ABSTRACT

Objective: To study how hospitals and their diagnosis and treatment supplies relate to each other, analyzing if they have market relations or behave as networks of organizations. Furthermore, the study tries to set the consequences of such relation in terms of access to knowledge, learning and innovation. Methods: A multiple case study performed at four top large private hospitals in São Paulo (Brazil), involving their outsourced laboratory, imaging and hemotherapy services. Individual interviews were conducted with managers and owners of both organizations (hospitals and vendors) using semi-structured questions to ascertain selected independent and dependent variables. The analysis used pattern-matching techniques. Results: The study demonstrated they behave as networks. There are standard and complex interactions, with mutual exchange of knowledge and learning. There is strategic and operational collaboration to find solutions, generating new products and services and implementing new technologies. The relationships are long-standing and actions are interdependent. It is not a typical client-supplier interaction neither a characteristic expression of hierarchy. Conclusion: The present paper can provide useful information to prepare a quantitative research tool; based on this information, it is possible to estimate the adequate size of a representative sample.

Keywords: Outsourced services; Telecommunication network; Hospitals; Diagnostic services

INTRODUCTION

According to Powell et al.(1), companies in several sectors are carrying out almost all production process steps using some type of external cooperation. Several Brazilian(2-3) and foreign(4-6) authors have shown the dissemination of outsourcing practices in hospitals. In the Southeastern region of Brazil, it already surpasses support and general services and comprises areas such as professional and technical health services(2). This trend can also be seen in USA; there, compared to other sectors, healthcare area presents a high rate of outsourcing(5). In regards to outsourcing of diagnostic and therapeutic support services (DTSS) of hospitals in Brazil, it was verified that in the Southeastern region of Brazil, 39% of hemotherapy, 63% of laboratory, 38% of radiology, 61.4% of computerized tomography (CT) and 70.2% of magnetic resonance imaging (MRI) services were outsourced(2).

On the other hand, Jarillo(7) stated that one way to efficiently compete is creating strategic networks, that is, long-term volunteer arrangements among distinct...
but related organizations, which aim at profit and enable these organizations to gain or maintain competitive advantages in regards to competitors, by optimizing the operational costs and minimizing coordination costs.

According to Powell et al. (1), when the knowledge base of an industry is complex, and expanding, and, furthermore, the sources of expertise are dispersed, the loci of innovation will be found in learning networks, and not in individual companies. When there is a regime of fast technological development, scientific findings are so broadly distributed that no single company has all the internal qualification needed to be successful(1).

**Perspective of network of organizations**

Based on the literature, we can say that Coase(8), in his article “The Nature of the Firm”, ruptured the idea that a company is like a “black box”. The key insight presented by Coase is that companies and markets are alternative ways to organize transactions(9).

Williamson(10-11) resumed Coase’s work, including theory of organizations, history of business and legal aspects. The author concluded that in order to organize recurring transactions, which involve uncertainty or high specificity, hierarchy has priority over the market. The reasons for this option would be related to limited rationality of the agents and the need to deal with the trend towards opportunism. Despite the advances on the concepts, this perspective sees the company separated from the market, and, in a broader sense, from the social context itself(9). In many cases, however, the company boundaries become fluid and new kinds of collaboration appear, different from the market and from hierarchy. Some researchers responded to these changes proposing a market-hierarchy continuum, presenting intermediate hybrid arrangements(9).

Powell(9) was one of the pioneers in discussing hybrid models, but understood them as inexact, static, limited, and do not help to explain several feasible ways of cooperation. The idea of transactions taking place in a continuum is very mechanical and fails to capture the complexity involved in exchanges.

Other authors stated that the markets can not be isolated from the social structure and emphasize that economic activities are immersed in social relation structures, even questioning if the division between market and hierarchy is useful in certain situations(12). Others showed the existence of a combination of several exchange forms, which originate mixed arrangements: dominance and hierarchy elements in contracts, introduction of market processes into companies, such as transfer pricing, compensations based on performance; much of the behavior observed in the companies does not seem related to vertical integration logics(9).

The new way to describe and analyze organizations proposed by theorists of networks of organizations emphasizes, therefore, that some exchanges depend more on cooperation, relationship, mutual interest and reputation. Chart 1 summarizes the main differences between market, companies and networks, according to Powell(9).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Market</th>
<th>Hierarchy</th>
<th>Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normative base</td>
<td>Contract</td>
<td>Employment</td>
<td>Complementary</td>
</tr>
<tr>
<td>Communication media</td>
<td>Ownership right</td>
<td>Employment</td>
<td>Forces</td>
</tr>
<tr>
<td>Method to solve conflicts</td>
<td>Prices</td>
<td>Routines</td>
<td>Relationship</td>
</tr>
<tr>
<td>Flexibility level</td>
<td>Courts</td>
<td>Supervision</td>
<td>Rules of</td>
</tr>
<tr>
<td>Commitment between the parties</td>
<td>High</td>
<td>Low</td>
<td>reciprocity-</td>
</tr>
<tr>
<td>Environment</td>
<td>Low</td>
<td>Medium to high</td>
<td>reputation</td>
</tr>
<tr>
<td>Choice of players</td>
<td>Precision /</td>
<td>Formal /</td>
<td>Medium</td>
</tr>
<tr>
<td>Mixed forms</td>
<td>suspicion</td>
<td>bureaucratic</td>
<td>to high</td>
</tr>
<tr>
<td>Details</td>
<td>Independent</td>
<td>Dependence</td>
<td>Interdependence</td>
</tr>
<tr>
<td>Flexibility level</td>
<td>Repeated</td>
<td>Informal</td>
<td>Open /</td>
</tr>
<tr>
<td>Commitment between the parties</td>
<td>transactions</td>
<td>organization</td>
<td>mutual benefits</td>
</tr>
<tr>
<td>Environment</td>
<td>Contracts as</td>
<td>Transfer pricing</td>
<td></td>
</tr>
<tr>
<td>Mixed forms</td>
<td>hierarchical documents</td>
<td>Business units</td>
<td></td>
</tr>
<tr>
<td>Flexibility level</td>
<td>Low</td>
<td>Medium to high</td>
<td></td>
</tr>
<tr>
<td>Commitment between the parties</td>
<td>Low</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>Precision /</td>
<td>Formal /</td>
<td></td>
</tr>
<tr>
<td>Mixed forms</td>
<td>suspicion</td>
<td>bureaucratic</td>
<td></td>
</tr>
</tbody>
</table>

Source: Powell WW(9).

Looking at organizations, it is possible to observe that their essence, internally seen, is cooperation. Without it, there would be no organization. Actually, in activities in which people do not need to cooperate, there are no organizations. When the objective requires coordinated efforts by many people, probably supported by investment of capital, the organizations are present. While cooperation seems to be the essence of relationships within organizations, competition seems to be the essence of inter-organizational relations, in the dominant point of view(7). However, this frontier between cooperation and competition does not necessarily have to coincide with the company legal boundaries. It is possible to have cooperation among companies and competition inside them. Actually, we are talking about two dimensions that cross each other(7).

Another way to consider learning in collaboration among companies is when learning is perceived as connected to the conditions in which the process occurs. Learning is created in a context of community. A formal organization, with its bureaucratic rigidity, is a poor vehicle for learning. Sources of innovation are not exclusively inside the companies. On the contrary, they are usually found in the interstice among companies, universities, laboratories, suppliers and clients(1).
OBJECTIVE
This study aims to address how hospitals and different DTSS companies relate to each other, analyzing if they have market relations or behave as networks of organizations. Furthermore, it tries to define the consequences of such relationship in terms of access to knowledge, learning and innovation.

METHODS
The study explores variables linked to outsourcing at hospitals and searches for associations existing among variables selected in the literature (independent variables) and inter-organizational structures adopted in the DTSS of private hospitals (dependent variables). The Theory of Networks was used as a theoretical reference.

The investigation was conducted in an intentional sample of four private hospitals (two profit and two non-profit organizations) that are considered of excellence, in the city of São Paulo. The DTSS were selected to be analyzed because they have recently gone through outsourcing, have remarkable technology and employ intellectual capital. Within the DTSS, we chose services with higher volume of procedures: clinical analysis laboratory, imaging and hemotherapy services. Each of these services was studied at the four hospitals, totaling twelve services.

Data collection aimed at objective data and perception of executives and owners of organizations (hospitals and companies) about independent and dependent variables of the Theory of Networks. The referential concepts were operationalized as described in chart 2. The data collection techniques were: (1) semi-structured interviews based on the theoretical referential variables; (2) analysis of reports and contracts and (3) direct observation.

Nineteen interviews were conducted, totaling 9 hours and 36 minutes of interviews recorded, lasting, in average, 32 minutes each. The recordings were transcribed before the analysis. Whenever possible, we tried to interview owners or directors of the organizations (ten were owners and the others were directors or managers) and long-term employees of the companies (twelve had been working for the organizations for over five years), based on the presumption that they would be more knowledgeable in regards to the organization.

RESULTS
The presentation form chosen was one indicated by Yin(13) for reports of multiple case studies. It consists on crossed assessment of each aspect or variable in all cases (charts 3-5). Chart 6 shows the adaptation of the Theory of Networks to outsourced services at the studied hospitals.

<table>
<thead>
<tr>
<th>Theoretical constructs</th>
<th>Study variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncertainty</td>
<td>Variability of processes and results</td>
</tr>
<tr>
<td>Importance of relation</td>
<td>Number of other clients of the company</td>
</tr>
<tr>
<td>Percentage of company revenue</td>
<td></td>
</tr>
<tr>
<td>Percentage of hospital revenue</td>
<td></td>
</tr>
<tr>
<td>Technological evolution</td>
<td>Technological evolution of products and processes</td>
</tr>
<tr>
<td>Demand for speed</td>
<td>Demand for speed</td>
</tr>
<tr>
<td>Contract detailing</td>
<td>Specification of products and services</td>
</tr>
<tr>
<td>Amounts and terms</td>
<td>Evaluation indicators and penalties</td>
</tr>
<tr>
<td>Incentives</td>
<td>Participation in results</td>
</tr>
<tr>
<td>Communication</td>
<td>Frequency of contacts</td>
</tr>
<tr>
<td>Informality</td>
<td></td>
</tr>
<tr>
<td>Conflict resolution</td>
<td>Conflict resolution</td>
</tr>
<tr>
<td>Frequency of relations</td>
<td>Frequency of contact of employees of different organizations</td>
</tr>
<tr>
<td>Frequency of contact with the board</td>
<td></td>
</tr>
<tr>
<td>Flow of information</td>
<td>Information exchange among employees</td>
</tr>
<tr>
<td>Participation in strategic meetings</td>
<td></td>
</tr>
<tr>
<td>Term of contracts</td>
<td>Term of contract</td>
</tr>
<tr>
<td>Control</td>
<td>Personnel management</td>
</tr>
<tr>
<td>Hiring forms</td>
<td></td>
</tr>
</tbody>
</table>

Chart 3. Empirical observations of the Theory of Networks variables in laboratories at the hospitals studied

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hospital A</th>
<th>Hospital B</th>
<th>Hospital C</th>
<th>Hospital D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncertainty</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Importance of relation</td>
<td>Single client of the company</td>
<td>Strategic client of the company, in hospital group</td>
<td>Single client of the company</td>
<td>Laboratory has other clients and outpatient care</td>
</tr>
<tr>
<td>Technological evolution</td>
<td>High</td>
<td>Recent contract</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Contract detailing</td>
<td>Pro-forma</td>
<td>Old contract</td>
<td>Old contract</td>
<td>Details on terms</td>
</tr>
<tr>
<td>Participation in results</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Not disclosed</td>
</tr>
<tr>
<td>Communication</td>
<td>Informal</td>
<td>Formal</td>
<td>Routine</td>
<td>Routine</td>
</tr>
<tr>
<td>Conflict resolution</td>
<td>Through administration</td>
<td>Through administration</td>
<td>Through administration</td>
<td>Participation in strategic meetings</td>
</tr>
<tr>
<td>Frequency of relation and flow of information</td>
<td>Horizontally high</td>
<td>Horizontally high</td>
<td>Horizontally high</td>
<td>Horizontally high</td>
</tr>
<tr>
<td>Term of contract</td>
<td>12 years</td>
<td>28 years</td>
<td>8 years</td>
<td>3 years</td>
</tr>
</tbody>
</table>
Modern hospitals are networks of organizations

**DISCUSSION**

Pattern-matching approach was used as specific analytical strategy. For Yin\(^{(13)}\), this is one of the most desirable strategies to increase the internal validity of findings. This logic compares an essentially empiric pattern with another based on prediction. The study analysis concern was with the overall pattern of results and with the level in which the pattern was adjusted to those described.

For all interviewees uncertainty was considered average. In all sectors, the demand for speed was considered high, according to the respondents. The requirement for intensive knowledge was considered true. It is a field in which professionals have long-lasting education. Permanent training and updating are required, in addition to much effort to follow up literature, even if only on the sub-specialty. Services require capital investment — some, not even that —, but they would not exist without qualified manpower.

In the services investigated, in general, the product evolution cycles were defined as high evolution speed (2 or 3 years, according to some comments). The process evolution cycles (medical procedures), as medium-high speed (a little slower than that of products, as commented). This technological assessment is considered comparable to medium-high evolution speed industries.

It was stated that the conflicts were always solved through the administration and through talks and, so far, never by legal means. That is a characteristic of the hierarchical governance mechanism. An evidence of a typical market conflict solving would be reporting the use of the legal system to solve any dispute, which would certainly be an embarrassing statement. Another evidence of conflict solving typical of networks would be a normative sanction on behalf of other market players, something that is possible but that was not found in this study. The way of solving conflicts was thus assessed, despite the doubts regarding the power of evidence obtained in the interviews.

Contracts are the normative base of the relations, in most cases. At Hospital A, where the relation between hospital and laboratory has lasted 12 years, until recently,
there was no contract; in the imaging service, in place for
12 years, there is no contract. Contracts are typical in
market relations, but their detailing is more characteristic
of this type of governance. Most contracts analyzed were
old and without details, except for the most recent ones,
with the laboratory at hospital D and the hemotherapy
service at hospital C, which contain a few details on terms
of assessment criteria.

The degree of commitment can be inferred by the level
of interest shared between both parties. The demand for
the hospital directly influences the results of companies,
which therefore are interested in increased number of
patients seen at the hospital. The hospital success in
several dimensions, such as treatment effectiveness and
image in the market, and it depends on and benefits
both parties. In two cases there is participation in results.
Network of organizations are characterized by medium
to high level of commitment between the parties.

When the question was about relationships, in
eight situations the respondents answered that it was
characterized by routine (one of the most typical features
of a hierarchy): hemotherapy and imaging services at
hospital D and the laboratories at hospitals C and D.

The frequency of interaction between the parts (both
lateral with physicians and employees, and vertical,
with the board, as well as participation in hospital
strategic meetings) was defined as intense, especially
horizontally. It was reported in almost all services
that communication is necessary for good outcome
of some patients, especially in the most severe cases.
There is a large number of “exceptions” in regards
to what are considered regular cases. Some cases are
unique in their characteristics and severity, requiring
non-routine techniques to reach a conclusion and
interaction between the hospital and the company teams
for exam indication and interpretation. Some require
combined follow-up for longer periods, as in the cases
that need hemotherapy procedures. Besides, hospital
physicians frequently consult service professionals
about indications and details of exams. There is also
lateral communication to solve administrative matters,
such as collection of accounts and invoicing. Some
respondents said that there are members from almost all
companies taking part at hospital technical committees,
management projects, and, in a few cases, in strategic
meetings (vertical communication).

Some services give support to hospital or even
participate with it in negotiations with payers. They
exchange knowledge in both technical and administrative
fields. In the technical field, there are symposia with
professionals from companies and hospitals, as well
as daily interaction that provide exchange of new
information on procedures and indications. Some
companies maintain an institutionalized interaction
channel, such as in one case in which a customer call service
toll free) was set up for consultations with laboratory
specialized physicians. They also share knowledge and
learn together in the administrative field. Due to proximity,
hospitals and companies keep in touch with the philosophy
and administration routines of each other. Some examples
were given, such as when a hospital learns from the company
about ways of optimizing collection from the payers.

Interaction has also proven itself necessary when
launching new products. Not only did the companies
incorporate new technologies and presented them to
hospitals, but also hospitals frequently launched new
products, such as new types of surgery or new procedures,
and, in order to make them feasible, required the
company involvement to plan and implement them.
Sometimes, the initiative was taken by the company itself,
which encouraged the hospital. In these cases, there was
massive exchange of strategic information on the market
requirements and feasibility of the venture. One of the
most complex examples is the case of implementation
of new types of organ transplant, that needed extensive
support, during all phases (pre-, trans- and post-
operative) of the DTSSS. In another hospital, there were
plans involving both parties to establish an umbilical cord
blood bank using stem cell freezing techniques.

It was concluded that the services studied presented
all four characteristics needed for establishing a network
of organizations. However, the confirmation that the
network of organizations was created can only be made
through dependent variables, which are characteristic
of the governance mechanism. It is observed that in services
there are routine and standardized exchanges and other
more complex interactions, generating knowledge
exchange among the parties and enabling learning and
possibility of innovations. In general, the relations last
long and the actions are interdependent.

Therefore, it is observed that the variables present
characteristics that are intermediate between the
market, the hierarchy and the networks. Yet, according
to some authors, many of these characteristics are
not exclusive. For instance, networks can use legal
sanctions available in contracts and markets and
companies can use the normative sanctions by means
of relationships and social communication. Taking
these considerations into account, we concluded that
the model of organization network offers a structure
with descriptive power for the phenomena observed
in all services and in each one, at least partially. Many
exchanges do not depend on controls (hierarchy) or on
a competitive dynamics to ensure their effectiveness.
Part of effectiveness depends on a non-standardized
interaction between both sides.
The study showed that the organizations present network features. There are standardized and complex interactions, including knowledge exchange and mutual learning. There is evidence indicating operational and strategic cooperation to generate solutions, create new products or services and implement new technologies. These configurations represent change compared to what was observed in the beginning of 1990’s.

The findings of this study confirm some speculations in the literature. Some authors have already stated that some hospital products (diagnoses and treatments) are unique, physicians depend on non-routine techniques to solve special cases, and the resulting diagnoses and treatments necessarily depend on intuition and experimentation. The networks provide learning of new patient care routines and practices, sharing of knowledge on health problems and discussion on the complementarity of service provision. All these changes represent organizational learning processes, in which interaction between persons from different organizations affects routines and practices that exist in each one of them (14).

The relation between the organizations inside the hospital proved to have complex aspects. It is neither a typical client-supplier market interaction, nor a typical expression of hierarchy. There are several combinations of control and ownership among the different services and diverse hospitals. Hybridism and social immersion co-exist. The decision is not only to outsource or not, because defining how the relation will be is an important part of the solution.

Upon conclusion of this study, it is possible to point out a few limitations. First, there were few interviews per organization. Only two members of each hospital (one from the clinical area and one from administration) and one executive or owner of the company were interviewed, in order to carry out a study with better external validity, and limited resources. Furthermore, they were considered key informants in their organizations, hence capable of providing qualified information. Therefore, the validity of the constructs involved in the research was not considered affected.

**CONCLUSION**

A few lines of research can be derived from this study. We highlight some possibilities, such as to conduct more accurate studies to test the same hypotheses. In this case, the present study can generate useful information to prepare a quantitative research tool, such as a Likert scale questionnaire. For this line of research a considerably larger sample of hospitals will be required, but based on information provided in this study, it is also possible to estimate the appropriate size of a representative sample.

**REFERENCES**