



## INNOVATION AND CONTINUOUS IMPROVEMENT IN THE BÚRIGO CLINICAL ANALYSIS LABORATORY

Renan Grijó Búrigo<sup>a</sup>, Nério Amboni<sup>a</sup>

<sup>a</sup>Santa Catarina State University

### Abstract

The article aims to analyze the impacts of projects Escalpe (Intravenous Infusion Catheter, in Portuguese), SMS, and Vaccines for patients, implemented by the Improvements Group of the Búrigo Laboratory under the dimension of innovations (products, processes, marketing, and organization), proposed by the Oslo Manual, from the Organization for Economic Co-Operation and Development (OECD). The theoretical structure of the research involves the topics related to quality and innovation inside organizations. The data and the information was collected through bibliographical research, documental analysis, interviews, and observation. The results found demonstrated that the Improvement Groups contribute to innovate products/services and processes in Búrigo Laboratory. The findings also match Oslo classification, and that innovations in services are much more incremental than radical. Improvement Groups represent a strategy to a continuous search for excellency in services and relationships among the stakeholders.

**Keywords:** Innovation; Clinical Laboratory; Quality; Improvement Groups.

### 1. INTRODUCTION

In a business environment that is everyday more and more competitive, the ability to innovate is considered a strategic resource to the survival and longevity of an organization. For Sacramento *et* Teixeira (2013), the adoption of innovative practices promotes the search for competitive differentials, in order to respond and to go beyond consumer market demands. As for Barney (1991), a company develops a competitive advantage upon its competitors at the moment it implements a strategy that was not yet adopted by no other company. According to Gem (2007), the innovation in products, services, processes, management technologies, and in business models represents the watchword in a search for competitive differentials in Brazil and in the world.

The clinical analysis laboratories (CAL) are having many changes due to the demands of the Society of Information and Knowledge, either in the relationship with their clients, or in management, or even in proceedings and processes, aiming to target the excellency in quality of the offered services (Castells, 1999). In the past, the analysis was conducted by few professionals, as the demand was smaller and the

process only allowed the analysis to be done one-by-one, artisanal and manually. With the automation, starting in the decade of 1970, the life of the laboratory professional started to change, but the great transformation, based on Felder *et al.* (1990), and Pereira (2012) occurred on the following decade, when in Brazil the importation of equipment was finally permitted, and again in the decade of 1990, when information technology brought new concepts seen in softwares, with the integration between machinery and the main diagnosing instruments.

Oliveira *et* Mendes (2010) comment that, when observing only Brazil's domestic scenario in the field of laboratorial development, managers and their teams are now confronted on a daily basis with the necessity to demonstrate crescent levels of technical excellency, to guarantee reliability of the results, with shorter delivery times, larger *menu* of offered exams, and cheaper prices/lower budgets to continue being competitive. Besides those elements, out of the clinics there are legal and regulatory requirements, new expectations and necessities from clients (soliciting clinical body, patients and relatives, funding sources, and external researchers), the recommendations and directives of scientific societies,



technological innovations, pressure coming from competitors, and suppliers with a wide variety of new products. The quick evolution of processes also have created a demand for better instruction and preparation of the professionals, and the adoption of more efficient quality management tools for laboratories searching to the excellency of the offered services.

In a clinical laboratory, the component of the quality control system is defined as every systematic action necessary to generate reliability for laboratory services, in order to answer to the necessities of health of the patient and to prevent errors. For Martelli (2011), the quality control program is defined as a system of managerial programs that allows necessary conditions to improve quality control, in order to achieve client's satisfaction, solving non-conformities and promoting improvements in the system as a whole. The Improvement Groups, according to Campos (2004), they represent an innovative proposal to resolve issues found, as well as they can be motivated to create/innovate products or services and processes, among others, in health organizations.

In this direction, the article aims to analyze the influence of the projects Escalpe, SMS and Vaccines for patients, implemented by the Improvement Groups of Búrigo Laboratory, under the dimension of innovation (products, processes, marketing, and organization) proposed by the Oslo Manual, from the Organization for Economic Co-Operation and Development (OECD, 2005). The article is structured as follows: 1) introduction; 2) theoretical argumentation regarding innovation of organizations, quality, and continuous improvement; 3) methodology; 4) presentation, analysis and discussion of results; 5) final considerations and references.

## 2. 2. QUALITY AND INNOVATION IN ORGANIZATIONS

### 2.1 Quality and continuous improvement

In the end of the second millennium, the corporate scenario can be described as a constant search for achieving total quality as means for business survival and competition. But it was before, since the Industrial Revolution, with the development of working tools and measuring unit systems both in England and in the United States that quality started to develop, and it still in progress until today. The studies of Garvin (1992), Feigenbaum (1994), Shank *et* Govindarajan (1997), and Ryan *et* Moss (2005) demonstrated the path taken by corporations to achieve today's management of total quality: a) the Era of Inspection (quality focused on the product); b) the Era of Statistical Quality Control (quality focused on the process); c) the Era of Quality Guaranteed (quality focused on the system); and d) the Era of Total Quality – or TQM (quality focused on the business).

The Era of Total Quality Management, according to Mainardes, Lourenço and Tostini (2010), is a natural evolution from the three previous eras and it is presently ongoing. Quality management is applied in everything inside the organization, in all levels and areas, including sales, finance, purchasing, and other activities not linked directly with production. The concept of total quality management is wide, involving not only quality aspects, but also benchmark activities, projects of products and processes, supplies, logistics, and problem-solving, and it is strongly supported on the people of the organization.

Damazio (1998) defined TQM as a philosophy that uses quality as a basic attribute in all processes, moving through all people in the organization when reaching the goal in the first time. The author defined nine principles of TQM: total satisfaction from clients; participative management; development of human resources; constancy in proposals; continuous improvement; process management; delegation of powers; management of information and communication; and guarantee of quality. Based on the NBR ISO 9000 (2000) standard, there are eight quality management principles: 1) focus on the client; 2) leadership; 3) involvement of people; 4) process approach; 5) systemic approach for management; 6) continuous improvement; 7) factual approach for decision-making; and 8) mutual benefits in the relationship between the corporation and its suppliers.

Quality management, therefore, can adopt programs that were developed inside the corporation or based on external standards, which need to be capable to demonstrate a level of assisting excellency by the continued improvement in management, in structure, in processes, in people, in results, and in the relationship among the social actors. The idea of continuous improvement is linked to the capacity to resolve problems through small steps, in high frequency, and in short cycles of change (Bessant *et al.*, 2001). Under the perspective of Briaies (2005), the idea is based on the elimination of waste through cheap solutions, based on motivation and creativity of collaborators to improve business' processes.

For Shiba *et al.* (1997), managers must understand the improvement movement as a process, with the goal to generate a direction and a support to engaged collaborators in improvement activities. The process can differentiate from one to another organization, which means, the *how to do* and the *how to achieve* the essential competences to a continuous improvement, aiming to reach a common result: the essential competency to a continuous improvement. The essential competences, by Mesquita *et* Alliprandini (2003) are those that build a source of competitive advantage for the company, and that were constructed throughout a long period of time, and are hardly copied by other competitors.



Other approaches are also important, such as the ISO 9000 and the QS 9000 quality systems, PDCA (Plan-Do-Check-Adjust method), QFD (Quality Function Deployment, used to translate the necessities and desires of clients in requirements for projects of products and services), once, depending on the level of practice, they can define the level of maturity of an organization in relation to continuous improvement. For Mesquita *et al.* (2003), the organization changes in its levels, building basic abilities, and developing behavioral standards for continuous improvement.

## 2.2 Innovation in organizations

Innovation has been the center of discussions since the beginning of the 20<sup>th</sup> century, when Schumpeter (1982) differentiated it from invention. For the author, invention is an idea, a scratch, or model for a new or improved artifact, product, process, or system. An innovation, in an economical sense, is complete when there is a commercial transaction involving an invention, and then, wealth. As Santos *et al.* (2011) said, the incorporation of innovation occurred by the absorption of new technologies, concepts, processes, management models, people, and ideas. According to the results of the Research for Technological Innovation (PINTEC, 2010), 88.3% of the companies that adopted innovative practices had, at least, one positive impact: an increase of company's share in the market, improvement of quality of offered products/services, and an increase in productivity output. Henriques *et al.* (2008) also argue that the implementation of innovative practices generates an improvement in the processes of the organization, reduction of costs, increase in productivity, and aggregation of value to products/services, creating a differential profile into the market.

According to OECD (2005), an innovation can be described as an implementation of a new or significantly improved product (good or service), process, marketing method, or organizational method into business practices, into workplaces, or into external relations. The improvements in companies can occur in various forms and formats. Some insert themselves into well-defined innovative projects, such as the development and introduction of a new product, while others have continuous improvement in their products, processes, and operations.

Oslo Manual is the main international source for directives to collect and use data from innovative activities in the industry. It aims to guide and standardize concepts, methodologies, and the construction of research statistics and indicators for R&D of industrialized countries. Its predecessor, the Frascati Manual, which was edited in 1962, originated a series of publications by the OECD, later known as the Frascati Family. The first edition of the Oslo Manual was in 1990. The first translation to Portuguese was produced and

released by FINEP electronically, in 2004. In 2005, the third publication was released (OECD, 2005).

The classification of innovation developed in the OECD is divided in four categories:

- 1) product: is the introduction of a new or significantly improved good or service in its characteristics or intended uses;
- 2) process: implementation of a new or significantly improved production method or distribution;
- 3) marketing: implementation of a new marketing method with significant changes in product or packaging conception, and/or product placement in its promotion or in its price fixing;
- 4) organizational innovation: a practice of a new organizational method in company business, in organization of the workplace, or in its external relations.

Tidd, Bessant and Pavitt (2008) include the innovation of position (re-launching of a product with a new use) and innovation of paradigm, with changes in subjacent mental models that forge what the company does (the provision of online insurance products for low cost air companies, for example). Such ideas are near those already developed by Schumpeter (organizational, product, market, and input process of innovation types). According to Nodari *et al.* (2013), such classification matched the document produced by the Innovation Forum of Business Administration School of São Paulo, at Getúlio Vargas Foundation.

Innovation can be incremental and radical. It is incremental when a product, process, or service is improved. Such improvement can occur with the inclusion of new materials, as it happens with packaging, for example, making them more practical to be used, or even when the organization decides to add differentiated uses or evident improvements to become even more desired by clients/consumers. It is radical when new ideas result in brand new products or processes, which did not exist previously in the market (MBC, 2008). For the OECD (2005), in services, innovation is organized in a less formal structure as it has a more incremental nature with less technologies. This means services have characteristics that are specific from manufactured products, as intangibility, simultaneity, perishability, and low protection of intellectual propriety (Sacramento *et al.* Teixeira, 2013).

In the area of health, innovation in services and products is under discussion in all levels (international, nation-wide, regional, and local), as survival and competition of laboratories are directly associated to the capacity of innovation, or in other words, the capacity of laboratories to offer a pro-



duct and/or a service with superior quality and aggregated value to clients. Such values were considered as a strong indicator of market share, once they can be converted into competitive advantages (Seki *et al.*, 2003). The chain of values, developed by Porter (2005), shows the connection between the organizational strategies with the processes used in the development of laboratorial activities, generating some sort of value to the client. Gonçalves, Barbosa and Martins (2012) also argue that the change in production or distribution methods impact the value for clients and reduce costs. In the view of Tigre (2006), the changes in organizational processes are more difficult to implement than the ones using technologies, because the first require alterations in business processes, changes command and hierarchical chains, new formats to access data, and changes in organizational routines used for a long time.

The understanding of Farias *et al.* (2011) in the topic says there is significant room to diffuse innovations in health services, such as the optimization of working processes; reduction of costs in acquiring information related to safety of products under health surveillance control; c) more accurate audit script; reduction of costs in project production and increase in the level of users' satisfaction. These innovations can improve service standards that are seen as a social benefit, and also can help to improve the productivity, as health organizations need to innovate both to improve productivity and to increase users' satisfaction.

According to Mendes (2011), the innovation in clinical laboratories is also influenced by health professionals, users, suppliers, and managers. The interaction among these different interests and expectations, and the capacity to negotiate acceptable solutions to all actors are fundamental for the innovation to be implemented and consolidated. On the other side, innovation can be halted by internal and external elements, such as changes in consumers' behavior; price freeze; specialized workforce (excess or lack); rigid legislation; managers' business orientation, and pressure coming from big players. As catalyst facts of innovation, there is leadership, strategic view and plan; organizational environment; capacity to assume risks; flux of information; qualification of the team; and organizational culture (Carayannis, Gonzalez, and Wetter, 2003; Omachonu *et al.*, 2010).

### 3. METHODOLOGY

The research can be described as a descriptive and qualitative case study (Bruyne *et al.*, 1977; Trivinos, 1987) demonstrating the impacts of the projects Escalpe (Intravenous Infusion Catheter, in Portuguese), SMS, and Vaccine for patients, implemented by the Improvement Groups of Búriço Laboratories, under the dimension of innovation (products, processes, marketing, and organizational) proposed by the

OECD's Oslo Manual (2005).

The data and the information was collected through different techniques – bibliographical research, documental analysis, interviews, and participating observation. The bibliographical research involved a review of concepts, and theoretical and practical arguments regarding the topics quality and innovation. The documental analysis included the research and study of documents and reports from the studied company, regarding Project A (Escalpe), Project B (SMS for patients), and Project C (Vaccines for patients).

There were 13 interviews with professionals, being nine members of the improvement groups, one coordinator, and three managers. The objective was to identify the benefits generated by each project, as well as other possible relevant information to fully understand the topic. The participating observation occurred as one of the authors was the general director of the laboratory, acting and interacting with the participants of the improvement groups, from 2011 to 2013, sharing his everyday routine and the meanings found in the implementation and follow-up of projects. For Morin (1997), knowledge is pertinent when man is capable to build meaning into a global context, or in order words, see the *complexus* setup. The participative observation motivates social interaction, which enables the acquisition of knowledge from one part to the whole, and vice-versa (Queiroz *et al.*, 2007).

The data and information collected are organized and described in a descriptive format, according to the projects analyzed. Next, there was the qualitative analysis and interpretation of data and information gathered, supported by the theoretical and practical fundamentals, and in regards to the classification of innovation present in OECD Oslo Manual: innovation in product and/or service; innovation in processes; innovation in marketing; and organizational innovation.

## 4. PRESENTATION AND DISCUSSION OF RESULTS

The topic involves the characterization of the researched laboratory regarding its history, organizational structure, services provided, and staff. In sequence, there is the description, analysis, and discussion of projects implemented in the researched laboratory.

### 4.1 The Búriço Laboratory

The researched organization is the Búriço Laboratory, which offers services to companies, physicians, health plans, schools, individuals, veterinarians, among others. The laboratory has clients over the south part of Santa Catarina state, having collection units in five different cities, with headquar-



ters in the municipality of Criciúma. In total, there are 14 primary service units. The Búriço Laboratory is in the market of clinical analysis for more than 30 years, and lately, it has been through a process of succession, with the son taking over the roles and activities, and as the director of the organization.

#### 4.1.1 History

The structure for laboratorial exams was not build from night to day. The process that initiated and supported the name of the Búriço Laboratory in the market started in 1981, when the first headquarters was open. The work was done mostly by one laborer, who had to collect blood and be a receptionist at the same time.

Between 1990 and 1995, health companies started to have more access to equipment and reagent produced abroad, and to keep up with the scientific development and the increase demand in exams, the technical management of Búriço Laboratory invested in more modern and up-to-date equipment. In 1995, through an agreement, the laboratory started to produce exams to a hospital in the city. To guarantee good quality in service, the direction decided to build a new headquarters, near the client hospital, much wider and modern than the previous building, in 1995.

In 2005, the Búriço Laboratory achieved its main goal: to be accredited in guaranteeing and proving all its quality in exam processing. At this time, this accreditation was done by the Brazilian National Accreditation System, a specific organization under the **International Organization for Standardization** (ISO 9001), bringing even more quality and trust in the services provided.

In the year of 2010, it was initiated the implementation of the Continuous Improvement Program, sharing the philosophy of a participative administration throughout the Laboratory. In the beginning, many ideas arose and were implemented. In 2012, a new technical area was built to produce exams according to all standards set by current legislation, which later became a reference to many other laboratories in the state of Santa Catarina.

#### 4.2. Continuous Improvement Management: Methodology of operations

The project developed by the improvement groups, according to the methodology created by Búriço Laboratory, can arise in two formats: based on complaints/suggestions from clients/collaborators, and based on ideas from collaborators. According to the origin, the projects can have more or less steps, as well as used different quality measuring tools.

One of the origin formats of projects is related to the notes of complaints/suggestions in the QMS (Quality Management System) digital system. These notes can arrive at any step of the process of laboratorial exam, from the moment of registering clients and exams, then on the collection of material, the performance of the exam, or even when delivering the laboratorial report, or from the answers in the client's satisfaction research. In sequence, it is possible to observe the steps of registry and treatment of complaints/suggestions, developed according to quality standard ISO series 9000, using the MASP methodology (Portuguese acronym for Method of Analysis and Troubleshooting), and PDCA (*Plan, Do, Check, Act*) cycle.

- **Identification of the problem:** the problem can be detected internally (collaborator) or externally (client). The problem can arrive from pre-analytical, analytical, or post-analytical stages, in different types of registry.
- **Immediate action:** what is done immediately to "solve" the issue. In the case immediate action cannot fully solve the issue, it must at least reduce its impact in order to control the situation.
- **Analysis of causes:** the use of Ishikawa Diagram works to investigate and identify the origins of the problem.
- **Definition of corrective/preventive action:** the actions are defined to prevent and fully resolve the problem. When the action is simple and done immediately, only the information of what needs to be done; however, depending on the complexity, it may be required to develop a project, designed to improve the process in focus and to suppress any gap the corrective action was not able to solve.

In sequence, the stages of formulation, follow-up, and finalization of the projects are presented.

**Launching an idea:** this stage is related to the arrival of an idea from the improvement group, which could be a result of a corrective/preventive action, or from an idea from a member of the group. The idea is explained in details to be clear regarding the intended stages to solve the problem. The objectives, benefits, and targets of the project are highlighted. Brainstorming is used as a tool to define the best idea and/or treatment.

- **Approval by the quality manager:** approval or denial of the idea according to the elements exposed by the group.
- **Planning the activities:** the group list everything that





will be performed to implement the project, from the person responsible for the project to deadline. They use the 5W2H tool to gather the information required.

- **Approval by the quality manager:** approval or denial of the activities planning.
- **Budgeting:** the group informs all necessary resources to implement the project, including supplier and values.
- **Approval by the directors:** approval or denial of the presented budget.
- **Implementation of the idea:** after all previous steps are approved, the group is free to develop and implement the project according to the defined activities.
- **Evaluation of effectiveness:** the quality manager evaluates the effectiveness of the project through criteria of project origin (by occurrence or idea), usefulness in practice, complexity, and goal achievements. In the case effectiveness does not achieve a minimum standard, the project needs to be redone according to the steps previously mentioned.

The second alternative involves ideas originated from collaborators not related to complaints/suggestions. Such situation occurs when members of groups visualize that some process of stage can be improved and/or a new service can be included, as well as ideas of projects of social responsibility. Therefore, the first four stages are eliminated, moving to the stage **Launching an idea**. The stages after are the same as described on the first alternative.

### 4.3 Description of results of projects implemented at the Búriço Laboratory

The project selected for this research (A – Escalpe; B – SMS for patients; and C – Vaccines for patients) comprehend intrinsic differentiations due to the area they are assigned. As for differentiation, it is understood these projects are products and/or processes not yet implemented by competitors, who are also providers of laboratorial service of clinical analysis in the south region of Santa Catarina.

#### *Project A – Escalpe*

The project **Escalpe** (Intravenous Infusion Catheter, in Portuguese) was developed by the improvement group **Na Mosca** (Bullseye, in Portuguese), constituted by five parti-

cipants from Lobby and Technical areas. According to the members of the group, it started with a complaint from a client whose son needed to have a functional test, including the collection of blood samples, and as a consequence, five punctures. The project started on October 7<sup>th</sup> 2011, with the objective to reduce the number of punctures and increase clients' satisfaction. The expected benefits by the group was to reduce the number of punctures, increase clients' satisfaction, and to have another differential for the laboratory. The total cost of implementation of the project was R\$ 956.75, which included the material required and training the collection team. After implementation, the collaborators took some time to feel at ease with the new technique of collection offered to clients. Some activities were performed so the standard was set into the routine, as training with the supplier of the intravenous infusion catheters for attendants and for the collection team supervisor, so the later could properly overlook the team, focusing on effectiveness. The effectiveness evaluation was performed by the quality manager in June 6<sup>th</sup> 2012, and by the rsector manager responsible for the area in which the project was applied. The participants gave a grade of 9.0 out of 10, being 1 = extremely awful, and 10 = extremely good. The result achieved in the evaluation of the project was confirmed by the discourse of three out of five members of the improvement group Bullseye, renamed as interviewees 1, 2, and 3, as follows:

*This project came as a great promise to overcome client's expectation, and to be another differential in quality service delivery of the Laboratory, which is confirmed by a specific research with clients that used the method. One of the main benefits was identified during the implementation of the new method, and without a doubt, was an immediate satisfaction of the client. The recognition of quality service delivered by the laboratory and customer loyalty.*

*No one likes collecting blood, being stuck with a needle, then imagine when the exam requires a series of collections... It is gratifying to know a project of your team became the proceeding for a less traumatic collection procedure for the client. With the use of the catheter, these collections are much calmer nowadays.*

For the interviewee 3, *"to implement the Escape project in the laboratory was really gratifying due to the positive feedback from patients who used the method, praising and highlighting the differential we had towards the other laboratories"*. The results reached with the Escalpe project also confirm the fragments of discourse collected with the three members of the improvement group Bullseye, which means:

- a) *new collection methodology (new service):* the catheter is a new format for collecting, in which the vein is punctured only once, and the collector only changes the tubes. It can be placed for minutes or



hours on patient's arm if necessary to perform long-lasting exams, or the ones that require large amount of blood;

- b) *new materials used*: the catheter is more modern and less aggressive material when compared to syringes used in the past, because they not only have mechanisms to protect the patient and the laborer during the collection, but also reduce the possibility of wounds, such hematomas. It also minimizes the chances of work accidents, once the blood moves from the catheter directly to the tube. With the methodology used in regular collections, the blood must be transferred from the syringe to the tube, with the possibility of hemolysis and spills;
- c) *new formalized proceedings*: with the implementation of this methodology, new proceedings were described and implemented, generating knowledge to all collaborators who had access to this type of documentation;
- d) *quicker, less painful (because it is only one puncture), more effective collection format*: the collection is quicker, as the tubes fit straight into the catheter. It is less painful, as many collections can occur, in different schedules, with many different tubes, and with only one puncture in the patient, which is more effective due to the speed and agility.

Project A (Escalpe) is incorporated to the routine, as the laboratory continues being the only one to perform this type of collection in the region. The improvement group Na Mosca, before finalizing the project, used a satisfaction survey with clients who had collections supported by the philosophy of the project. The results of the survey demonstrated a positive outcome from the researched in the case they were required to have another collection; they also affirmed they would recommend the new methodology to relatives and friends. The new methodology of collection, because it is different from the traditional, demanded theoretical and practical training for the collaborators of Búriço Laboratory.

#### *Project B – SMS for patients*

The project **SMS for patients** was developed by the improvement group **Elite Troop**, composed by IT, Lobby, Quality, HR, and Purchasing areas. Its main goal is to send a SMS message for patients when their reports were ready. Then, the patient gets a message informing that the report can be downloaded from the Internet, or he could also get the printed version in any laboratory service unit. The expected benefits were related to the disclosure of the results of the exams, or in other words, to remember clients their reports

were ready. The project started on December 17<sup>th</sup> 2011 and ended in December 28<sup>th</sup> of the same year, with 70% of the clients getting SMSs at the moment the reports were ready. It was not possible to achieve 100% of the clients because some patients were hospitalized (and had no cellular phone number in their profiles), thus as others who did not have or were unable to declare their cellular phone numbers. The total investment was R\$ 558.00, which included purchasing a computer system and training of attendants. The effectiveness evaluation was performed by the quality manager and the manager responsible for the area of application in June 4<sup>th</sup> 2012. The final grade of the managers was 9.5 out of 10, being 1 = extremely awful, and 10 = extremely good. The grade achieved is confirmed by the fragment of discourse of three out of the five members of the improvement group Elite Troop, renamed interviewees 1, 2, and 3:

It is gratifying to see a project in practice, and to know you were part of its implementation. The project SMS helped to deliver the results. The patient comes to the unit to get his report only when all results are ready, and some before the deadline.

The project "SMS Report" started as a benefit to the patient that came to the laboratory to get the results of the exams, when most of the times they were not yet ready. Then, as a project, the patient gets an SMS in his cellular phone when all results are ready, facilitating the removal of the report.

The idea of implementation of SMS messages came with the modernization of today's means of communication, and the necessities of clients through information gathered by clients' satisfaction surveys produced by the quality department. The project was launched by the continuous improvement group Elite Troop, with the approval by the directors, and just after that, the clients started to get messages on their cellular phones with information regarding the day their reports would be ready to download/pick-up, and happy birthday messages. It had good acceptance by the public, which whenever possible, made comments or thanked the messages sent.

The results achieved with the SMS for patients also confirmed the discourses observed from the three members of the improvement group Elite Troop. The results were the following:

- a) *before there was no means to tell the client the exam reports were ready*: without the SMS, patients did not know when their exam reports were ready, ge-



nerating troubles in locomotion. In many cases, the exams were ready prior to the deadline, but the client was still unaware of this fact;

- b) *new service of communication with the client*: SMS is also used as means to communicate with the client in other dates, as sending messages in commemorative days. This new channel of communication was evaluated positively by the patients, both by the easiness it generates and the awareness they had knowing when their exam reports are ready, avoiding losses in time and locomotion.

### Project C - Vaccines

The project **Vaccines** was developed by the improvement group *Backyardigans*, composed by five participants from Lobby and Technical areas. The idea came from a large demand for flu vaccines during the H1N1 peak, in the Winter of 2012. The initial thought was to sell the vaccines together with its application, thus finding more clients, both people and companies. According to the members of *Backyardigans*, the project aimed to place the laboratory in a new area of the market, providing and applying vaccines to people and companies interested in the product/service. With the Vaccines, the team expected all collaborators to be vaccine against H1N1 and that the laboratory improved financial results of the period. The project initiated on June 20<sup>th</sup> 2012, with the purchase of vaccines, restauration and preparation of the application room. The total cost, including the restauration of the room to the taxes, bureaucratic paperwork from public authorities and purchasing of vaccines was R\$ 62,381.83. In October 2012, the Vaccines sold 98% of the 2,000 doses purchased, besides the restoration of the room and approval from the competent institutions. The evaluation of effectiveness was performed by the quality manager and by the manager responsible for the area in which the project was applied in September 11<sup>th</sup> 2013. The grade given was 9.0 out of 10, being 1 = extremely awful, and 10 = extremely good. The grade achieved in the evaluation of the project is confirmed by the fragment of discourse of three out of the five members of the improvement group *Backyardigans*, renamed interviewees 1, 2, and 3, as follows:

The project came from the large amount of calls of people asking for the H1N1 vaccine, and in other clinics and health care units that had the vaccine were not able to cope with the demand. Then, we had the idea to implement this service in the laboratory, with the objective to vaccinate collaborators and relatives, and the society as a whole. The main goal was to implement a specific room in the laboratory, and to supply many other vaccines through the year.

The idea of the project came after the surge of H1N1 influenza, when we had many calls of clients asking if we had the shots. With the crescent demand, we saw the opportunity to amplify the services provided by the laboratory, and with the support from the directors and hard working from the collaborators, we implemented the vaccination room, with a team fully capacitated for the job, offering vaccines to the public, increasing their satisfaction with our services.

The creation of the project Vaccines occurred due to the large demand of people for the vaccine H1N1, when there was a peak for this type of influenza. With this idea, we thought to offer, in the future, other vaccines, providing a differential to our clients, which generated greater satisfaction coming from them.

The main result achieved with the project Vaccines also supports the speeches from the three members of the improvement group *Backyardigans*, or in other words, the new service was offered to the clients. From the purchased vaccines, 98% were sold in less than a month, generating revenue to the laboratory and satisfaction among clients. The project continued, and in 2013, other laboratories started to participate in the market of vaccines. However, for this season, the researched laboratory acquired 4,000 doses, representing twice the size of the stock from 2012. The vaccine sales started in March 2013 selling 75% of the doses until the end of 2013, also generating great results above the expenses.

### 4.4 Analysis and discussion of results

The analysis and the discussion of the results of innovations generated by the improvement groups at the Búrigo Laboratory was performed during the classification of innovation proposed by the OECD Oslo Manual: innovation of product, of process, of marketing, and of organization. It was observed there was an innovation of product/service in projects A (Escalpe) and C (Vaccines for patients). Project A (Escalpe) permitted the innovation in services by the incorporation of a new methodology for collection, as the vein is punctured only once, permitting the collector to change tubes. With the innovation in collection service, there was the addition of new materials and proceedings, giving opportunity to a quicker and effective service. Project C (Vaccines for patients) was a success in sales. Implemented in 2012, at the peak of H1N1 influenza epidemics, it was innovative because there were only medical clinics in conditions to perform the vaccination. The innovation in process motivated by the implementation of Project B (SMS for patients) aggregated more value to the service of clinical analysis, improving the performance of supporting





marketing activities, as well as information technology support. For the patients, SMS messages are considered state-of-art, as it uses new means of communication with the client, considerably facilitating the situations in which the reports are ready before the deadline. Chart 1 presents the projects implemented by the improvement groups, with a synthesis of the results achieved, type of innovation, and summary of the innovation characteristics proposed by the Oslo Manual.

The innovations generated in products/services with the implementation of the projects A (Escalpe) and C (Vaccines for patients), and in processes, such as in Project B (SMS for patients) demonstrate the concept of innovation presented at the OECD Oslo Manual, or in other words, an innovation can be described as the implementation of a new or significantly improved product (good or service), process, marketing or organizational method in business practices, organization of working stations, or in external relationships. Yet according to the Manual, the minimum requirement to define an innovation is that

the product, the process, the marketing or organizational method must be new (or significantly improved) for the organization.

The arguments of Van de Ven (1986) also match the findings of this research, once the innovation is a development and implementation process of a novelty, including new processes, or the development of new ideas, such as a new technology, product, process, or arrangements. An innovation can also be considered when introduced change is new for the organization, for the market (project Escalpe came with a new methodology of collection, project Vaccines offered a new service). Being capable to sell a product that no competitor has is an advantage, however being capable of doing something no one else can do, or doing better than the others, is also a significant advantage (Tidd, Bessant and Pavitt, 2008). From the findings of this study, it is possible to see that the improvement groups influenced positively the development of new products and services, just by the fact these groups were focused in specific tasks, compromised and motivated in making them well.

Chart 1: Projects implemented versus type of innovation. Santa Catarina, Brazil, 2016.

<b>Projects implemented by improvement groups</b>	<b>Synthesis of the results achieved</b>	<b>Types of innovation according to OECD Oslo Manual</b>	<b>Synthesis of innovation characteristics proposed at OECD Oslo Manual</b>
Project A Escalpe	New method of collection (new service);  New materials used;  New proceedings formalized;  Quicker collection method, less painful (because it was only one puncture) and more effective.	Product	The innovations of products in the segment of services can include important improvements regarding the offering or addition of new functions and characteristics in existing services;  Innovation involves methods, equipment, and/or abilities to perform the new service or the substantially improved one.
Project B SMS for patients	Before there was no method to tell the patient the exam report was ready;  New communication channel to the client;  Use of new software.	Process	The innovations in process also include new or substantially improved techniques, equipment, and softwares in supporting roles, such as purchasing, accountability, computing, and maintenance.  The implementation of new or significantly improved information and communication technologies (ICT) can be considered an innovation of process aimed to improve effectiveness and/or the quality of a support activity.
Project C Vaccines	New service provided to clients;  New methodology and new proceedings.	Product	Introduction of new goods or services;  New products are goods or services that significantly differ in their characteristics or in predicted use of them, when compared to other products already produced by the company.

Source: produced by the authors



The adoption of innovative practices also permitted an improvement in laboratory processes (Project B), motivating the reduction of costs and increase in productivity. Projects A and C aggregated value to the products and/or services, creating a differential in the market and confirming the arguments of Paladini (2009). For this author, the guarantee of quality can bring operational contributions, such as the reduction of costs, defects, and rework, increasing productivity and differentiation of the company towards the competitors. The innovation of processes has a strategic role. The Research in Technological Innovation (PINTEC, 2010) showed that 88.3% of the organizations that adopted innovative practices presented at least in positive impact: company's growth in market share (Project C), improvement of quality in services and increase of service offering capacity (Projects A, B, and C). Coutinho *et Ferraz* (2002) complement the affirmation by saying that the importance of innovation for competitiveness is essentially the construction of efforts to innovate the organization, in products and/or services, in proceedings, or in management. The same line of thinking is used by Tidd, Bressant and Pavitt (2005) who comment that innovations, indifferently from the type, must be aligned to the organizational strategy, and with projects that may generate competitive advantages for the organization. Innovation is the key process of business. Therefore, for the authors, it is an activity that is essentially connected to survival and growth of the enterprise.

The activities of innovation in services tend to be continuous, which consist in a series of incrementing changes in services and processes, making it difficult to identify the elements isolated from each other, or in other words, the changes must occur in a more integrated format – services, processes, and other methods, as seen in the Búrigo Laboratory, confirming the proposal for constant innovation present in the OECD Oslo Manual, and in the arguments of researchers in the field.

Hence, there is a match with the words of Tasca (*apud* Brasil, 2011), when this author argues that the idea of “more of the same” does not work. For him, in some cases deep changes are necessary on the management tools. Many health organization managers have already understood the situation by feeling in their skin the necessity to find alternate solutions. They understand that the problem with incoherence between service offerings and health necessities does not end with indiscriminately increasing the offer, but introducing new practices, new instruments, new ways to perform health care in a more integrated, effective, and equitable way. This is the deep meaning of innovation in health care management: introduce changes that result in a concrete and measurable improvement. This improvement can involve different areas of management, such as performance, quality, effectiveness, and consumers' satisfaction.

## 5. FINAL CONSIDERATIONS

The analysis of the impact of the projects implemented by the Improvement Groups of Búrigo Laboratory, on the dimension of innovation (products, processes, marketing, and organizational) proposed by the OECD Oslo Manual permitted the development of some considerations related to the topic.

The improvement groups linked to the projects implemented at the Búrigo Laboratory represent an example of a continuous search for an excellency standard in services, from the continuous improvement in management, structure, processes, people, results, and relationships built among social actors. In a global sense, it is the responsibility of Quality Management to collaborate in a decisive manner to elevate the effort from the high administration regarding the definition of quality policies of CAL. In an operational overview, the CAL need to develop, implement, and evaluate quality programs aimed to a continued search for consumers' satisfaction in regards to the services provided. The culture and the policy for quality must be spread to all collaborators, from the operational support to the direction. However, the dissemination is not enough, as the application of the presets and policies of quality depend on the predominant culture of the organization, which means, the levels of compromising and engaging from all in a search for excellency in the service provided to the clients. The improvement groups of Búrigo Laboratory started to provide more value to the ideas from collaborators, understanding their real role in the process of decision-making.

After the beginning of the program, it was possible to note a higher engagement and participation of collaborators in the problems and their solutions, aiming to provide a more quality service. Through a resolution and/or the generation of new ideas, workers felt much more involved with the laboratory, creating feelings of compromising and dedication much higher than before the existence of the improvement groups. Other results also were found: improvement in quality, productivity, and cost reduction; training and education at work; flexibility; improvement in internal communications; and alignment with different levels of the organization.

Projects implemented also influenced both the innovation of products and/or services as processes, confirming the idea of innovation proposed by the OECD Oslo Manual. It was also possible to confirm that the activities of innovation in services represent a continuous process, consisting in a series of incremental changes in products and processes, making it difficult to identify the terms separately, which means that changes occur integrated to the products, processes, and other methods. Innovations



and improvements are essential to the growth and development of organizations, as when well implemented, they can bring new clients and openings for new markets.

In the area of health, the innovation in services and products is under discussion, as the survival and competition of laboratories are directly associated to the capacity of innovation, which means the capacity laboratories will have to offer a product and/or a service in superior quality and aggregated value to the clients. Such values started to be considered as strong indicators of market share, once they can be converted in competitive advantage (Seki *et al.*, 2003). Being capable to sell something no one sells is an advantage, however, being able to do something no one else can, or being able to do it better than the others is also a significant practice (Tidd, Bessant and Pavitt, 2008).

In this direction, innovation as a continuous improvement cannot be seen by company managers as an isolated act, but a systemic one. A system involves a set of inter-related parts looking for a common objective. The director, when observing that innovation works in a systemic format, searched for the effectiveness of the system as a whole (input, process, output, continued retro feeding) in the permanent search for innovations that enabled the aggregation of value to the services provided to the clients. The instruments for systemic rationale, for Senge (1990), are useful to unveil the subjective and unconscious aspects that can explain the behavior and the administrative action, with the goals to overcome traditional paradigms. The understanding of Goldratt *et Cox* (2003) is that the reach of the organizational results depends on the combined efforts of all collaborators and sectors. If the manager wants to improve the global performance of the organization, he needs to know the link/sector that is blocking to achieve the results. For the author, it is essential to focus the efforts in improving the weakest link of the chain, because it determines the global performance of the studied system. Any initiative to try to improve other links than the weakest one will not generate systemic improvements, and even the potential local benefits can threaten the global goal.

To finalize, it is worth to mention that all studies have limitations. The present analysis translates the perceptions of the interviewees and the interpretation from other authors of the content present in documents, interviews, and in theoretical proposals. To minimize the subjective impressions of the authors, different techniques for data collection were used, permitting the triangulation of the information gathered both in the description and in the analysis and discussion of results. In the end, it is important to highlight that the study was performed in a laboratory with an implemented Quality Management. Because of that, new studies can be performed in other organizations in the area of health to confirm or not the results here found.

## REFERENCES

- Associação Brasileira de Normas Técnicas – ABNT. (2004), NBR ISO 9000/2000 - Sistema de Gestão da Qualidade: fundamentos e vocabulário, ABNT, Rio de Janeiro, RJ.
- Barney, J. B. (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol 17, No 1, pp. 99-120.
- Bessant, J., Caffyn, S. e Gallagher, M. (2001), "An evolutionary model of continuous improvement behavior", *Technovation*, Vol 21 No. 7, pp. 67-77.
- Brasil. Ministério da Saúde, Secretaria-Executiva, Subsecretaria de Planejamento e Orçamento, (2011), Plano Nacional de Saúde – PNS: 2012-2015, Brasília, Ministério da Saúde, disponível em: <http://conselho.saude.gov.br/biblioteca> (Acesso em 10 de janeiro de 2013).
- Briales, J. A. (2005), *Melhoria contínua através do Kaizen: estudo de caso Daimlerchrysler do Brasil*, Dissertação de Mestrado em Sistemas de Gestão, Universidade Federal Fluminense, Niterói, RJ.
- Bruyne, P., Herman, J., Schoutheete, M. de. (1991), *Dinâmica da pesquisa em ciências sociais - os pólos da prática metodológica*, Livraria Francisco Alves, Rio de Janeiro, RJ.
- Campos, F. A. L. (2004), *Uma investigação do CCQ sob a perspectiva da solução de problemas: análise da teoria e da prática*. Tese de doutorado em Engenharia de Produção, Universidade Federal de Minas Gerais, Belo Horizonte, MG.
- Carayannis, E. G., Gonzalez, E. et Wetter, J. (2003), "The nature and dynamics of discontinuous and disruptive innovations from a learning and knowledge management perspective", em Shavinina L. V. (ed.), *The International Handbook on Innovation*, Pergamon, Amsterdam, pp. 115–138.
- Castells, M. (1999), *A sociedade em rede*, Paz e Terra, São Paulo, SP.
- Coutinho, L. et Ferraz, J. C. (2002), *Estudo da competitividade da indústria brasileira, Papiros e Editora da Unicamp*, Campinas, SP.
- Damazio, A. (1998), *Administrando com a gestão pela qualidade total*, Interciência, Rio de Janeiro, RJ.
- Farias, J. S. et al. (2011), "Adoção de prontuário eletrônico do paciente em hospitais universitários de Brasil e Espanha. A percepção de profissionais de saúde", *Revista de Administração Pública*, Vol. 45, No. 5, pp. 1303-1326.
- Feigenbaum, A. V. (1994), *Controle da qualidade total: gestão e sistemas*, Makron, São Paulo, SP.
- Felder, R. A., Boyd, J. C., Margrey, K., Holman, W. e Savory, J. (1990), "Robotics in the medical laboratory", *Clinical Chemistry*, Vol. 36, No. 9, pp. 1534-1543.
- Garvin, D. (1992), *Gerenciando a qualidade: a visão estratégica*.



- ca e competitiva, Qualitymark, Rio de Janeiro, RJ.
- GEM Brasil. (2007), Relatório global, IBQP, Curitiba, PR.
- Goldratt, E. M. et Cox, J. (2003), *A meta: um processo de aprimoramento contínuo*, Nobel, São Paulo, SP.
- Gonçalves, A. A., Barbosa, J. G. P., Martins, C. H. F. (2012), "Inovação em serviços de saúde: a implementação do PACS no INCA", *Tecnologias de Administração e Contabilidade*, Vol. 2, No. 2, pp. 166-182.
- Henriques, Z. S., Sacomano Neto, M., Camargo, S. H. C. R. V., Giuliani, A. C. e Farah, O. E. (2008), "Estratégias de inovação das empresas metalúrgicas no setor sucroalcooleiro de Piracicaba", *Revista de Administração e Inovação*, Vol. 5, No. 2, pp. 92-111.
- Mainardes, E., Lourenço, L. e Tontini, G. (2010), "Percepções dos conceitos de qualidade e gestão pela qualidade total: estudo de caso na universidade", *Revista Gestão.Org.*, Vol. 8, No. 2, pp. 279-297.
- Martelli, A. (2011), "Gestão da qualidade em laboratórios de análises clínicas", *UNOPAR Científica de Ciências Biológicas e da Saúde*, Vol. 13(Esp), pp. 363-368.
- Mendes, E. V. (Coord.). (2011), *Organização Pan-Americana da Saúde. Inovação nos sistemas logísticos: resultados do laboratório de inovação sobre redes integradas de atenção à saúde baseadas na APS*, Organização Pan-Americana da Saúde, Brasília, DF.
- Mesquita, M. e Alliprandini, D. H. (2003), "Competências essenciais para melhoria contínua da produção: estudo de caso em empresas da indústria de autopeças", *Gestão & Produção*, Vol. 10, No. 1, pp. 17-33.
- Morin, E. (1997), "Complexidade e ética da solidariedade", em Castro, G., Carvalho, E. A. et Almeida, M. C. *Ensaio da complexidade*, Sulina, Porto Alegre, RS.
- Movimento Brasil Competitivo. (2008). *Manual de inovação*, disponível em: <http://www.mbc.org.br/mbc/novo/> (Acesso em 19 de novembro de 2013).
- Nodari, C. H., Olea, P. M. e Dorion, E. C. H. (2013), "Relação entre inovação e qualidade da orientação do serviço de saúde para atenção primária", *Revista de Administração Pública*, Vol. 47, No. 5, pp. 1243-1264.
- Oliveira, C. A. de et Mendes, M. E. (2010), *Gestão da fase analítica do laboratório: como assegurar a qualidade na prática*, ControlLab, Rio de Janeiro, RJ.
- Omachonu, V. K., Einspruch, N. G. (2010), "Innovation in healthcare delivery systems: a conceptual framework", disponível em: [http://www.innovation.cc/scholarlystyle/omachonu\\_healthcare\\_3innovate2.pdf](http://www.innovation.cc/scholarlystyle/omachonu_healthcare_3innovate2.pdf). (Acesso em 19 de abril de 2013).
- Organização para Cooperação e Desenvolvimento Econô-
- mico (OCDE). (2005), *Manual de Oslo: proposta de diretrizes para coleta e interpretação de dados sobre inovação tecnológica*, disponível em: [http://www.mct.gov.br/upd\\_blob/0026/26032.pdf](http://www.mct.gov.br/upd_blob/0026/26032.pdf) (Acesso em 20 de novembro de 2013).
- Paladini, E. P. (2009), *Gestão da qualidade: teoria e prática*, Atlas, São Paulo, SP.
- Pereira, F. M. F. (2012), *Fatores responsáveis pela mudança no desempenho da indústria das análises clínicas no Brasil*, Dissertação de Mestrado em Gestão Empresarial, Escola Brasileira de Administração Pública e de Empresas, Rio de Janeiro, RJ.
- Pesquisa de inovação tecnológica: 2000/2008. (2010), *Brasil, grandes regiões e unidades da federação selecionada*, IBGE, Rio de Janeiro, disponível em: <http://www.pintec.ibge.gov.br/downloads/PUBLICACAO/Publicacao%20PINTEC%202008.pdf> (Acesso em 22 de novembro de 2013).
- Porter, M. (2005). *Estratégia competitiva: técnicas para análise de indústrias e de concorrentes*, Campus, Rio de Janeiro, RJ.
- Queiroz, D. T., Vall, J., Souza, A. M. A. e Vieira, N. F. C. (2007), "Observação participante na pesquisa qualitativa: conceitos e aplicações na área da saúde", *Revista de Enfermagem da UERJ*, Vol. 15, No. 2, pp. 276-283.
- Ryan, C. e Moss, S. (2005), "Total quality management implementation: the 'core' strategy", *Academy of Strategic Management Journal*, Vol. 4, No. 1, pp. 61-77.
- Seki, M., Pereira, J., Plínio, G., Seki, M. O., Niyama, F. P., Caruso, M. C., Paschoaletto, M. C. D. L., Seki, M. O., Sellmann, S. A. S., Vivan, R. H.F. e Parellada, R. L. (2003), "A inovação de valores nos laboratórios clínicos", *Jornal Brasileiro de Patologia e Medicina Laboratorial*, Vol. 39, No. 3, pp. 211-214.
- Shank, J. et Govindarajan, V. (1997), *A revolução dos custos: como reinventar e redefinir sua estratégia de custos para vencer em mercados crescentemente competitivos*, Campus, Rio de Janeiro, RJ.
- Sacramento, P. M., Teixeira, R. M. 2013, "Inovações Implementadas por Empreendedores como fonte de vantagens competitivas: estudo de casos múltiplos em hotéis/pousadas na cidade de Aracaju". Artigo apresentado no 3Es, 2013: Encontro de Estudos em Estratégia, Bento Gonçalves, RS, 19 a 21 de maio, 2013, disponível em: [http://www.anpad.org.br/diversos/trabalhos/3Es/3es\\_2013/2013\\_3Es201.pdf](http://www.anpad.org.br/diversos/trabalhos/3Es/3es_2013/2013_3Es201.pdf) (Acesso em 20 de fevereiro de 2014).
- Santos, A. B. A., Fazon, C. B. e Merose, G. P. S de. (2011), "Inovação: um estudo sobre a evolução do conceito de Schumpeter", *Caderno de Administração*, Vol 5, No 1, pp. 1-16.
- Senge, P. M. (1990), *A quinta disciplina*, Best Seller, São Paulo, SP.
- Shiba, S. et al. (1997), *TQM: quatro revoluções na gestão da qualidade*, vários tradutores, Bookman, Porto Alegre, RS.



Schumpeter, J. A. (1982), *Teoria do desenvolvimento econômico: uma investigação sobre lucros, capital, crédito, juro e o ciclo econômico*, Abril Cultural, São Paulo, SP.

Tidd, J., Bessant, J. R. et Pavitt, K. (2008), *Gestão da inovação*, Bookman, Porto Alegre, RS.

Tigre, P. B. (2006), *Gestão da inovação: a economia da tecnologia no Brasil*, Campus, Rio de Janeiro, RJ.

Van de Ven, A. H. e Engleman, R. M. (1986), "Central problems in the management of innovation", *Management Science*, Vol 32, No 5, pp. 590-607.

Triviños, A. N. S. (1987), *Introdução à pesquisa em ciências sociais: a pesquisa qualitativa em educação*, Atlas, São Paulo, SP.