tech</td>
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<tr>
<td>Manager, <em>trademark</em> secure cabinet system</td>
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