

Modern hospitals are networks of organizations

Hospitais modernos são redes de empresas em colaboração

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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

RESUMO

Objetivo: Estudar como se dão as relações entre hospitais e empresas de apoio diagnóstico e terapêutico, averiguando se são relações de mercado ou se apresentam comportamento de redes. Além disso, busca-se definir as conseqüências do tipo de relação para o acesso a conhecimento, aprendizado e inovação. **Métodos:** Realizou-se estudo de casos múltiplos em quatro hospitais privados de grande porte, considerados "de excelência", no município de São Paulo, em seus serviços de diagnóstico por imagem, laboratórios de análises clínicas e bancos de sangue. Procedeu-se a entrevistas para obter a percepção de executivos e proprietários das organizações (hospitais e empresas prestadoras de serviços) quanto às variáveis do modelo da Teoria das Redes. A análise utilizou a técnica de adequação ao padrão.

Resultados: O estudo demonstrou que as organizações apresentam características de redes. Existem interações padronizadas e complexas, com troca de conhecimento e aprendizado mútuo. Há evidências de que ocorre colaboração, operacional e estratégica, para geração de soluções, criação de novos produtos ou serviços e para implementação de novas tecnologias. As relações têm longa duração e as ações são interdependentes. Não são uma típica interação cliente-fornecedor de mercado, tampouco representam uma expressão típica da hierarquia. **Conclusão:** O presente trabalho pode gerar informações úteis para a confecção de um instrumento de pesquisa quantitativo e, a partir das informações contidas neste trabalho, pode-se também agora estimar um tamanho adequado para uma amostra representativa.

Descritores: Serviços terceirizados; Rede de telecomunicações; Hospitais; Serviços de diagnóstico

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

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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⁾.

Chart 1. Comparing economic organization forms

Characteristics	Forms		
	Market	Hierarchy	Network
Normative base	Contract – Ownership right	Employment relation	Complementary forces
Communication media	Prices	Routines	Relationship
Method to solve conflicts	Courts	Supervision	Rules of reciprocity-reputation
Flexibility level	High	Low	Medium
Commitment between the parties	Low	Medium to high	Medium to high
Environment	Precision / suspicion	Formal/ bureaucratic	Open/ mutual benefits
Choice of players	Independent	Dependence	Interdependence
Mixed forms	Repeated transactions	Informal organization	
	Contracts as hierarchical documents	Transfer pricing Business units	Multiple partners Formal rules

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.

Chart 2. Operationalization of variables used in the study

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

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

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

Chart 4. Empirical observations of the Theory of Networks variables in imaging services at the hospitals studied

Variable	Hospital A	Hospital B	Hospital C	Hospital D
Uncertainty	Medium/high	Medium	Medium	Medium
Importance of relation	20% of the company revenue. Single supplier in the hospital group	Single client of the company	Outsourced workers are autonomous	Company has its own clinic
Technological evolution	High	High	High	High
Contract detailing	It does not have. Completely verbal	Not much detailed. Very old	Not much detailed	Not much detailed
Participation in results	Yes (50%)	Not disclosed	No	No
Communication	Informal	Informal	Routine	Routine
Conflict resolution	Through administration	Through administration	Through administration	Through administration
Frequency of relation and flow of information	Horizontally high	Horizontally high	Horizontally high. Participation in strategic meetings	Horizontally high
Term of contract	12 years	28 years	Several contracts: from years to months	15 years

Chart 5. Empirical observations of the Theory of Networks variables in blood bank/transfusion services at the hospitals studied

Variable	Hospital A	Hospital B	Hospital C	Hospital D
Uncertainty	Medium	Medium	Medium	Medium
Importance of relation	Company has 12 clients. This ranks fourth in revenue	Company has 12 clients. This ranks third in revenue. Group has other supplier	Company has another hospital as client	Single client of the company
Technological evolution	High	High	High	High
Contract detailing	Not much detailed. Standardized	Not much detailed	Clauses on quality control	Not much detailed
Participation in results	No	No	No	No
Communication	Routine	Routine	Routine	Routine
Conflict resolution	Through administration	Through administration	Through administration	Through administration
Frequency of relation and flow of information	Horizontally high	Little communication	Horizontally high. Participation in strategic meetings	Horizontally high
Term of contract	15 years	10 years	3 years	15 years

Chart 6. Adjusting the Theory of Networks to outsourced services at the studied hospitals

Characteristic	Description	Mechanism of governance
Normative base	Old contracts, with few details. <i>Pro-forma</i> contracts.	Market/Network
Communication media	One service has no contract Structured in routines, but requires frequent interactions	Hierarchy/Network
Frequency of interaction	Horizontally high	Hierarchy/Network
Conflict resolution	Through administration	Hierarchy/Network
Flexibility	Contract/agreements between companies	Market/Network
Commitment	Sharing objectives	Hierarchy/Network
Preference of players	Interdependence	Network

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 DTSS. 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⁽¹⁴⁾. 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.

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