Improving Activities of Logistics Departments in Hospitals: A Comparison of French and U.S. Hospitals

Olivier Aptel*
Michèle Pomberg**
Hamid Pourjalali**

Abstract

The first objective of the paper is to examine the current status of logistics activities in hospitals in both countries. The second objective is to find out whether the perceived and actual environmental (including regulatory) changes resulted in planned and actual changes in logistics activities. This research extends prior research that compared hospital logistics functions in France and the U.S. in 1998 and discusses reasons for observed differences.

In general, French hospitals reported more success in implementing advanced logistics functions than their U.S. counterparts. U.S. hospitals entered into outsourcing of their logistics functions more often than the French hospitals. We attribute these differences to changes in financing and regulations in the French healthcare industry. We did not find significant changes in financing and regulations in the U.S. healthcare industry.

The results also provides evidence that in response to environmental and regulatory changes, French hospitals reduced supplies inventory levels to a larger extent than did their counterparts in the United States.

Keywords

Strategic Alliance
Horizontal and Vertical Logistics
Outsourcing
Partnerships
Medical Collaboration
French - USA Hospitals

*ESC Rennes School of Business, France
**University of Hawaii, Manoa, USA

Introduction

Economic and political factors have led to increased attention to health care issues, perhaps mainly because of the rapid growth of health care costs in both private and public sectors. The aging of the population, the increasing demand for health care services, the rising cost of inpatient and outpatient care, professional shortages, new technology, and new drugs will continue to drive up the total cost of both inpatient and outpatient health care. Before the introduction of diagnosis-related groups (DRGs) in 1983 in the U.S.—and 1986 in France—hospitals focused mainly on revenue maximisation rather than cost control. With DRGs, patients are charged a flat fee based on the diagnosis. The flat fee varies based on the relative amount of treatment service and the number of procedures required for each diagnosis. Under the DRG system, hospitals are reimbursed based on the type of service provided; therefore, with its introduction, hospitals shifted their attention towards cost control to improve their financial well being (profitability). Control of logistics activities, considered a major part of hospital costs, can affect the cost structure of healthcare organisations. More than 30 percent of hospital expenses are related to logistics activities, and increased efficiency in those activities, therefore, can significantly reduce hospital costs.

France and the U.S. have different social and economic systems; thus their healthcare systems, and consequently their logistics practices, may be different. The objective of this study is to provide insights into hospitals' logistics functions in France and the United States in an attempt to explain how changes in financing and regulations influenced logistics

We wish to thank two anonymous reviewers of the *Journal of Applied Management Accounting Research* for their comments and Ms. Melissa Archpru Akaka, Ms. Erin Eno, and Ms. Laura Brashier for their help in collecting data from U.S. hospitals. We also thank Dr. Leslie Eldenburg and Ms. Frances Griffin for their constructive comments on an earlier version of this manuscript. An earlier version of this paper was presented at an EAA annual meeting and the current version has benefited from comments obtained during that presentation.

functions. In a previous study, Aptel and Pourjalali (2001) reported that managers of logistics departments in the U.S. and France intended to improve their logistics to advance efficiency and reduce costs. The current study extends that study to examine whether these efforts were successful and if so, how. We study the movement in logistics functions from 1998 to 2005 in both countries and offer a basis for the differences observed between the two countries. We also examine the current status of the logistics activities in hospitals in both countries and determine whether perceived and actual environmental changes (i.e., changes in financing and regulations) resulted in planned and actual changes in logistics activities. It is expected that the level of change will be higher for French hospitals, as they had indicated a greater desire to use more advanced management and accounting information systems (Aptel and Pourjalali, 2001). Furthermore, the French healthcare system has been subject to more regulation during the last decade than the U.S. healthcare system.

In the next section the healthcare industry in France and the U.S. is compared to explain our expectations for the differences in logistics functions. Next, we provide an overview of current managerial issues in healthcare and hospital systems. This overview also includes some background on how hospitals have attempted to control costs, specifically, a brief description of activity-based management (costing), just-in-time (JIT), outsourcing, and evidence-based management/evidence-based best practice (EBBP). The sample selection and data collection then detailed, which is followed by an analysis of the data. The final section is the summary and conclusions of the study.

The French and U.S. Healthcare Industries: A Comparison

Both the French and the U.S. healthcare systems face many challenges. Among these challenges is the difficulty of coping with rapidly increasing healthcare expenditures. A growing elderly population and more expensive medical treatments and technologies will continue to influence public spending priorities in both countries. In the U.S, the federal government has been dealing with a growing number of Americans without medical insurance.[1] In France, insufficient resources have led to changes in healthcare delivery and strikes by medical doctors and others, while increases in health care costs have led to larger budget deficits.

Healthcare Costs

In both France and the U.S., health expenditures have tripled since 1960. Despite U.S. citizens' limited access to coverage, the United States spends far more on its health care system than any other country. In 2005, approximately 2 trillion dollars or $6,401 per person was spent on health care by the USA; and as a share of GDP, healthcare spending grew to 15.3 % in that year. Hospital spending, the largest share of national health expenditures, accounted for 31% of total health care costs.[2] However, the healthcare spending growth decelerated for the third year in 2005. The slowdown is attributed to a weaker growth in prescription drug spending.[3] In recent years, the U.S. hospitals have also faced a shortage of doctors, nurses, and medical technicians.

In France, hospital funding continues to be subject to macroeconomic regulation. National financial targets are set to control overall spending. In 1997, parliament voted for an annual national health insurance spending objective (ONDAM) with financial targets that would limit the health care spending (Bellanger and Tardif, 2006). Under the Social Security Act of 2003, which became effective in 2005, these financial targets were based on ownership of the hospitals: public or private (for profit). French healthcare expenditures were 11.1% of the country's GDP and France

[1] President Barack Obama's effort in 2009 to change the US Health Care system specifically targets this problem.

[2] Data from OECD Health Division, June 2007, http://www.oecd.org/dataoecd/46/36/38979632.xls, accessed 9/20/07.

[3] Source: Centers of Medicare and Medicaid Services - Office of the Actuary: Data from the National Health Statistics Group, NHE summary including share of GDP, 1960-2005, http://www.cms.hhs.gov/NationalHealthExpendData/02_NationalHealthAccountsHistorical.asp, accessed 11/20/2007.

was ranked the third in healthcare spending among all OECD countries in 2005.[3] Studies by the French Ministry of Health have shown that healthcare costs varied widely among French hospitals. These differences are attributed to regional differences.

Differences in Providing and Financing Healthcare

The U.S. government plays a much smaller role in the healthcare sector than does the government in France. Privately-owned hospitals dominate the U.S. market, with a market share of approximately 60% of the market for all hospitals. State and local hospitals only account for 22% of the U.S. hospital market.[4] Thus, researchers usually use micro-economic theories to analyse the U.S. healthcare sector. For example, several studies have found that physicians and hospital administrators in the U.S. respond to economic incentives in a rational manner and there is growing evidence that agency theory explains the choice of compensation contracts in healthcare organisations (e.g., Brickley and Van Horne, 2002).

In the U.S., the health care system is financed by employee/employer insurance, Medicare and Medicaid for the elderly and some of the poor, and the Veterans' Administration for the military. The system leaves many citizens underinsured and around 45 million without healthcare insurance. The U.S. Federal Government reimburses approximately 33% of all healthcare expenditures, mainly through Medicare—the health insurance program for individuals over age 65—and through Medicaid—a program for disadvantaged individuals.[5] Federal, state, and local government funding together cover about half of all healthcare expenditures. In comparison, France has a universal and tax-financed healthcare system.

The system is based on the principle of solidarity and ensures access to care on the basis of need. The Statutory Health Insurance system as a branch of the general social security system is responsible for the financial management of health care. A total of 35% of healthcare finance comes from general taxation (Maynard, 2005). France's social insurance system is mainly free for consumers at the time of use and covers the country's entire population. About one third of all French hospitals are private not-for-profit hospitals, which enjoyed their own reimbursement system until 2005. Doctors working in these private hospitals were and still are paid directly on a separate fee-for-service basis comparable to their colleagues in ambulatory care. Healthcare costs show large disparities in the different regions, reflective of historical negotiation processes. The remaining two-thirds of French hospitals (beds) belong to the public sector.

New Developments in Healthcare Delivery and Finance

Given the significance of healthcare costs and the public interest in it, during the last decade the delivery, financing, and accountability in healthcare systems have been subject to ongoing debates and changes in both France and the U.S.[6] However the level of regulatory changes has been less extensive in the U.S. when compared to France. During the period of our study, 1997-2005, the most important change in the U.S. healthcare system was the passage of the Balanced Budget Act of 1997 that adjusted Medicare and expanded the prospective payment system to nursing home, home health care agencies, and hospice agencies. The Patients' Bill of Rights (1998) was passed by the U.S. House of Representatives but failed in the U.S. Senate. The next important legislative act was in 2003 when Medicare Prescription Drug Benefit Program became law.

[4] Source: American Hospital Association website: http://www.aha.org/aha/resource-center/Statistics-and-Studies/fast-facts.html, accessed 9/20/2007.

[5] Source: Medicare and Medicaid website: approximately one third of the population is covered by Medicare and Medicaid http://www.cms.hhs.gov/MedicareProgramRatesStats/downloads/MedicareMedicaidSummaries2005.pdf, accessed 11/20/2007.

[6] Since these changes impose costs on healthcare institutions, identification of their impact on the quality of care provided and developing strategies to contain those costs are very important for hospitals (Finkler and Ward, 2003).

During the same period, French healthcare witnessed substantial changes in both health care delivery and regulations. In this period, French healthcare was marked by the phenomenon of hospital restructuring. About two-thirds of hospitals (60%) were involved in some sort of restructuring operations and about one-fifth of the hospitals (20%) experienced more than one restructuring of their operations. These restructuring activities took place both within healthcare units and across multiple healthcare units. Examples of restructuring within a healthcare unit were closure of hospital segment(s), reductions in segment(s) capacity, conversion of capacity, and even closure of the healthcare unit. Examples of restructuring across multiple healthcare units were merger, partnership, and consolidation of services. More than 700 healthcare institutions in France were subject to these restructuring activities. For example in the field of obstetrics, the consolidation of services resulted in closures of over 120 maternity services.

Most of these changes were necessary, as the source of funding for French hospitals changed during this period. To control the growth of expenditures and to avoid wasting resources, France has emphasised the role of co-payments, introducing significant user charges for patients. To improve efficiency, France has introduced hospital payment systems based on diagnosis-related groups (DRGs) where the payment unit is the hospital stay. When the first list of French DRGs was published in 1986, the prospective payment system (PPS) covered on average 10% of the treatment cost of acute hospital care. This percentage was intended to increase to 50% by 2007 and to 100% by 2012. Normally, a transition arrangement allows for the full implementation of the new system over the medium and long term (e.g., Bellanger and Tardif, 2006). Since 2005, the system has been successful in for-profit, private hospitals that are entirely funded by the PPS[7] and are paid for their actual activity. A transition arrangement has also allowed the harmonisation of all hospital charges by 2012 using an average cost per DRG; therefore each DRG will have a nationally defined price. Schreyögg, et al. (2006) show that decisions on spending are made after hospitals consider the price (or reimbursement rates) of their services. Given that reimbursement methods are different among countries, different needs for costing information and spending are also expected among countries. The quality of the managerial/cost accounting system is an extremely important factor in determining prices, along with costs, in hospitals. The following section provides more detailed coverage of managerial and cost accounting issues in the healthcare industry.

[7] The PPS system assumes that the price does not vary from hospital to hospital. But hospitals have different structures and patients differ in their characteristics. Therefore, experts are considering the introduction of a generalised adjustment coefficient and price variations for patients with specific treatments to increase incentives for hospitals to improve efficiency.

Current Managerial (Cost) Issues in the Healthcare Industry

In the last two decades, governments in many countries have tried to control increases in healthcare costs by changes in healthcare policies and regulations, such as adjustments to payment systems. The prospective payment system (PPS) has widely influenced internal management and management accounting systems in health care institutions. For example, Hill (2000) reports that many U.S. hospitals without an appropriate management system found it necessary to adopt a cost system after the introduction of PPS by Medicare. In general, health care institutions can be motivated to change their management and accounting systems if the external situation demands it.

Before DRGs were introduced, when the U.S. and France had a cost-plus reimbursement system, hospitals were able to increase their profitability by increasing the number of patients treated or increasing the amount of treatment per patient. Competition among hospitals was based on quality, which led to offering more advanced technology, better facilities, and more extensive services to attract more patients. The more intense the competition, the higher the level of services provided (Keeler, et al. 1999). This quality competition lowered the demand for information related to cost control (Krishnan, 2005). To improve hospitals' incentives to control costs, the federal government changed

the reimbursement structure from a cost-plus to a fixed-price system. The risk of high costs was shifted from third-party payers to hospitals and physicians. In essence, the fixed-price regulation shifted the basis of competition in the hospital market from quality to price (Dranove et. al., 1988) and increased the demand for cost reduction.

In 2001, large European hospitals spent, on average, around 33% of their budgets on logistics and supply chain activities. Results from a survey of the Institute Superieu de Logistique Industrielle (ISLI) in Bordeaux found that it cost one French hospital around 120 million Euros to operate its supply chain (Tierney, 2007). This amount suggests the presence of significant economic incentives to increase efficiency and decrease costs in supply chains. Hospitals have used activity-based management (costing), just-in-time (JIT), outsourcing, and more recently evidence-based management/evidence-based best practice (EBBP) to reduce costs.

In 1997, approximately 22% of all U.S. hospitals were using an activity-based management/costing (ABC) system (West and West, 1997). Because activity-based costing has achieved a position of some prominence as a process improvement technique for managers in the healthcare industry, one could assume that it is widely used in by now. But more current research shows that this is not the case (e.g., Lawson, 2004). Other studies found that ABC as a management tool does not produce more accurate cost estimations than other conventional techniques of cost allocation (Armstrong, 2002). Other techniques (such as budgeting, benchmarking, and strategic planning) are used more often in healthcare organisations. Since hospitals are much more complex than other healthcare providers and thus have a greater implementation cost, the results are not surprising. Given the findings of prior research, we have not included survey questions about activity-based management/costing in our study.

One of the most expensive items for hospitals is the cost of medical supplies. Consequently, healthcare is a perfect industry in which to apply elements of the just-in-time (JIT) system. In the JIT approach, a product or service is supplied just when it is needed and in the exact quantity needed. Material management and pharmaceuticals are the most likely areas where JIT can be adopted in the healthcare sector, but another important area is in the workforce: many organisations have tried to solve their staffing issues with the JIT technique. Hospitals have, for example, redesigned their nursing units according to the concept of patient-focused care, which includes the use of workers with multiple skills. Numerous hospitals are using external staffing companies extensively, dealing with as many as 20 to 30 different staffing companies or vendors (Shaffer, 2007). Our study specifically measures this aspect of managerial cost control in French and U.S. hospitals.

Another method of cost reduction is outsourcing. Outsourcing can improve efficiency and consequently reduce costs. With advances in the Internet and other technologies, economic entities can easily use contractors in countries where labour is less expensive. As hospitals are heavily labour intensive, accounts receivables and accounts payable departments and other less technical areas with a large number of employees can be easily outsourced. Because salary expenses are considered hospitals' largest expense,[8] the healthcare industry may benefit from outsourcing at a much higher rate than most other industries.

Kane (2007) reports the three most common models of outsourcing: complete outsourcing; an in-house model, where control for managing the supply chain stays within the hospital; and a hybrid model, which is a combination of both. Generally, financially healthy hospitals have more opportunities to keep their supply chain in-house or work with the hybrid model, whereas financially troubled hospitals are better off with the complete outsourcing model. The healthcare function that is most commonly outsourced (Shinkman, 2000) is information technology (29%), followed by finance (20%), and support services (19%). Outsourcing information technology functions, for example, has long been seen as having high potential for cost savings: the health care industry is an IT

[8] In recent years, however, the cost of supplies has been increasing by a larger percentage than the cost of labour.

intensive industry and regulatory mandates have resulted in increased standardisation of transaction processing, security, and privacy information. Outsourcing IT functions in health care exceeded 2 billion dollars annually in 2005 (Ciotti and Pagnotta, 2005).

Other changes, some as a result of cost reduction efforts, have also been implemented. For example, during the 1997-2005 period, the French health care system witnessed a number of structural changes such as substantial increases in the number of hospital closings, horizontal mergers, and vertical combinations. A more recent change is in the area of evidence-based management/evidence-based best practice (EBBP).

Evidence-based management is a decision-making tool in which information that decision-makers rely on is based on evidence related to the operation.[9] More recently, health care managers have attempted to use evidence-based management for cost containment and control. Generally, however, the problem of using evidence-based management is the lack of "evidence" of its success. That is, researchers and practitioners have not been able to determine whether observed attempts at cost control and containment in hospitals have resulted from the evidence-based management strategy or from other strategies.

Sample Selection and Data Collection

In their 2001 study (based on data collected in 1998), Aptel and Pourjalali compared responses from French and U.S. hospitals to a questionnaire[10] about their logistics functions. The questionnaire was written in English, translated to French, and finally translated back to English to make sure that the French and English questions carried the same meaning. In the current study, we used the same questionnaire (with very small adjustments in response to changes in time) to create the opportunity to compare the results of our survey in 1998 to those in 2005. We used the same methodology to obtain information as in our prior study. That is, we limited our comparison to hospitals located in France and in the U.S. and we used the same (or a similar) database to obtain the names and addresses for hospitals. However, in our first study, we limited our sample of U.S. hospitals to California. In 2005, using the American Hospital Association's Annual Directory, we sent surveys to all hospitals in California, Washington, and Hawaii (west coast states); New York (on the east coast); and Texas (a large southern state). We selected these states based on their large numbers of hospitals and the degree of information available for each hospital (e.g. address, size, operation, and financial information), in order to have a more diverse representation of hospitals in the U.S.[11] Hospitals in Hawaii (a total of seven) were included because of the ease of access to the management of these hospitals in case we needed in-person interviews. Similar to 1998, we sent survey questionnaires to all French hospitals based on the list provided by the Health and Social Affairs Ministry. We excluded French cliniques from our sample because these private units are small and their operation is very different from a hospital, making comparison between them and hospitals difficult.

A total of 1320 questionnaires were sent to U.S. hospitals and 678 to French hospitals. We received 182 (55) responses from U.S. (French) hospitals. Table 1 presents information about the sizes of the sample hospitals in both countries. In the U.S., we observe a wide spread—with more responses from medium-sized hospitals (hospitals with 50 to 300 beds). However, large hospitals were more responsive to our questionnaire in France. French respondents had an average size of 887 beds (the smallest respondent had 90 beds) while American respondents had an average

[9] Evidence-based practice has profound implications because what is designated as "evidence-based" may determine what treatment is conducted, what is taught, and what is funded. However, the terminology does not carry similar meanings for different individuals and organisations. For example, the Institute of Medicine defines evidence-based practice as "the integration of the best research evidence with clinical expertise and patient values." The American Psychological Association defines evidence-based practice as "the integration of the best available research evidence with clinical expertise in the context of patient characteristics, culture, and preferences".

[10] The survey questionnaire is in Appendix 1.

[11] Data availability provided the opportunity to extend our research to other areas.

size of 225 beds (the smallest respondent had 16 beds). The sizes of the sample hospitals are very similar to those from our survey in 1998. To make our data comparable across time, the U.S. results are divided into only-California respondents and other-than-California respondents; however, most of the data comparisons did not show statistically significant differences. The only-California sample had an average size of 260 beds (compared to 250 beds in 1998). Excluding cliniques from the 1998 French sample gave us a population similar to our 2005 sample: in 1998, 80 respondents had an average size of 594 beds with 58 beds for the smallest respondent.

Table 1: Number/percentage of Respondents by Hospital Size

Panel A: The number of respondents by hospital size

Hospital Size (Number of beds)	6-24	25-49	50-99	100-199	200-299	300-399	400-499	500+	Total
U.S. sample	6	34	37	40	25	18	7	15	182
California sample	0	7	14	16	10	10	4	6	67
France sample	0	0	2	8	4	6	4	31	55

Panel B: Percentage of respondents by hospital size

Hospital Size (Number of beds)	6-24	25-49	50-99	100-199	200-299	300-399	400-499	500+	Total
U.S. sample	3.30%	18.68%	20.33%	21.98%	13.74%	9.89%	3.85%	8.24%	100%
California sample	0.00%	10.45%	20.90%	23.88%	14.93%	14.93%	5.97%	8.96%	100%
France sample	0.00%	0.00%	3.64%	14.55%	7.27%	10.91%	7.27%	56.36%	100%

Note: *While all French and Californian respondents included the size of their hospitals, eleven (11) U.S. respondents did not answer this question.*

Data Analysis

Most healthcare research suggests that differences and changes in healthcare systems are related to differences and changes in social and economic systems. Consequently, we anticipate that differences and changes in social and economic systems in the U.S. and France may influence each country's healthcare systems and consequently hospitals' logistics practices.

Given that the changes in France were more pronounced than those of the U.S. between 1998 and 2005, we can expect that changes in hospitals' logistics practices were also more significant than those in the U.S. hospitals. In addition, French hospitals had indicated a stronger desire than U.S. hospitals to use more advanced management and accounting information systems (Aptel and Pourjalali, 2001).

The current study extends Aptel and Pourjalali (2001) to examine whether, and if so to what degree, efforts reported in 1998 by logistics departments were successful. We examine the current status of the logistics activities in hospitals in France and the United States and determine whether the perceived and actual environmental changes resulted in planned and actual changes in logistics activities.

This study also reports how hospitals have tried to implement and extend known managerial (accounting) systems to reduce costs and/or to improve efficiencies.

To facilitate reporting, we have divided our results into three parts. First, we will compare the responsibilities and the reported changes in responsibilities of the logistics departments in France and the U.S. Then, we discuss "medical supplies" in a separate section, as they represent significant costs for hospitals, followed by our report on different aspects of

strategic alliances including a short discussion on outsourcing.

Responsibilities of Logistics Departments

Almost all U.S hospitals[12] reported having a logistics department. The main responsibility of the logistics department was reported as being direct support of inventory (purchasing, supplying, receiving, inventory control, and internal distribution). Other functions of logistics departments were also reported, but were not considered as important. While the direct support function of logistics departments declined from 1998 to 2005, the indirect support function declined even more.

For example, the results in 2005 show a 19% reduction compared to 1998 in having management information systems (MIS) as a part of logistics departments. One possible explanation is that MIS functions are more and more incorporated within other functional areas or are increasingly outsourced. Our results suggest the latter.

Approximately 82% of the French respondents reported having a logistics department, a substantial increase compared to the 3l.4% reported in 1998. This increase is in line with what was perceived as necessary by French hospitals in 1998, i.e. creation of specific logistics departments in hospitals. Among the options provided, the respondents reported that the main logistics functions were in linen service (89.9%), food service (88.9%), receiving (82.17%), supplying (83.19%), purchasing (81.27%), internal distribution to medical departments (73.62%), and inventory management (69.79%).

Similar to 1998, the logistics departments in France are responsible for both direct and indirect support services. Linen and food services remain their most important responsibility. Overall, the responsibilities reported in 2005 were very similar to those reported in 1998. The major differences were related to “inventory management,” “maintenance service,” and “telemedicine,” which were lower in 2005.

Based on these results, French hospitals have not increased outsourcing of their management information systems, having reported the same level of responsibility as in 1998.[13] The high increase in the home medical care function in 2005[14] can be explained by a recent requirement that French hospitals increase this service. Telemedicine, with the steepest decline in logistics responsibilities rankings,[15] is not considered a very important part of the logistics department. Table 2 provides a comparison of responsibilities given to logistics services in the U.S. and France in 1998 and 2005.

Medical Supplies

Compared to our data in 1998, the value of inventory kept per bed in the U.S. hospitals has increased by an average of 14%.[16] This increase could be the result of an increase in the level of supplies, increases in the cost of medical supplies, or both.[17] There is no question that the cost of medical supplies has increased over the years, 5.2% in 2007 based on the consumer price index summary[18].

One other reason for the increase in the cost of inventory per bed is the decrease in the number of beds in our 2005 sample. Smaller hospitals in this sample have a much higher average inventory level per bed than larger hospitals.

[12] 97.93% (98.6% in 1998) reported the existence of a logistics department.

[13] 44.14% reported MIS as the responsibility of a logistics department in 1998

[14] A 70.2% increase in 2005 compared to 1998.

[15] Telemedicine decreased by 61%.

[16] Average costs were $4,000 per bed in 1998 which corresponds to $4,793 in constant dollars in 2005

[17] Interestingly, respondents (on average) believed that the level of inventory had remained the same for the previous five years. This may indicate that, opposite to their suggested “need for decrease in inventory,” they do not find a decrease in the level of inventory appropriate and/or necessary.

[18] Consumer Price Index Summary, http://www.bls.gov/news.release/cpi.nr0.htm, accessed 1/20/2008.

Table 2: A Comparison of Responsibilities Given to Logistics Services in the U.S. and France

Panel A: 1998

RESPONSIBILITY	UNITED STATES	FRANCE
+	Receiving	Food services
	Internal distribution to medical departments	Laundry
	Purchasing	Physical supplying
	Inventory management	Receiving
	Physical supplying	Inventory management
	Laundry	Purchasing
	Management Information system	Internal distribution to medical departments
	Transportation	Transportation
	Maintenance/environmental services	Maintenance/environmental services
	Home care services	Management Information systems
	Food services	Home care services
-	Telemedicine	Telemedicine

Panel B: 2005

RESPONSIBILITY	UNITED STATES	FRANCE
+	Receiving	Food services
	Internal distribution to medical departments	Laundry
	Physical supplying	Physical supplying
	Purchasing	Purchasing
	Inventory management	Receiving
	Management Information system	Internal distribution to medical departments
	Linen service	Transportation
	Transportation	Inventory management
	Maintenance/environmental services	Management information system
	Food services	Maintenance/environmental services
	Home care services	Home care services
-	Telemedicine	Telemedicine

The average dollar value of inventory kept per bed in French hospitals is approximately $2,300,[19] a drastic decrease since 1998 and significantly different (lower) from that of the U.S. Several reasons can contribute to this difference. For example, it is possible that the cost of medical supplies is lower in Europe than in the U.S.; however this reason cannot explain the fact that the amount of medical supplies in French hospitals was higher than that in the U.S. in the 1998 survey. Another reason may be that French hospitals are typically larger than their U.S. counterparts and in general, larger hospitals are more efficient in handling their supplies. However, the only plausible explanation for the strong decrease in inventory is improvement in the management of inventory in French hospitals; hospitals in France seem to have been able to

[19] Inventory decreased from 35,717 French Francs in 1998 to 12,513 FF or 1,908 Euro in 2005

manage their supplies very effectively. It is likely that the urgency in reducing costs in French hospitals in the early 2000s was a significant factor in the reduction of their medical supplies inventories. More French respondents (92.6%) continue to suggest that they need to decrease their inventories than do U.S. respondents (74.3%). They also see more need to improve relationships with their suppliers and create new partnerships than do U.S. respondents (95.7% versus 76% and 91.2% versus 71.7% respectively).

Medical supplies are purchased and distributed differently in the two countries. The inventory system in U.S. hospitals is closer to a just-in-time system, while French hospitals prefer to use central warehouses.

Another noteworthy comparison is responses to two questions addressing whether "inventory has been reduced" and whether "the number of suppliers has been reduced." The following comparison indicates the change in the perception of managers of logistics departments in the U.S. and French hospitals from 1998 to 2005. It is very clear that the French hospitals are increasing their attention to medical supplies management.

A substantial majority of U.S. respondents indicated a need to continue to decrease their inventory by improving their relationships with their suppliers, by decreasing the number of suppliers, and by finding new partnerships. However, the degree of need to decrease the number of suppliers was more significant in the 1998 responses. Stated differently, U.S. hospitals in 2005 seemed to be more satisfied with the number of suppliers, compared to 1998.

The largest reported need was in improvement in relationships with the suppliers. There is a high level of awareness with respect to improving the distribution system in France. The majority of French respondents report a need to further decrease their medical supplies.

They also believe the creation of new partnerships is a very important method for improving their distribution system and reducing inventory levels.

Table 3: Changes in Perceptions in USA and French Hospitals

Question/ Percentage of Respondents	**U.S.A.**		**France**	
	1998	*2005*	*1998*	*2005*
Inventory has been reduced	83%	66%	46%	71%
Number of suppliers has been reduced	68%	70%	18%	81%

Comparative Analysis using Indices and Outsourcing

Similar to Aptel and Pourjalali (2001), we developed three indices: "Maturity of Logistics," "Current Partnership," and "Anticipated Partnership." The first two indices report the respondents' beliefs about their current status in logistics functions and in partnerships. The last index provides information on their expected future partnerships. Below is more detailed information about these indices.

The *Maturity of Logistics* index is defined as the sum of the following items:

1. **Extent of logistics department responsibility.** Answers to question number 2 (related to logistics department responsibilities) are aggregated and averaged.
2. **The perception of logistics managers on how to improve distribution systems.** Answers to question 4 are aggregated and averaged.
3. **The extent of logistics department improvement** during the last three years by reduction of medical supplies and number of suppliers. Answers to questions 7 and 8 are aggregated and averaged.

The *Current Partnership* index is defined as the sum of the following elements:

1. **Medical Collaboration** *for Current partnership Index***.** An aggregate measure of collaboration in medical departments, medical staff, and telemedicine (the first three parts of question 10).

2. **Collaboration on infrastructure** *for Current Partnership Index***.** An aggregate measure of collaboration in laundry sharing, food services, and warehouse sharing (the last three parts of question 10).
3. **Logistics Collaboration** *for Current Partnership Index***.** An aggregate measure of collaboration in purchasing (part four of question 10), just-in-time programs, stockless programs, EDI, and supplier certification (question 11).

The definitions of the *Anticipated Partnership* index and the Current Partnership index are very similar. Answers to question 14, which are related to the hospital's plans for the next five years, are used to calculate the related values.

1. **Medical Collaboration** *for Anticipated Partnership Index***.** An aggregate measure of collaboration in medical departments, medical staff, and telemedicine (question 14).
2. **Collaboration on infrastructure** *for Anticipated Partnership Index.* An aggregate measure of collaboration in purchasing, laundry sharing, food services, and warehouse sharing (question 14).
3. **Logistics Collaboration** *for Anticipated Partnership Index***.** An aggregate measure of collaboration in purchasing, just-in-time programs, stockless programs, EDI, and supplier certification (question 14).

Table 4 provides the values for these indices for French and U.S. hospitals for years 1998 and 2005. In 1998, U.S. hospitals reported much higher Maturity of Logistics and Partnership indices, whereas French respondents reported a much higher expected degree of partnerships for the future.

The data from 2005 show that the French were successful in attaining this objective, as the Maturity of Logistics and Partnership functions increased substantially and are now higher in French hospitals than in the U.S.

French hospitals continued to show a higher Anticipated Partnership index in 2005 compared to their U.S. counterparts, suggesting that they intend to continue to improve their logistics activities at a faster pace than do the U.S. hospitals. The extent of logistics department responsibilities in French hospitals has also increased substantially (1.34 in 1998 and 3.44 in 2005). This increase suggests that logistics departments and functions are becoming more centralised in France. This finding is in line with the increase in the reported number of logistics departments. Figure 1 compares these relationships between French and U.S. hospitals in 2005.

U.S. hospitals reported outsourcing as one of the significant methods of collaboration in 2005. Similar to other businesses in the U.S., hospitals have entered more and more into outsourcing their operations. Table 5, Panel A compares the reported averages for outsourcing activities in the U.S. hospitals in 1998 and 2005. As the table indicates, the level of outsourcing increased significantly over the 7-year reporting period. It is possible that outsourcing has now become a common practice in U.S hospitals.

Outsourcing in French hospitals is not as important as it is in U.S hospitals. Table 5, Panel B compares the reported averages for outsourcing activities in French hospitals in 1998 and 2005. As the table indicates, the level of outsourcing in France decreased over the 7-year reporting period. Laundry service is the only service which is still subcontracted (27.5%). It is possible that improvement in some aspects of the logistics function did not take place as those areas were outsourced in the U.S.

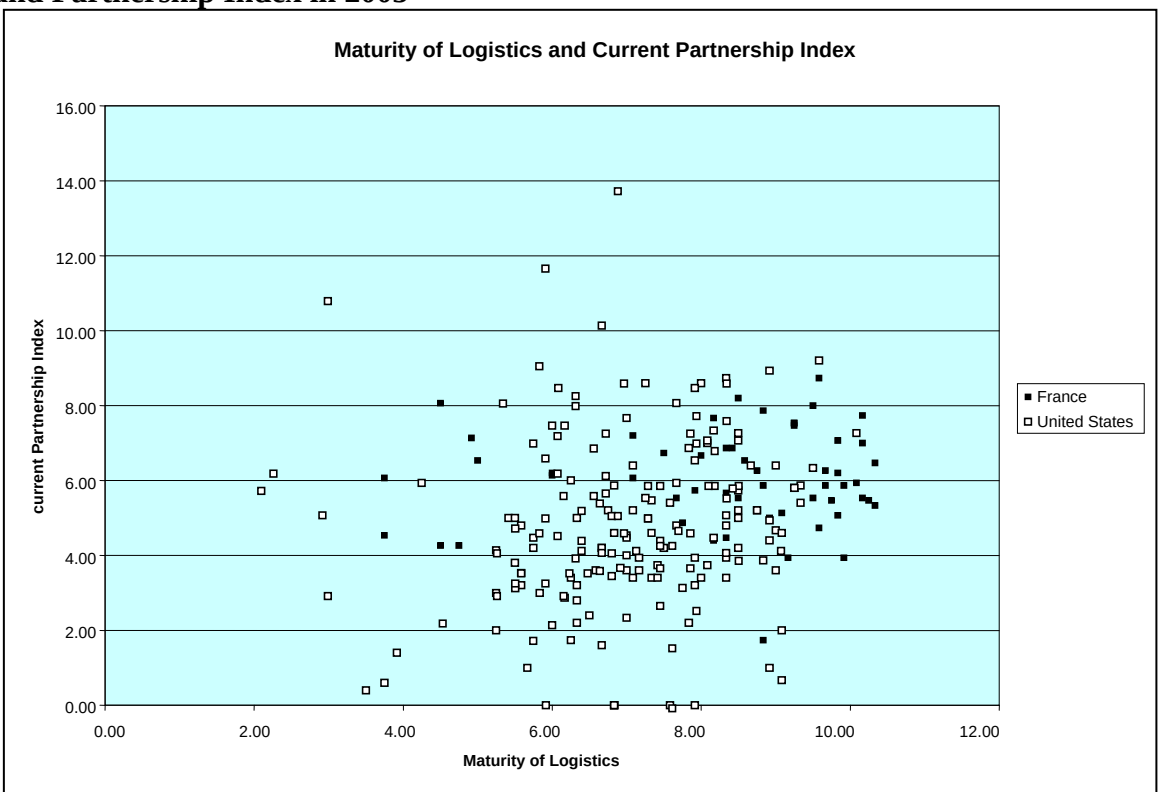
In summary, our comparative findings summarised in the form of indices provide further evidence that French hospitals have been able to improve their logistics functions more significantly and intend to improve these functions even more than their U.S. counterparts in the future.

These results are consistent with our proposition that French hospitals chose to select managerial methods that helped the reduce costs since they were subject to higher levels of economic (and regulatory) changes compare to the U.S. hospitals.

Table 4: Comparison of the Aggregate Values for Indices for U.S. and French Respondents, 1998-2005

	France		US	
	1998	*2005*	*1998*	*2005*
Maturity of Logistics:	**5.93**	**8.32**	**8.27**	**7.06**
Extent of logistics department responsibility	1.34	3.44	3.34	2.97
Logistics managers' perception of how to improve distribution system	2.44	2.6	2.26	2.14
Extent of logistics department improvement	2.06	2.27	2.67	1.96
Current Partnership Index:	**5.25**	**6.06**	**5.4**	**4.82**
Medical collaboration	1.56	1.79	1.72	1.43
Collaboration on Infrastructure	1.55	1.84	1.26	1.41
Logistics collaboration	2.14	2.43	2.43	1.99
Anticipated Partnership Index:	**5.95**	**6.47**	**4.82**	**3.92**
Medical collaboration	2.21	2.28	1.45	1.21
Collaboration on Infrastructure	1.53	1.82	1.39	1.17
Logistics collaboration	2.21	2.36	1.98	1.54

Figure 1: Comparison of Relationship between French and U.S. Maturity of Logistics and Partnership Index in 2005



Note: Figure shows a higher French Maturity and Partnership index in 2005 compared to the U.S.

Table 5: Reported Outsourcing

Panel A: The U.S.

Activities	Averages 1998 %	Averages 2005 %
Linen	26.0	57.4
Food	6.3	23.8
Warehousing	8.6	4.4
Transportation	7.3	16.1
Information system	5.5	10.9

Panel B: France

Activities	Averages 1998 %	Averages 2005 %
Linen Service	38.2	27.5
Food	12.2	10.6
Warehouse	2.6	4.9
Transportation	32.6	18.5
Information System	24.5	13.8

Reported in percentage terms, in response to "What part of the following hospital activities are outsourced?"

Summary and Conclusion

The objective of this study was to present insights into hospitals' logistics functions and to show how the logistics functions have changed in response to economic and regulatory changes in France and the United States from 1998 to 2005. Using the results of a 1998 survey questionnaire, Aptel and Pourjalali (2001) reported that managers of logistics departments in the U.S. and France intended to improve their logistics to increase efficiency and reduce costs.

The current study examined whether these reported efforts were successful. Table 6 contains a summary of responses with respect to: (1) how medical supplies activities were currently handled; (2) how the management of medical supplies had improved during the previous 7 years (1998-2005); (3) whether any strategic alliances exist (or existed) with other hospitals to reduce the costs of medical supplies; and (4) whether the hospital was planning to implement additional contemporary management systems in the near future.

As can be seen, we found a substantial and significant improvement in logistics functions in French hospitals from 1998 to 2005. We attribute this improvement to changes in the healthcare financing practices and regulations in France. For example, a higher emphasis on the role of co-payments, the success of the prospective payment system (increases from 10% to approximately 50% in 2005), and efforts to reduce costs in response to increased use of the DRG system directly affected French healthcare systems.

Results of our survey in 2005 indicate that French hospitals want to continue to improve their logistics functions. Also, French hospitals

Table 6: Summary of Responses to Four Topics for the U.S. and France

Questions	*How medical supplies activities are currently handled.*	*How the management of medical supplies has improved during the last 7 years (1998-2005)*	*Whether any strategic alliances exist (or existed) with other hospitals to reduce the costs of medical supplies.*	*Whether the hospital is planning to implement additional contemporary management systems in the near future*
US	*A) Medical Supplies* • Delivery to medical departments via a central warehouse (44.3%) • Semi direct delivery via medical department warehouse (37.8%) • Central warehouse, distribution center, medical department warehouse (31.6%) • Suppliers only rarely directly deliver inventory when needed (!6%); but has increased by 35.6% compared to 1998 *B) Food Service* • Still provided mostly internally, slight increase compared to 1998 in use of outside suppliers (10.4%)	• Slight increase in level-of-medical-supplies inventory • Slight decrease in suppliers • Decreases in partnerships in suppliers certifications; Stockless and Just-in-Time programs • Decrease in Electronic Data Interchange (EDI) programs, but major weight, followed by JIT	• Less than 25% partnership with other hospitals (decreased by 15.1%) • Partnerships are concentrated in purchasing, medical staff, and laundry sharing (in order of level of partnership) • Laundry sharing increased by 160% • Hospitals increasingly sub-contract food service; transportation and laundry service, and IS	• Decrease in intent to implement partnerships in medical departments (20.9%); in purchasing (18.6%); supplier certification (22.4%), EDI (15.6%), Medical Staff 11 % • Slight decrease in intent to implement just-in-time programs, warehouse sharing, food service and stockless programs.
FRANCE	*A) Medical Supplies* • Delivery to medical departments via a central warehouse - (majority – 71.9%) • All other methods decreased compared to 1998 *B) Food Service* • Provided mostly internally, when externally –supplier certification is required	• Reduction in level-of-medical-supplies inventory • Improved relationship with suppliers • Improved just-in-time programs (3.3%); and major weight in supplier partnerships • Major improvement in EDI programs with suppliers; but minority in importance • Improved stockless programs (19.8%) • Improved supplier certification programs (8.8%)	• Alliances among or between hospitals only in purchasing and laundry sharing (about 44.5%). • Large increase in warehouse sharing, but only minority in alliances in general • Some hospitals sub-contract laundry service, food service, and transportation, but overall decrease in outsourcing (IS: 44% decrease)	• Increase in intent to Initiate/extend partnership projects in the near future in warehouse sharing (37.7%); EDI (12.7%); and JIT (10.9%) • Generally, still high intent to increase partnership programs

are not as involved in outsourcing as their U.S. counterparts. When a function is outsourced (as is reported in the U.S.), the need for collaboration is removed. U.S. hospitals, on the other hand, did not show much improvement in their logistics functions.[20] The U.S. healthcare system has not witnessed substantial changes since 1998, which may contribute to this lack of improvement. Another factor is that logistics functions in U.S. hospitals were much better developed in 1998. As a consequence, U.S. hospitals had been more successful earlier in reducing their supplies. Both the current Partnership index and the Anticipated Partnership index showed higher levels of collaboration in French hospitals.

This research can be extended in at least two different aspects: by including and linking accounting data to logistics functions and by including new developments in healthcare management, for example evidence-based best practice (EBBP), one of the more recent undertakings in addressing the quality of healthcare. EBBP suggests that standardisation may be used to reduce patient treatment without affecting the quality of care.

The method tries to define a general plan for diagnosis and treatment of a disease, including appropriate tests and treatments. But the question arises as to what extent the work of physicians in various hospitals can or should be standardised. Thibadoux, et al. (2007) report that physicians' main concerns are related to the ethical dilemmas that may result from using this method.

When all concerns are considered, applying traditional, standard cost-accounting techniques to evidence-based medicine protocols will be relevant for future healthcare providers as well as policy planners. Standardisation of medical costs is also a tool for budgeting and planning in health care institutions.

[20] In some aspects they were less efficient, although the decreases were not statistically significant.

References

Aptel, O. and Pourjalali, H. (2001), "Improving Activities and Decreasing Costs of Logistics in Hospitals, a Comparison of U.S. and French Hospitals", *International Journal of Accounting*, 36 (1), pp. 65-90.

Armstrong, P. (2002), "The Costs of Activity-Based Management", *Accounting, Organizations and Society*, 27 (1/2), pp. 99-120.

Bellanger M. and Tardif, L. (2006), "Accounting and Reimbursement Schemes for Inpatient Care in France", *Health Care Management Science*, 9 (3), pp. 295-305.

Brickley, J. A. and Van Horne, R. L. (2002), "Managerial Incentives in Nonprofit Organizations: Evidence from Hospitals", *Journal of Law and Economics*, 45, pp. 227–249.

Ciotti, V. and Pagnotta, B. (2005), "The Other Side of Outsourcing", *Healthcare Financial Management*, 59 (2), pp. 38-41.

Dranove, D. (1988), "Pricing by Nonprofit Institutions: The Case of Hospital Cost Shifting", *Journal of Health Economics*, 7, pp. 47-57.

Finkler, S. A. and Ward, D. M. (2003), "The Case for the Use of Evidence-based Management Research for the Control of Hospital Costs", *Health Care Management Review*, 28 (4), pp. 348-365.

Hill, N.T. (2000), "Adoption of Costing Systems in US Hospitals: An Event History Analysis 1980–1990". *Journal of Accounting and Public Policy*, 19 (1), pp. 41–71.

Kane, D. (2007), "Strategies Emerge to Bring Supply Costs Down", *H&HN: Hospitals & Health Networks*, 81(8), p. 32.

Keeler, E. B. et al. (1999), "The Changing Effects of Competition on Non-profit and For-profit Hospital Pricing Behavior", *Journal of Health Economics*, 18, pp. 69-86.

Krishnan, R. (2005), "The Effect of Changes in Regulation and Competition on Firms' Demand for Accounting Information", *The Accounting Review*, 80 (1), pp. 269-287.

Lawson, R. A. (2005), "The Use of Activity-based Costing in the Healthcare Industry: 1994 VS. 2004", *Research in Healthcare Financial Management*; 10 (1), pp. 77-94.

Maynard, A. (2005), "European Health Policy Challenges", *Health Economics*, 14, pp. 255-263.

Schreyögg J., Stargardt, T., Tiemann, O, and Busse, R. (2006), "Methods to Determine Reimbursement Rates for Diagnosis Related Groups (DRG): A Comparison of Nine European Countries", *Health Care Management Science*, 9, pp. 215-223.

Shaffer, F. (2007), "A Buyer's Guide to Effective Management of External Staffing Companies", *Nurse Leader*, 5 (2), pp. 36-40.

Shinkman, R. (2000), "Outsourcing on the Upswing", *Modern Healthcar*e, 30 (37), pp. 46-54.

Thibadoux, G., Scheidt, M., and Lucke, E. (2007), "Accounting and Medicine: An Exploratory Investigation into Physicians' Attitudes toward the Use of Standard Cost-accounting Methods in Medicine", *Journal of Business Ethics*, 75, pp. 137-149.

Tierney, S. (2004), "Supply Chain Costs on the Mend at some European Health Authorities", *Supply Chain Europe*, 13 (3), pp. 16-18.

Udpa, S. (1996), "Activity-based Costing for Hospitals", Health *Care Management Review*, 21 (3), pp. 82-96.

West , T. and West, D. (1997), "Applying ABC to Healthcare", *Management Accounting*, 78 (8), pp. 22-33.

Appendix 1

Questionnaire for Hospital's Logistics System

Please, complete this questionnaire as it relates to **your hospital**.

1- Does your hospital have a **materials management department, a purchasing department, or a logistics department?**

1o Yes 2o No *(go to question #3)*

2- Approximately, what **portion of the responsibility** for each of the following is **handled by this department** ?

	0%	1 to 25%	26 to 50%	51 to 75%	76 to 99%	100%	don't know
Purchasing	o	o	o	o	o	o	o
Physical supplying	o	o	o	o	o	o	o
Receiving	o	o	o	o	o	o	o
Inventory management	o	o	o	o	o	o	o
Internal distribution to medical departments	o	o	o	o	o	o	o
Management Information Systems	o	o	o	o	o	o	o
Telemedicine	o	o	o	o	o	o	o
Food services	o	o	o	o	o	o	o
Linen services	o	o	o	o	o	o	o
Transportation	o	o	o	o	o	o	o
Home care services	o	o	o	o	o	o	o
Maintenance/environmental services	o	o	o	o	o	o	o

3- In **percentage terms**, indicate the **manner that medical supplies are distributed** to the **medical departments** of your hospital :

	0%	1 to 25%	26 to 50%	51 to 75%	76 to 99%	100%	don't know
Supplies are **directly** delivered to our medical departments by vendors as needed	o	o	o	o	o	o	o
Supplies are inventoried first in our **medical department storages** then used as needed	o	o	o	o	o	o	o
Supplies are inventoried first in our **central warehouse,** then delivered by our **distribution centre directly** to medical departments	o	o	o	o	o	o	o
Supplies are inventoried first in our **central warehouse**, then delivered by our **distribution centre** to medical department **storages** and finally used as needed	o	o	o	o	o	o	o

4- What do you think is (are) needed to improve **your distribution** system:

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Don't know**
we need to decrease inventories	o	o	o	o	o	o
we need to reduce the number of our suppliers	o	o	o	o	o	o
We need to improve relationships With our suppliers	o	o	o	o	o	o
We need to create new partnerships with other hospitals	o	o	o	o	o	o
Others (please specify)…….	o	o	o	o	o	o

5- Please estimate the total **dollar value of the inventory kept** in **your hospital** :

$ _____

6- In percentage terms, how is that amount **allocated among the following** categories?

_____ % in a **Central Warehouse**

_____ % in a **Distribution Centre**

_____ % in **Medical Departments**

_____ % in **other** locations (please explain: _____)

_____.

Total 100 %

7- Compared to **five years ago** the **total inventory** kept in our **hospital** has:

o greatly decreased o decreased o stayed about the same o increased o greatly increased o don't know

8- Compared to **five years ago** the **total number of our vendors** has:

o greatly decreased o decreased o stayed about the same o increased o greatly increased o don't know

9- Does your hospital use **telemedicine**?

o Yes o No

10- In percentage terms, please indicate the degree of strategic **alliances**[21] between **your hospital** and **other hospitals** in the following:

	0%	1 to 25%	26 to 50%	51 to 75%	76 to 99%	100%	don't now
Medical Departments	o	o	o	o	o	o	o
Medical staff	o	o	o	o	o	o	o
Telemedicine	o	o	o	o	o	o	o
Purchasing	o	o	o	o	o	o	o
Laundry sharing	o	o	o	o	o	o	o
Food services sharing	o	o	o	o	o	o	o
Warehouse sharing	o	o	o	o	o	o	o
Others (please specify)…….	o	o	o	o	o	o	o

11- In percentage terms, please indicate the degree of partnerships[22] between **your hospital** and your **vendors** in the following:

	0%	1 to 25%	26 to 50%	51 to 75%	76 to 99%	100%	don't now
Just-in-time programs	o	o	o	o	o	o	o
Stockless programs	o	o	o	o	o	o	o
E.D.I. (Electronic Data Interchange)	o	o	o	o	o	o	o
Supplier certification	o	o	o	o	o	o	o
Others (please specify)…….	o	o	o	o	o	o	o

12- Compared to **five years ago**, would you say that your hospital **saved money** because of its **partnerships with your vendors** ?

o Yes o No

[21] An agreement between two or more individuals or entities stating that the involved parties will act in a certain way in order to achieve a common goal. Strategic alliances usually make sense when the parties involved have complementary strengths.

[22] A relationship of two or more entities conducting business for mutual benefit.

13- In percentage terms, what part of the following your hospital activities are **outsourced**?

	0%	1 to 25%	26 to 50%	51 to 75%	76 to 99%	100%	don't know
Linen	o	o	o	o	o	o	o
Food	o	o	o	o	o	o	o
Warehousing	o	o	o	o	o	o	o
Transportation	o	o	o	o	o	o	o
Logistics Information system	o	o	o	o	o	o	o
Others (please specify)…….	o	o	o	o	o	o	o

14**- How likely** is your hospital to **implement** during the **next five years** each of the following **partnership projects** ?

	Very unlikely	Unlikely	Neutral	Likely	Very Likely	Don't know
Medical Departments	o	o	o	o	o	o
Medical staff	o	o	o	o	o	o
Telemedicine	o	o	o	o	o	o
Purchasing	o	o	o	o	o	o
Laundry sharing	o	o	o	o	o	o
Food services sharing	o	o	o	o	o	o
Warehouse sharing	o	o	o	o	o	o
Just-in-Time programs	o	o	o	o	o	o
Stockless programs	o	o	o	o	o	o
EDI (Electronic Data Interchange)	o	o	o	o	o	o
Supplier certification	o	o	o	o	o	o
Others (please specify)……	o	o	o	o	o	o

1- Number of **beds**: _____ 2 – Type of hospital[23]: _____

Thank you very much for your help.

[23] For example, private, public, teaching and research, research, clinic.