Developing Learning Capabilities and New Practices in the Management of Organ Transplants: A Case Study at a Hospital in Rio de Janeiro

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The lack of organ donors is a public health problem, but organ harvest rates can be stepped up through focusing on workforce development and education, buttressed by investments in technology. This research examines the development of learning capabilities and new practices in the management of transplants through the introduction of the Donor Action® Program at the Adão Pereira Nunes Hospital in Rio de Janeiro, Brazil. The implementation of this Program underpinned the accumulation of organizational knowledge, together with the development of organizational learning. We also identified the possibility of practical applications that enable process improvements in other healthcare units involved in the transplant management process.

1. Introduction

The management of the organ and tissue donation and transplant process offers massive challenges to public administrators. Minor faults in the loss of potential donors and consequently lives. The donation of organs and tissues for transplantation may begin with live or deceased donors, each with its own specific process. The focus of this study is organ donation by deceased patients. Harvest rates can be stepped up through public policies focused on the education and development of the practitioners involved, in parallel to investments in technologies supporting this process. The shortage of organs for donation is a public health problem and this survey could help enhance the organ harvesting system in Brazil.

In 2009, with low organ donation rates in Rio de Janeiro (RJ), the State Transplant Program (PET) was set up in order to develop collective learning capabilities and fine-tune the process. One of the main PET initiatives was the acquisition of the Donor Action® Program (DA), which is a quality management tool for the organ and tissue donation and transplant process, established in 1998 by a group of transplant coordinators in Europe and the USA. This is an internet-based system that, grounded on data collected through two questionnaires, produces reports outlining the situation diagnosed at each hospital. Thus, the program identifies when and where a potential donor is lost, indicating problems and the need for training teams, helping develop and implement process upgrade targets in hospital units. Action monitoring and reassessment are essential for developing learning capabilities and consolidating the innovative practices implemented (Donor Action, 2013).
The general purpose of this paper is to understand how the DA can upgrade the organ and tissue donation and transplant management process through building up institutional capacities for accumulating expertise (Nonaka; Takeuchi, 1997) through the development of collective learning capabilities (Argyris; Schon, 1978) and the introduction of new practices (Gallouj, 2002; Djellal; Gallouj, 2005). As this is an international program, an additional objective of this research project is to identify and analyze the need to adapt this program to the culture and specific characteristics of the RJ system.

2. Review of the Literature

2.1. The Organ Donation and Transplant Process in Brazil and RJ

The initial stage in donating the organs and tissues of deceased patients for transplantation is the detection of donors in order to harvest their organs. Potential donors are normally found in Intensive Care Units (ICUs) or hospital Emergency Rooms (Pestana et al., 2013), with patients in these facilities generally suffering from acute several neurological injuries that frequently progress to brain death (Domingos; Boer; Possamai, 2010).

The harvesting process begins with the identification of a potential donor at a hospital, following a protocol established by the Brazilian Federal Medical Council (CFM) for diagnosing brain death. The notification of the potential donor is compulsory and must be forwarded to the Organ Notification, Harvest and Distribution Centers (CNCDOs) in each Brazilian state, regardless of whether the donation of the organs and tissues of the potential donor is feasible or not. The relatives of the potential donor must be notified immediately that this protocol has been opened. Brazilian law establishes that the informed consent of the relatives of a potential deceased donor is the only type of authorization valid for harvesting organs and tissues (Brazil, 1997). These Centers are in charge of managing the list of potential recipients, through acknowledging notifications of brain deaths and the organization of the logistics, with the distribution of the organs and tissues in their sphere of action. In order to perform these activities, these Centers are backed by Organ and Tissue Search Organizations (OPOs), and Intra-Hospital Commissions for Organ and Tissue Donations for Transplantations (CIHDOTTs).

In parallel and subsequent to a diagnosis of brain death, a careful evaluation of the potential donor must be conducted, as well as ensuring hemodynamic maintenance, in order to ascertain and ensure the quality of the organs and tissues to be donated. Once the diagnosis of brain death has been completed and notified to the relatives of the potential donor by the attending physician, a family interview on donation must take place with a qualified practitioner who explains all the details of the donation and transplant process. Family assistance is an ethical tool that must extend through all phases of the process, meaning that it is the responsibility of the entire hospital healthcare team. Once a donation has been authorized by the relatives, the entire logistics side must be organized for transplant surgery.

RJ was the first State where an organ transplant operation took place in Brazil, in 1965. Despite this pioneering stance, it was unable to maintain its position in this field.
during subsequent years, being rapidly outstripped by São Paulo, and then by other Brazilian States. In 2009, faced by low organ donation rates and thus with only a few transplant operations performed in this State, it decided to shut down the Rotransplante Program, which was the entity in charge of managing the transplant area under the State Health Bureau, announcing the introduction of a modern program based on professional management: the State Transplant Program (PET).

One of the main PET initiatives was the acquisition of the Donor Action® program, which identifies when and where a potential donor is lost, highlighting problems and the need for training the teams, spurring the development and establishment of goals for upgrading this process in hospital units.

The shortage of organs for donation is due not only to the lack of potential donors, but also to a failure to turn potential donors into effective donors. This may be due to gaps in the process, such as non-identification of brain-dead potential donors, and failure to identify brain death in good time (Matesanz, 2004).

In order to upgrade this process, the DA is one of several initiatives that have been adopted during the past few years in many countries, in order to step up donations of organs harvested from deceased patients. This program may be characterized as a tool that systematically underpins the feasibility of upgrading the organ donation process (ROELS et al., 2010). The DA diagnosis is handled through three tools: Hospital Attitude Survey – HAS; Medical Records Review – MRR and the DA System Database, where data are keyed in and analyzed in order to produce reports on the situations at each hospital. The HAS is a questionnaire consisting of 32 questions addressing the knowledge and attitudes of practitioners involved in the organ transplant process (physicians, nurses and administrative staff). Together with the HAS, the hospital unit records cases resulting in death (MRR) in the system. This process discloses the level of support received by these practitioners in terms of the donation process, identifying the need for training and education on this topic. Along these lines, the program establishes the bases for monitoring and upgrading the donation process (Höckerstedt; Heikkilä; Holmberg, 2005; Roels et al., 2010).

The DA program consists of three stages: diagnosis, through deploying the HAS and MRR tools; analysis and performance, identifying priorities for upgrading the process through the HAS and MRR analysis; and assessment and further application after a year, in order to assess the outcomes of the DA Program and comparing the findings of the first round of questionnaires with those of the second round. Monitoring and re-assessing actions are essential for developing learning capabilities and consolidating the innovative practices implemented (Donor Action, 2013).

The DA System Database is the largest international database on this topic, and was used by some 400 hospitals in seventeen countries in 2009 (Roels et al., 2010). Despite the success of the DA Program implemented in many countries, as reported in the literature (Höckerstedt; Heikkilä; Holmberg, 2005; Roels, et al., 2010), it is important to analyze the need to adapt this Program to the specific characteristics of each country where it is implemented.
2.2. Learning capability and capacity for building up knowledge

Knowledge has become the mainstream of organizational performance, developing into the main input for what is produced, purchased and sold (SVEIBY, 1998). For Davenport and Prusak (1998), knowledge is a fluid blend of condensed experiences, values, contextual information and insights, which result in a structure able to assess and acquire new experiences and information.

Authors such as Nonaka and Takeuchi (1997), Davenport and Prusak (1998) and Choo (2003) acknowledge the existence of two types of knowledge in organizations: explicit and tacit knowledge. The first is decoded information that can be broken down and presented in handbooks, schemes and graphs, conveyed through systematic, formal language (Nonaka, 1994); it is understandable for anyone who understands the symbology in which it is presented, and may be acquired through formal education (Thompson; Mendes; Thompson, 2011). Tacit knowledge is personal knowhow incorporated in work experiences, together with skills and expertise, involving intangible facts such as beliefs, values, personal goals, emotions, ideals, competences etc. (Nonaka; Takeuchi, 1997).

The ongoing, dynamic and simultaneous interaction between these two types of knowledge – explicit and tacit – drives the knowledge expansion process. Knowledge generated by individuals is thus expanded and crystallized as part of the knowledge of the organization, through dialogue, discussion and sharing experiences for making sense, with support for communities sharing practices (Takeuchi; Nonaka, 2008). Thus, the first proposition that is analyzed in this paper is:

**P1: The implementation of the donation and transplant process quality management program allows the build-up of knowledge through interaction between knowledge expressed in handbooks, schemes and graphs (explicit knowledge) and personal, subjective knowledge that is incorporated in work experiences (tacit knowledge).**

Making personal knowledge available to others is the key activity of knowledge management, which is grounded on four basic knowledge creation standards (Nonaka; Takeuchi, 1997): Socialization - sharing and creating tacit knowledge through direct experience; Combination- systematizing and acquiring explicit knowledge and information; Externalization – articulating the basic principles of tacit knowledge and converting them into explicit knowledge; Internalization - sharing explicit knowledge allows its internalization.

This knowledge creation process may also be fostered by favorable conditions, such as organizational intent, open-mindedness, redundant information, mobilization of knowledge activists and the establishment of an appropriate organization context (Galbraith, 1977; Takeuchi; Nonaka, 2008; Winograd; Flores, 1986).

For Takeuchi and Nonaka (2008), organizational intent discloses the intentions of the organization for acquiring, creating, accumulating and exploiting knowledge. According to these authors, it is necessary for the organization to be quite clear about the type of knowledge to be acquired and how to bring it into operation.

Creating knowledge also requires people to become more open-minded, through breaking down routines, habits and cognitive structures. This allows basic attitudes to be questioned, introducing new concepts and fostering knowledge development (Winograd; Flores, 1986).
Expressed through redundancy, an abundance of information also fosters knowledge creation as this means the existence of information that extends beyond immediate operating requirements, allowing concepts to be shared with people who do not necessarily need the information (Galbraith, 1977). Conditions that encourage the creation of organizational knowledge include the existence of an organizational structure that fosters collaboration and the use of knowledge activists - people who are considered knowledge benchmarks and who handle its dissemination. (Takeuchi; Nonaka, 2008).

These knowledge creation processes are related to learning, which constitutes a cumulative process through which knowledge evolves, memorizing the effects of past experiences. Based on these remarks, the second proposition to be analyzed is:

**P2:** *When introducing the donation and transplant process quality management program, the organizational learning process is enhanced by the existence of conditions fostering knowledge: organizational intent, open-mindedness, information redundancy, mobilization of knowledge activists and the establishment of an appropriate organizational setting.*

As a process that involves the organization in detecting and correcting errors, the organizational learning process is basically implemented in two cycles (ARGYRIS; SCHON, 1978). During the first learning cycle, workers detect errors and correct their behaviors, without altering the core characteristics of the theory in use. This is an adaptive, corrective or incremental learning curve, as new behaviors are developed under the aegis of the current standards. Actions causing errors are corrected, ensuring efficiency over the short term. The two-tier learning process is rated as a higher level of learning, as this requires altering the organizational assumptions and standards. It allows errors to be corrected, with interventions addressing their causes as the outcome of reflections, analyses and consequent alterations to organizational values. This approach questions the values that steer action strategies, altering or eliminating organizational standards that are not compatible with smoothly-functioning operations. This defines new priorities and standards or restructures those already in place, reformulating official theories (ARGYRIS, 1998; ARGYRIS; SCHON, 1978). These remarks lead to the presentation of Proposition 3:

**P3:** *The implementation of the donation and transplant process quality management program enhances the organizational learning process through an incremental process that detects errors and corrects behaviors and/or alters organizational standards, values and assumptions, eliminating organizational standards that are not compatible with the smooth functioning of the process.*

Fine-tuning processes is a requirement found in the routines of all organizations, whether occurring in a structured manner or not (Mesquita; Alliprandini, 2003). In order to ensure the commitment and coordinated actions of everyone in the organization responding to upgrade programs, it is necessary to develop a culture that enhances the value of learning processes (Gonzalez; Martins, 2011). This leads to the fourth proposition in this research project:

**P4:** *The organizational learning process obtained through implementing a donation and transplant process quality management program underpins fine-tuning the transplant management process.*
2.3. New Practices

Turning new knowledge into new practices – which are sometimes innovative – is an important indicator of organizational evolution. New routines are the way through which organizations implement the knowledge built up during the learning process, through steps designed to resolve problems (Nelson; Winter, 1982).

In service organizations such as hospitals, and highly complex fields such as organ transplants, each type of service rendered has components that make it unique, raising difficulties for defining routines (Djellal et al., 2004). The intangible and relational nature of rendering services offers challenges for standardization, as the outcome or product of the service will always depend on the coordination capabilities and agreement of all the players involved (Gadrey, 2001). For transplants, even though we can measure the outcomes in terms of the procedures undertaken, the composition of the service is not limited to this indicator; it is known that successful organ harvesting and effective completion of procedures depends on practitioner involvement, family sensitivity and the technical conditions in place at the time.

As proposed by Gallouj (2002), the general model for a service product allows the service to be characterized as the outcome of the interaction of assorted characteristics that in turn constitute the process and the final outcome of the service. In this model, illustrated in Figure 1, the final service is the outcome of the competences of the service provider, connected to the competences of the clients (or users) through material and/or immaterial technologies.

![Figure 1- General representation of the service product](source: Gallouj (2002)).

In this model, altering any characteristics in the various vectors means changing the final service rendered. If this alteration results from the deployment of new knowledge, with positive outcomes, this will give rise to innovations in the service. Gallouj and Weinstein (1997) identified six innovation models in services based on this product representation, namely:
• *Radical innovation:* involves the creation of totally new products with end characteristics that are completely different from those of earlier products, which require new competences on the part of the producer as well as the clients. In these cases, it is probable that the technologies in use – whether material or immaterial – are also completely new. Here we have a new characteristics system that results in a service product that is also completely new.

• *Upgrade innovation:* this results from altering some existing product characteristic, as an upgrade and presumably without altering the system as a whole. An alteration to a competence of the service provider, resulting from the organizational learning process, is sufficient to characterize this type of innovation. The service product is modified, but in a specific manner, without the characteristics of the system changing as a whole, and with no substitution or addition of characteristics, consisting rather of a process of upgrading some of the existing characteristics.

• *Incremental innovation through substituting or adding characteristics:* results from the substitution or addition of a specific technical characteristic or competence necessary for the production or use of the product. It may be represented by a new competence – or by a new technology – that lowers production costs, or a new technique with the same effect.

• *Ad hoc innovation:* this is defined as “the interactive (social) construction of a solution for a particular problem presented by a specific client” (GALLOUJ; WEINSTEIN, 1997, p.549). This "interactive construction" in this case results in an alteration to the characteristics of the service rendered, through a specific solution involving elements of any of the mentioned vectors. A crucial element in this definition is the co-production nature of the innovations.

• *Innovation through recombination:* this is related to creating new products through different combinations of existing characteristics for products, resulting in new uses. The existing characteristics remain, but they are arrayed differently, altering the service product. This type of innovation is closely linked to the architectural innovations concept developed by Henderson and Clark (1990).

• *Innovation through formalization:* this type of innovation is related to the quest to establish standards and visibility for changes or innovations introduced. It thus refers to the process of naming a specific service and organizing its sequence, when this sequence involves physical characteristics or services as competences. The introduction of protocols, the adoption of standards and the establishment of good practices for specific procedures are examples of this type of innovation.

The introduction of the DA Program ushers in a systematic evaluation of the donation and transplant process, leading the way for a critical analysis of the procedures adopted, thus paving the way for the establishment of standardized procedures that ensure the best practices are put in place, as already acknowledged for this process. These elements lead on to the following proposition, which addresses alterations to the characteristics of the services ushered in through the adoption of the DA Program.

**P5:** *The implementation of the donation and transplant process quality management program fosters the creation and adoption of protocols that underpin the formalization of procedures for the teams involved in the organ harvesting process, thus fine-tuning the transplant management process through specifications for the services to be rendered and consequently the competences and technologies required.*
2.4. Resistance, difficulties and the required adaptations

When a technology clashes with an organizational culture, and when individual resistance to the system appears, technological solutions and business processes might not match up seamlessly, resulting in the underuse of the tool (Vom Brocke; Sinnl, 2011; Rivard; Lapointe, 2012). Along these lines, Jatene, Consoni and Bernardes (2012) affirm that the successful introduction of service innovations depends on two factors: the players engaged in the process and the existing structure for the innovation, which must incorporate it in the strategic planning and vision of the organization.

People resist technologies, as right from the start they assess not only their intrinsic characteristics, but also how they fit into individual contexts and organizational settings, trying to foresee the consequences of the solution (Suryaningrum, 2012). This technology resistance and acceptance process varies, depending on its implementation phase (Lapointe; Rivard, 2005). Individual barriers are related to individual capabilities for dealing with new situations, events, information and contexts, expressed in the organizational change literature. People might also feel that their self-images are threatened through situations that force them to change in order to adapt to new knowledge (Takeuchi; Nonaka, 2008).

The findings of the survey conducted by Johnson, Zheng and Padman (2012) indicate that a positive holistic perception of a new technology, which these authors call optimism, has significant and positive impacts on the acceptance of the technology being introduced. This impact is greater than the applicability or ease of use of the technology. Consequently, these authors highlight the importance of offering specific training to people involved in the process, arguing that the acceptance of new technologies may take some time to appear and generate results. For Takeuchi and Nonaka (2008), failure and success stories may encourage change or trigger fear of the unknown. Firmly established procedures and habits may also curtail future procedures and hamper alterations to attitudes and behaviors.

From the holistic business process management standpoint, culture is acknowledged as one of the key factors in the successful (or failed) implementation of new business processes through the acquisition of information systems (Llewellyn; Armistead, 2000; Hammer, 2010). As noted by Vom Brocke and Sinnl (2011), although most of the papers published on this topic focus on analyzing organizational cultures, some studies have acknowledged the influence of people’s culture on success or failure in introducing new practices and technologies (Lock, 2008). Thus, the success of a new project depends basically on how well people understand the ways in which a new system or technology could improve processes (Vom Brocke; Sinnl, 2011). In order to implement a new process successfully, individual attitudes must be encouraged through the absorption of innovation in the strategic planning and vision of the organization, offering specific training to all those involved and disseminating success stories in order to buttress their engagement in the process. This leads to the formulation of the following proposition:

\[ P6: \text{The organizational learning process is influenced by favorable individual attitudes among the players involved in the process.} \]

Figure 2 summarizes the five propositions addressed in this study.
3. **Methods**

The general objective of this study is to understand how the *Donor Action*® Program can streamline the organ donation and transplant management process through adding institutional capabilities for accumulating knowledge (Nonaka; Takeuchi, 1997), in addition to developing collective learning capabilities (Argyris; Schon, 1978). As an additional goal, this survey intends to identify and analyze the ways in which the program must be adapted to the culture and specific characteristics of the system in Rio de Janeiro.

Pursuant to the proposed goals, this is an exploratory survey, using the case study method (Yin, 2010). It must be stressed that this entire analysis is qualitative, aligned with the selective case study technical approach. There is thus no intention of exploring the acceptance or rejection of the proposals presented in the theoretical framework, instead comparing them with the evidence collected through the survey. We thus follow the analytical strategy of "adaptation to the standard", as described by Yin (2010), based on the prepared theoretical propositions.

An important aspect for conducting case studies is the selection of the case to be studied (Eisenhard, 1989), as its unique characteristics must justify its selection and consequently its potential contribution to the body of knowledge under examination. Furthermore, the selection of a single case must ensure that it pursues the revelatory purposes of the survey (Yin, 2010).

A decision was taken to study the Adão Pereira Nunes State Hospital (HEAPN) in Duque de Caxias, Rio de Janeiro, Brazil, which implemented the *Donor Action*® Program in order to assess its performance as an organs and tissues harvesting unit for the transplant management system. Inaugurated in 1999, the mission of this Hospital is to render humanized multi-practitioner healthcare services, serving as a reference center for trauma and high risk pregnancy, pursuing ongoing improvement and implementing on-the-job training facilities. Its values are: ethics, commitment, appreciation of people, humanization, efficiency, credibility and service quality. In 2013, this Hospital had 235 beds, offering medical services free of charge to accident victims, together with an emergency room, laboratories, imaging center, hospital facilities and wards. This Hospital was selected because, after the system was
implemented, educational actions allowed it to develop into a benchmark in this field. In 2012, this unit handled 32 organ harvests - three times more than in 2011; by itself, this Hospital harvested more than eleven Brazilian States and was awarded the Organ Donation Promotion Highlight Prize by the Brazilian Ministry of Health. In 2012/2013, a second assessment, also based on the *Donor Action*® Program, disclosed the progress of this Hospital at the various stages of the harvest process.

As interviews are among the most important sources of information for case studies (Yin, 2010), in-depth interviews were conducted with the management staff in charge of the organ harvesting process at this Hospital, as well as with practitioners working in its intensive care center. These interviews were conducted in April 2013, each lasting around an hour; they were all recorded and then transcribed, in order to ensure the highest possible level of accuracy reflecting the statements from the respondents.

The respondent profiles are presented in Table 1. The interview guide was drawn up on the basis of a review of the literature and, in order to complete the triangulations proposed in the literature (Yin, 2010; Woodside, 2010), the internal reports of the Hospital were analyzed, together with direct observation of the system by the researchers. Furthermore, the interviews were analyzed individually by all four researchers, who then sought consensus in the analysis.

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Position</th>
<th>Specialty</th>
<th>Time at the HEAPN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Former Medical Director</td>
<td>Former Medical Director, HEAPN</td>
<td>Neurosurgeon</td>
<td>10 months (Feb - Nov/2012)</td>
</tr>
<tr>
<td>Nurse AP</td>
<td>Nurse in charge of the CIHDOTT at the HEAPN since 2010</td>
<td>Nurse</td>
<td>4 years</td>
</tr>
<tr>
<td>Physician C</td>
<td>Physician, Intensive Care Center</td>
<td>Intensive Care Geriatrician</td>
<td>4 years</td>
</tr>
<tr>
<td>Nurse T</td>
<td>Nurse, Intensive Care Center</td>
<td>Nurse</td>
<td>3 years</td>
</tr>
</tbody>
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Table 1: Respondent Profiles

4. Results and Discussion

4.1. The process of implementing the Donor Action® Program at the Hospital

The first round of replies to the HAS questionnaire took place at the HEAPN in 2010. The idea of adopting the DA Program at this Hospital came from the Transplant Center, which selected some hospitals and issued a proposal for launching the project at that unit. Back then, the CIHDOTT coordinator, who was in charge of implementing the DA Program at the Hospital, also coordinated the Adult Intensive Care Center (ICU Adults). The respondents stated that implementation process "was complex". Nurse T stressed that there were many people and many sectors involved in completing the questionnaire, with some of them being lost. During this initial round, the MRR was not undertaken.

The second stage of the Program took place in 2012. Nurse AP was already effectively established in the CIHDOTT and decided, as she said, "to do something
different”. She circulated the HAS questionnaires directly to a universe of around 300 practitioners, with a response rate of almost 90%.

4.2. Ability to build up knowledge and learning, upgrading the process

*P1: The implementation of the donation and transplant process quality management program allows the build-up of knowledge through interaction between knowledge expressed in handbooks, schemes and graphs (explicit knowledge) and personal, subjective knowledge that is incorporated in work experiences (tacit knowledge).*

These interviews made it quite clear that the institution fosters explicit knowledge through immersion courses and lectures that are constantly offered to practitioners at this institution. Completed by the teams, the HAS questionnaire allowed the Hospital to identify part of the tacit knowledge expressed through the expertise and attitudes of the practitioners involved in the organ transplant process. The former Medical Director believes that the DA Program allows errors to be identified and corrected definitively, through building up the capacities of the entire team, particularly intensivists, through symposia, lectures and courses. Furthermore, Nurse AP spends attention and time on disseminating data and information on the progress of the donation and transplant process at the institution. As explained in the report written by Physician C, after the program was implemented, “there was more information, more training for the team on brain death and donations, as well as how to handle the families”. Along these lines, Nurse T stressed that there is plenty of information available through leaflets. These actions show that knowledge about the donation and transplant process is decoded and transmitted through formal education, concurring with Nonaka (1994) and Thompson, Mendes and Thompson (2011).

Physician C and Nurse T also stressed personal knowledge, embodied in the experience built up through working in the highly complex ICU at this Hospital, through daily practice, where the number of brain deaths is high. In the words of Nurse T: “in addition to training sessions, people learn from each other during the daily routines”. Moreover, Physician C also stressed the personal knowledge provided by the CIHDOTT intensivists who visit the Hospital and assess the patients together with the Hospital physicians, helping them in this process. “Through these joint efforts you learn, so this is also a type of training”, she said. As a result, sharing tacit knowledge at this institution was noted, as described by Nonaka and Takeuchi (1997) and by Thompson, Mendes and Thompson (2011). In the words of the respondents, both types of knowledge are articulated at this institution, with mutual feedback being extended through discussions, dialogues and exchanges of experiences among the practitioners, as urged by Takeuchi and Nonaka (2008). The respondents believe that practitioners are more open to knowledge and that they talk more about this topic.

It is thus understood that the evidence collected is aligned with the theory on this matter, summarized in Proposition 1.

*P2: When introducing the donation and transplant process quality management program, the organizational learning process is enhanced by the existence of conditions fostering knowledge: organizational intent, open-mindedness, information*
redundance, mobilization of knowledge activists and the establishment of an appropriate organizational setting.

Organization intent is one of the conditions fostering knowledge and is present at the HEAPN, to the extent that the current Hospital Management, such as Nurse AP, ensures that the organization is steered towards acquiring, accumulating, exploring and exploiting knowledge. In line with Takeuchi and Nonaka (2008), this institution is clearly aware of the importance of acquiring knowledge and bringing it into operation with the assistance of the DA Program. According to the interviewed managers, one of the main reasons that led to the adoption of the DA Program at this Hospital was the wish to monitor information on the process: how many people were at Level 3 on the Glasgow Coma Scale, with the process not opened? How many patients might have qualified for a protocol and could have generated the donation, but nothing was done? Why was nothing done? As noted by Nurse AP: “most of the patients have trauma, and many of them progress to death, but do they progress to death only because their hearts stop? Or might this be based on the brain death criteria and nobody was paying attention and saw this?” In addition to the entire in-house staff, the managers also sought help from outside participants, who provided support for the process, including the Transplant Center, which is available for whatever is needed, the local Medical Examiner’s Office (Instituto Médico Legal - IML), the Police Station and the Municipal Outreach Action Program. Furthermore, Nurse AP also stressed the support provided to CIHDOTT by the current Management.

Making sure that people are more open-minded through questioning attitudes and introducing new concepts, as stressed by Winograd and Flores (1986), is also found at this institution. Nurse AP believes that cooperation among the teams was a significant change, and that there is today a culture that is firmly established, with teams keenly aware of all the procedures involved in the donation process. She commented on a physician who headed up the ICU and resisted this process, but was encouraged to take some courses and received ample positive feedback on the transplants: “I took him by the hand and led him to a course, to another, and there at the last course that he attended at the Transplant Center he called me over and said: ‘Look, AP, I must admit, I have changed my mind completely; I was never against, but now I am very much in favor’, and today he is saying that he wants to come and work at CIHDOTT. This is a major triumph”.

Another factor stressed by the respondents is the spread of information throughout the entire Hospital (abundance and redundancy of information), including among people who do not work directly with the process. There is currently a culture of recording and disseminating the transplant process figures throughout the entire Hospital, which is a factor stressed by Galbraith (1977) as an important step underpinning knowledge creation at the institution. “Everybody understands the process; the flows are all written down and described, everyone knows the flow, right from the start of the process; today, I know that even the pathology technician must understand the entire process, how it takes place, why it is important for him to be careful with that body, because if there is any alteration to the body, this will result in a complication”, notes Nurse AP.

The mobilization of knowledge activists and the creation of an appropriate organizational context are elements that stand out very clearly in the interviews, personified by Nurse AP, for her dedication to this cause and engagement in the process. All the respondents stress the importance of this nurse for the success of
the Program and upgrading the processes. Nurse T commented that Nurse AP signs people up for the courses and then encourages them to attend; for those who were unable to go, Nurse AP gave them the information subsequently. The evidence is thus aligned with the second Proposition of this survey: the organizational learning process may be extended, when conditions favorable to knowledge are in place.

P3: The implementation of the donation and transplant process quality management program enhances the organizational learning process through an incremental process that detects errors and corrects behaviors and/or alters organizational standards, values and assumptions, eliminating organizational standards that are not compatible with the smooth functioning of the process.

The application of the MRR in the second round highlighted gaps in the identification and notification of potential brain-dead donors. Through the implementation of the DA Program, as with its findings to hand showing the loss of potential donors due to gaps in the process, Nurse AP undertook an active search through analyzing medical records, identifying patients in serious condition who might progress to brain death. The respondents believe that after the DA Program was implemented, the harvesting procedures were more widely disseminated in the ICU and the post-operative neurosurgery unit. As a result, practitioners in these sectors have been paying more attention to patients who might qualify as donors. Furthermore, the former Medical Director and Nurse AP stated that there were some mistaken procedures related to maintaining potential donor bodies, as the necessary medication was often not prescribed by duty physicians. With the DA Program, they started to prescribe the medications that should be taken for maintenance, ensuring better organ conservation.

Nurse AP said that she began to write about her experiences, forwarding papers to congresses and studying this topic. Above all, she underscores the introduction of specific protocols for the Hospital that describe all the transplant process flows: identification, maintenance and family assistance. An indication of the consolidation of these procedures is apparent in the engagement of new employees. What seemed to be a risk jeopardizing the consolidation of these procedures has in fact revealed its strength, as the new employees are rapidly engaged in the defined protocols.

All the respondents believe that there have been significant changes in organizational values in terms of organ donations and transplants. Nurse AP reported that there was some resistance to investing ICU resources and personnel in order to keep deceased patients under maintenance, preferring to allocate them to patients still offering some possibility of recovery: “for example, they saw no need to feed a dead patient; physiotherapy was unaware of its role in the process. Today, things are different; today they will move half the world to get that patient out of the ER and into the ICU. Today, we have a culture that has been established in all categories, being highly aware”, she states. For the respondents, a culture has been established with teams that are keenly aware of all the procedures involved in the donation process, representing, according to the (Argyris, 1998; Argyris; Schon, 1978), a restructuring of the official theory, eliminating Hospital rules that are not compatible with the smooth functioning of the process.

The data demonstrate that the implementation of this Program extended the organizational learning process, through a two-tiered learning process (Argyris; Schon, 1978), confirming the third Proposition of this survey.
P4: The organizational learning process obtained through implementing a donation and transplant process quality management program underpins fine-tuning the transplant management process.

Upgrading the transplant management process requires personal commitments and coordinated action for implementing these upgrades, with a keen appreciation of the learning process. These three factors were present in the situation under analysis.

Commitment is apparent through the Program implementation, and eagerness to monitor all information related to the transplant management process. The mobilization of Nurse AP and the engagement of new employees after errors were detected and capacity-building sessions were held also illustrate this commitment.

Coordinated actions were ushered in through establishing a culture that acknowledges the importance of transplant management, with the teams becoming more keenly aware of all the procedures involved in the donation process. As mentioned, Nurse AP believed that team cooperation was a significant change, while Nurse T and Physician C also stressed the learning process for the teams in practice as part of the routine, together with cooperation with external participants, such as the CIHDOTT intensivists.

Finally, enhanced appreciation of the organizational learning process was apparent in the statements, due to the importance given to explicit knowledge through immersion courses and lectures constantly offer to the practitioners, together with widespread dissemination of information on this topic to the entire team, and disclosure of the transport process figures to the entire Hospital.

Data on transplant management are collected and analyzed on a monthly basis, providing transplant process management indicators. For example, these indicators present information on the number of brain death notifications sent in, the number of organs harvested, and the number of organs that could not be harvested due to the absence of family consent, as shown in Figure 2. In addition to providing input for these reports, these data are shared with all the teams linked to the transplant process through what is known as a Management Panel. In addition to these data, this Panel presents the sources of the problems and how they will be resolved. This Panel hangs on the wall of the CIHDOTT room at the Hospital.

![Figure 2: Transplant Management Indicators](image)

Source: prepared by the authors
Consequently, the data support the Proposition 4, which suggests that the organizational learning ushered in through implementing the Program underpins the enhancement of the transplant management process.

4.3. New Practices

P5: The implementation of the donation and transplant process quality management program fosters the creation and adoption of protocols that underpin the formalization of procedures for the teams involved in the organ harvesting process, thus fine-tuning the transplant management process through specifications for the services to be rendered and consequently the competences and technologies required.

The replies of the respondents help identify important changes in the service characteristics, as from the introduction of the DA Program. Several characteristics of the transplant service were altered through the introduction of new practices modifying the competences of the service providers and the material and immaterial technologies mobilized.

At least three elements in the competences of the service providers were modified: donor identification, organ maintenance and assistance offered to donor families. These elements are thus associated with changes in the C vector, illustrated in Figure 1, with immediate repercussions on the end characteristics of the service (vector Y, in the same Figure).

As already reported, the identification of possible donors was altered through active search procedures. Above all at the Intensive Care Center and the post-operative unit of the Neurology wing, an analysis of brain death criteria was adopted as a procedure, together with monitoring the medical records of patients in serious conditions. This procedure was introduced after noting that potential donors were lost when these patients were not identified in good time.

Another key aspect was the introduction of new donor maintenance procedures. The introduction of the DA Program showed that the maintenance procedures were not being followed properly in all cases. The need to keep donor bodies in an Intensive Care Unit, with round-the-clock treatment until the organ harvesting procedures are completed, were systematically included in the transplant management protocol at this Hospital, prompting alterations to the competences of service providers mainly through capacity building sessions, but also maintenance-related technical aspects that have to be reviewed, consequently requiring changes in the technologies deployed (vector T in Figure 1).

Finally, the reports showed that the relational aspect of the survey is crucial for the success of the transplant management process. This aspect is reflected in the donor family assistance procedures. Once they have been told that brain death has been declared they are then offered explanations about the process, clearing up their doubts. The family assistance steps are crucial for service quality, in order to ensure that its goals are attained in full. Investments in systematic capacity building for the practitioners involved, and the adoption of clear procedures for these activities are also positive consequences of the service resulting from the constant assessments allowed by the introduction of the DA Program.
Returning to the service product representation illustrated in Figure 1, it is apparent that the adoption of the DA Program prompted the Hospital to alter the characteristics of the service provider competency sector, as well as those related to technology and the end services. This study did not conduct any direct assessment of the modifications to the user competences, consisting of donor families as well as organ recipients.

Based on the theoretical model mobilized (Gallouj, 2002; Gallouj, Weinstein, 1997), the new characteristics and / or modifications associated with the transplant services rendered at this Hospital may potentially constitute incremental innovations, upgrades and formalization. However, this analysis requires the findings to be monitored for a longer period of time, extending beyond the scope of this survey.

Nevertheless, the comment on how these procedures were integrated with the training activities, and the quantitative outcomes described here indicate the formalization of these new practices defining and adopting the protocols that encompass them. Consequently, this indicates that our Proposition 5 is also corroborated.

4.4. Resistance, difficulties and the required adaptations

P6: The organizational learning process is influenced by favorable individual attitudes among the players involved in the process.

As reported by the respondents, the DA Program was included in the strategic planning and vision of the HEAPN, particularly due to the personal interest of the former Medical Director in these topics and engagement of Nurse AP. Thus, the Program did not clash with the organizational culture, and there was no resistance to this process. All the respondents felt that the DA Program was well matched to the Hospital processes, needing no adaptations for its application. For Physician C and Nurse T, “all the questions made sense”. According to the literature, this alignment allows the success and full use of the potential facilities offered by the system that is being introduced (Vom Brocke; Sinnl, 2011; Rivard; Lapointe, 2012; Jatene; Consoni; Bernardes, 2012).

For Nurse AP, the main difficulty encountered was the size of the HAS questionnaire, which the respondents felt was very long. “People felt the questionnaire was very long, and they wondered about the number of questions. Everybody wanted this to be something succinct. My main difficulty was explaining to people that this is really an important study that is worth the time spent on it”, she notes. Among the respondents, the physicians were the most resistant to implementing the DA Program, also because they found the questionnaire too long.

In order to overcome these resistance, the persistence of Nurse AP was crucial, engaged in establishing an organizational context that paved the way for the success of this Program. In addition to constantly offering courses and lectures as already reported, Nurse AP believes that it is very important to provide feedback on the effort under way, with information on how many people are on the waiting list and how many could benefit through joint efforts. This nurse also stated that: “when an article on transplants come out in the newspaper, I show it to the team and say: ‘look here at the results of your work, thank you! So people say: goodness, that gives me
goosebumps!’, ‘that leaves me shaky, how great!’; this type of feedback ensures that they are far more motivated”. Furthermore, Nurse AP also provides feedback to the Intensive Care Unit heads and physicians. For the teams taking care of the body, this nurse encourages everyone to follow the entire process, believing that this boosts motivation: “you are caring for the patient, don't you want to see how the organs are harvested? Let's go over to the Surgery Center, let's watch, let's see”. These attitudes spur what Johnson, Zheng and Padman (2012) call optimism about the newly adopted process/technology through disseminating success stories which drive change and encourage acceptance of innovations (Takeuchi; Nonaka, 2008).

The evidence presented consequently corroborates Proposition 6 of this survey.

5. Conclusion

This paper presents the findings of the survey conducted to understand how the DA Program can help the organ and tissue donation and transplant management process through adding institutional capabilities for building up knowledge, as well as through the development of collective learning abilities. It also analyzes the need to adapt the Program to the cultural and specific characteristics of the system in Rio de Janeiro, as this is an international program.

A case study was conducted at the Adão Pereira Nunes State Hospital in Rio de Janeiro, which became a benchmark for the organ and tissue harvest process after the implementation of the DA Program, with better capacity building for the teams, and a shift in its organizational culture, while upgrading the transplant management process at this Unit.

The findings presented show how the introduction of this Program underpinned the ability to build up knowledge for the organization, through articulating tacit and explicit knowledge, while also fostering the development of organizational learning through a two-tier cycle. Conditions favoring knowledge, such as organizational intent, open-mindedness, redundant information, mobilization of knowledge activists and the establishment of an appropriate organizational setting proved important for the organizational learning process.

It was noted that the implementation of this Program not only allowed errors to be detected and behaviors corrected, but went even further triggering shifts in values and eliminating rules that were not compatible with the smooth functioning of the process.

With regard to the new practices, it was noted that the adoption of the DA Program prompted the review of many procedures and the introduction of new protocols, with direct impact on the quality of the services rendered. According to the theoretical model used for this analysis, we could identify innovations in the transplant service at this Hospital. However, as the indicators are subject to time constraints, we prefer to present them as new practices introduced, setting aside their analyses as de facto innovations for future investigations that allow a longitudinal analysis.

It was also noted that the organizational learning process was influenced by favorable individual attitudes among the people involved in the process. Attained
through implementing the Program, this learning curve helped upgrade the transplant management process.

The theoretical propositions presented were thus corroborated by the collected evidence, warranting further investigation in the future.

The contributions to this research are both theoretical and practical. As a theoretical contribution, this research can foster the development of subsequent research projects examining how bring together institutional abilities to build up knowledge and the development of learning capabilities can upgrade management processes, particularly in the healthcare fields. As a practical application, it is hoped that the findings presented here can encourage the deployment of practices upgrading processes of other healthcare units involved in transplant management processes.

References


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