

A3/BUSINESS CASE

Study of the feasibility of adaptation of the business process sales and operations planning (S&OP) in a university hospital

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ABSTRACT

In this research, the author set out to answer the following research question: how to adapt the S&OP process to the hospital services sector and how to proceed with its implementation in this environment. Therefore, the research has as general objective to analyze and elaborate a proposal of adaptation of the S&OP to the sector of hospital services and to propose its implantation through a process described by a step-by-step and preliminary procedure in the scope of the university hospital object of the study, more specifically in the emergency care. To this end, the author described the steps and procedures of the S&OP implementation process and adapted them to the hospital services environment, with emphasis on aspects related to hospital management with regard to demand management by hospital, capacity management and level of service. In this case, it is important to emphasize that in addition to elaborating the procedure of the S&OP implantation process for the emergency care of the hospital unit object of the study, the development of the work emphasized the medical clinic specialty for the case study. This research was also aimed at reducing the scarcity of S&OP scientific bibliographic material applied to the health care sector.

Keywords: S&OP. Sales and operations planning. Hospital management. Hospital service. Organizational culture.

1. INTRODUCTION

Since the Fordist era, business focus has been shifting, evolving, and breaking paradigms. Today, in the 21st century, the focus is all on the customers, focusing mainly on the quality of products and services, punctuality and prices practiced, in addition to agility and flexibility. (BARRETO ET AL., 2005).

According to Hopp and Spearman (2013), globalization has brought concrete benefits not only to the economies of the countries but also forced companies to continuously improve their processes, their management, their efficiency, their quality and their integration. In order to contribute strategically to the achievement of business goals, the Sales and Operations Planning (S&OP) process model was created which, according to Pedroso and Silva (2015), unifies the company not only vertically but also horizontally. Wallace (2001), one of the most cited authors in academic papers on the subject, brings S&OP as one of the most important management models for professional business management of this century, since it has the ability to coherently synthesize and strategically align demand with the installed capacity, in addition to making decision-making more assertive.

According to Feng, D'amours and Beauregard (2008), companies from the most varied segments and sectors are using the concepts of S&OP, since the concepts of the management model (S&OP) apply to both manufacturing companies and service companies, whether they stock-driven or on-demand (pushed or pulled).

The motivating factors for choosing the S&OP theme applied to hospitals are: the hospital has a problem of unevenness between demand and capacity; the author of this research obtained access to the time data of the demand-side operation, as well as the variability of the hospital's demands (a rare fact since hospitals hardly open data to third parties); and because we did not find, until 2017, brazilian research addressing S&OP in hospital services.

The choice of the emergency department for the S&OP implementation proposal in the case study of this work is justified because it is a bottleneck sector (restriction), of high demand and generates the greatest gap between hospital capacity and demand. The specialty of the medical clinic in the emergency room is the specialty with the greatest demand in the years 2015 and 2016, generating an average of 3800 appointments/month, representing 70% of all the specialties served in the emergency room, (specialties are: medical clinic, pediatrics, orthopedics, gynecology/obstetrics and surgery).

It is important to remember that the health sector is a great engine of the economy. Health expenditures in Brazil revolve around 9% of GDP, with 4.9% of private spending and 4.1% of public spending. According to ANAHP, GDP in 2012 being R\$ 4.4 trillion, health expenses exceeded the mark of R\$ 390 billion/year, placing Brazil as the 8th largest health market in the world. (ANAHP, 2015).

Trindade (2013) lists the main problems, failures and/or possibilities for improvements in which companies experience in the competitive and globalized market of this 21st century, such as:

1. Increased competition, and increasingly prepared competitors;
2. Search for improvements in performance and level of service to customers;
3. Spaces for improvements in the efficiency of the plans to reach goals established in the corporate strategy;
4. Unilateral decisions, where they analyze the facts without taking into account the whole;
5. Delays in deliveries;
6. The end of customer loyalty if they do not find the products/services available for purchase when they wish;
7. Increase in stock levels (inventory can be understood as raw materials or finished products, or even human resources) to support delays in deliveries, which generate undesirable costs in addition to incurring capital immobilization and risk of obsolescence;
8. Imbalance of the expected demand with the actual realized, generating imbalance in the levels of inventories, delays, and undesired costs;
9. Imbalance also of the demand with the productive capacity;
10. Lack of accuracy and integration of information between internal departments and between company and supplier.

It is important to note that hospitals also experience the problems mentioned above. (SOUZA, 2015).

From the point of view of the issues generating this research, the aim is to answer the following central questions: how to adapt the S&OP to the hospital services sector and how to proceed with its implementation in this environment?

In general, the main objective of this work is to prepare the adaptation of the Sales and Operations Planning (S&OP) to the hospital services sector and the proposal for step-by-step implementation in a university hospital, specifically in the pre-service, using mainly the developed methodology by Wallace (2001).

Detailing a little more, the specific objectives are:

- to describe and analyze, in the light of the literature, the procedures for implementing the S&OP process considering its inputs (in terms of demand and production capacity management) and outputs (regarding the level of customer service);
- describe and analyze, in the light of the literature, the hospital management with emphasis on the aspects emphasized in the previous objective and;
- elaborate the adaptations and the S&OP implantation procedure for the emergency department of a hospital, using the specialty of medical clinic for the case study.

Regarding the methodology of the work, the research is applied in nature. Regarding the objectives, this research is exploratory, involving a bibliographical survey and data collection in the hospital database, aiming to support the elaboration of the adaptations to the S&OP management model and contribute to the reduction of the scarcity of scientific bibliographic material on the S&OP theme applied to the sector of hospital services. The form of approach in the case study is qualitative and quantitative, as it analyzes the processes in an inductive and descriptive way, but also uses data and treats them for the elaboration of S&OP worksheets, capacity reports and their respective graphs. Regarding the strategies of approaches, the author used bibliographic research, documentary research and case study. (MARTINS, MELLO, TURRIONI, 2014).

The case study was carried out in a university hospital located in the city of Uberaba/MG/Brazil, which counts in 2016, after two years of its inauguration, with more than 700 direct employees and 400 indirect ones, in a constructed area of 18,500 m² and 220 beds the disposition of the population.

For the data collection, the author of this work used informal observations and conversations, but mainly to consult data from hospital files, whether they are physical

files or available in the hospital integrated management software database. These data are related to the history of demand separated by internal sector and/or type of service provided and the times and procedures in the stages of the internal processes of patient care, from the arrival to the release of the patient. After the data are collected, they will be tabulated, analyzed and used in the preparation of the adaptations in the S & OP worksheet and the capacity report and their respective graphs.

2 SALES AND OPERATIONS PLANNING (S&OP) AND HOSPITAL MANAGEMENT

This research brings the light of knowledge a bibliographical review elaborated through scientific references related to the themes: Sales and Operations Planning (S&OP) and Hospital Management from S&OP point of view.

2.1 Sales and Operations Planning (S&OP)

According to Wallace (2001), Sales and Operations Planning (S&OP) is a management model applied at the tactical level of alignment and balancing between demand and supply that serves very well in both pulled and pushed production systems. It arose precisely from the need that still exists in companies to align information and decision-making with a focus on reducing waste and costs, so that the customer is attended in a shorter time and with greater added value.

According to Wallace (2001), the benefits of implementing S&OP are:

- ✓ If the company produces for inventory, there is better customer service and smaller inventories;
- ✓ If the company produces to order, there is better customer service and shorter lead times;
- ✓ Increase productivity with stability of production rhythms and decrease of overtime;
- ✓ Improved teamwork among sales administration, operations, finance and product development staff;
- ✓ Improvement of senior management teamwork;
- ✓ Greater responsibility and commitment to the actual performance of the plan;

- ✓ Monthly updating of the company's business plan, causing a prior visibility of what can occur and thus reducing surprises in the annual result;
- ✓ Improves responsiveness (the company's ability to respond quickly to market desires);
- ✓ Improve the ability of employees involved with S&OP to better predict the future, also favoring proactivity.

2.1.1 General Objectives of S&OP

According to Wallace (2001), S&OP has several objectives, in which the main ones are: improving customer service, reducing inventories of both raw materials and finished products, reducing lead times and delivery times to customers, increasing efficiency in meeting agreed upon delivery times between company and customers, stabilizing production performance indicators, giving top management true control over the business, motivating teamwork among the sales, production, finance and development departments products.

One of S&OP's major goals is to integrate decision-making among business departments, making them work as a team, focused on delivering results and value to the customer. (WALLACE, 2001; THOMAS et al., 2011).

2.1.2 The process of Sales Operation Planning (S&OP)

The essence of S&OP is decision making. These decisions can be: change of the sales plan; change in plan of operations; change in the inventory plan and occurrence of delayed and/or pending orders; or no change, when the current plan is coherent. After the changes, the S&OP plan is distributed to stakeholders who detail according to their needs (divide into products, customers, regions, etc.). However, the S&OP is not a single monthly event, it is something that begins to be thought as soon as the meeting of the previous month ends, and is divided into five stages. (WALLACE, 2001).

The steps are, according to Wallace (2001):

- i. Execution of sales forecast reports: this is when the sales forecast is made;
- ii. Demand planning phase: when the sales department executes the new sales forecast, taking into account the data from the previous report, and weighs the demands to be met in certain periods, aligning forecast with market expectations;

- iii. Supply and capacity planning phase: the responsibility of the company's operations department is that it is analyzed every form of bottleneck that can arise in any productive stage, either by internal or external agent, and that prevents the fulfillment of the sales plan;
- iv. Pre-S&OP meeting: meeting tactical sales, operations, financial, and product development personnel to align attack actions to bottlenecks that have emerged, and align strategies with a focus on the business plan. The objectives, in general, are: to balance supply and demand with their decisions, to propose solutions to the problems encountered, to identify the areas where the consensus has not been reached, and to require a decision-making opinion at the S&OP executive meeting, construction of Alternative actions to solve the problems listed, and delimitation of the agenda of the S&OP executive meeting.
- v. S&OP Executive Meeting: has the objectives of deciding whether or not to comply with the pre-S&OP meeting recommendations, approve changes involving significant costs, make the necessary adjustments to the S&OP or the business plan with a focus on the best service to the market, solve The impasses generated at the pre-S&OP meeting, reviewing customer service level performance and issues related to new products and projects. As a result of this step there are minutes of the meeting with the details of the decisions made, modifications to the business plan if any, and updated and closed S&OP fourth-stage worksheets.

2.1.3 S&OP deployment steps

According to Wallace (2001), the steps for the correct implementation of S&OP are:

A) Initial training and decision to stop or continue: there must be an initial training with all those directly and indirectly involved with S&OP so that they feel engaged and able to continue the implementation process. After the training, executives decide whether to stop the deployment for various reasons, such as lack of qualification of personnel or others, or continue, for they understand the importance of this deployment at this specific time.

B) Designation of responsibilities: there must be the sponsoring executive, process owner or deployment project manager, spreadsheet maker, demand planning team, supply planning team, pre-S&OP team, and the S&OP executive team. Each one with its sectoral responsibilities.

C) Definition of product families: the choice should be based on the way the company goes to market to sell its products, what type of grouping it uses, and not according to the internal manufacturing process.

D) Development of the S&OP worksheet: S&OP worksheets can be divided into 2 types: for stock and for order. The choice will depend on which is the planning system, whether to stock or to order.

E) Defining one or two families for pilot testing: the choice of family should be made preferring the families that sell the most or that bring the greatest number of problems to the company. Regarding the choice of one or two families, choose two cases the company has two modalities of productive systems, pulled and pushed.

F) S&OP policy development: this document must contain the company's S&OP objectives, clear process steps, who are the participants at each stage of the process, and what actions should be taken at each stage of the process.

G) Creation of capacity reports: it is the finite capacity planning, where the production workload is grouped in the form of resources and is compared with the installed capacity and its demand.

H) Integration of all households into the S&OP: this integration will improve the process and format of the spreadsheets, add the planning of supplies, the financial and the new products to the S&OP, and automate the data entry.

I) Automating the process: entering the data manually in the worksheets seems a simple task, but when more and more families are being inserted this manual task tends to be costly and confusing, thus justifying the automation of the data.

J) Continuous improvement: S&OP can be improved by integrating it with supply chain management because the more collaborative the entire planning process, the more integrated the departments of the company and the more focused the positive results of the business will be.

2.1.4 Expected results with S&OP

There are several, among them:

1) Increased productivity, decreased capital investment, reduced supply imbalance and increased delivery efficiency. (CAULFIELD, 2013).

2) S&OP forces the company to improve its internal communication, both vertically and horizontally, as an orchestrator of the efforts of all departments with a single purpose: to achieve the goals of the company. (CORREA; GIANESI; CAON, 2007; REXHAUSEN; PIBERNIK; KAISER, 2012).

3) Improved quality, reliability, flexibility and speed of delivery. (THOMÉ; SOUSA; CARMO, 2014).

4) S&OP contributes significantly to increasing profitability, company performance and improving customer satisfaction. (PEDROSO; SILVA, 2015).

5) Reduction of security stocks. (BRUSSET, 2016; LIM; ALPAN; PENZ, 2014).

2.1.5 Critical factors for successful S&OP deployment

The key critical success factors for S&OP deployment are:

1) people working in teams, committed, and seeking continuous improvement, with active participation of top management (CORREA; GIANESI; CAON, 2007);

2) validation of worksheets and decisions by all departments involved (OLIVA; WATSON, 2011);

3) build alliances and take decisions in favor of the company and without delay (REXHAUSEN; PIBERNIK; KAISER, 2012);

4) increase the accuracy of the company's sales forecast (DELURGIO et al., 2009; MANIKAS; PATEL, 2016);

5) to ensure the credibility of the tool in view of the lengthening of the planning horizon (LARSSON; JOHNSON, 2016);

6) efficiently manage productive capacity in the long term (OLHAGER; JOHANSSON, 2012);

7) always insert the launch of new products in the S&OP because of the learning curve and resource utilization curve (WOCHNER et al., 2016);

8) have managers committed to the changes generated by the tool, eliminating silos (PEDROSO; SILVA; TATE, 2016).

2.2 Hospital management

Hospital management very much resembles the management of any other institution. But there are differences that need to be addressed. Are they:

- Peculiarities of hospital management: intangibility and different perspectives of quality in the service provided; structural, planning, labor, and scarce resources; demand and capacity almost always unbalanced; outdated public policies, little government support. (MEZOMO, 1995; COELHO ET AL., 2010).

- Hospital demand management: the focus of the manager should be much less on traditional strategies of promotion and much more on the quality of services offered that will generate credibility in society. (ANDRADE; ARTMANN, 2009). The manager should plan the alignment of demand with capacity, and not only put out fires. (ALVEKRANS ET AL., 2016).

- Hospital capacity management: efficiently managing capacity is to keep it balanced with demand in a way that minimizes bottlenecks and amplifies productivity. (CORREA; GIANESI; CAON, 2007).

- Level of hospital service to the client: the level of hospital service offered to the client is how efficient the health organization is in delivering the services in terms of punctuality, quality and price. (MEZOMO, 1995; SOUZA, 2015; ZANON, 2011).

3 CASE STUDY

3.1 Characterization of the hospital

The hospital targeted by the case study is located in Uberaba/MG, linked to an educational institution, and is now a university hospital. This hospital has a total of 18,500 m² of constructed area, with 220 beds, serving the population of Uberaba and region with services of surgical clinic, medical clinic, hemodialysis, gynecology/obstetrics, pediatrics, orthopedics, transplants, organ recruitment, laboratory and imaging diagnostics, outpatient clinics, and emergency care. The same started his calls in 2015.

This case study took place in the emergency care, because it is a bottleneck sector (restriction), of high demand and generator of unevenness between capacity and demand. At the emergency care the specialty to be researched is the medical clinic, which is the largest demand for supplies, with an average of 3800 appointments/month, which represents 70% of all the specialties served in the emergency care.

3.2 Diagnosis of the current hospital situation with a view to S&OP

Currently, the hospital has growing demand and stagnant installed capacity, causing imbalance, overloading and underloading of resources in certain periods, in addition to generating queues and losses to hospitals and clients. There is also the lack of knowledge in the hospital of S&OP and its benefits, where management basically acts on capacity management, not on demand management and on the leveling of demand and capacity.

3.3 Proposed deployment of the S&OP in the hospital

All S&OP deployment steps were followed according to Wallace (2001), brought in earlier in this article. Are they:

1) Initial training and decision to stop or continue: the hospital's governing body receives, at this moment, an initial training showing the importance of S&OP, its applicability and expected return with its implementation.

2) Designation of responsibilities: the characters are the executive sponsor (the administrative director), the S&OP process owner (hiring an operations manager), spreadsheet creator (operations manager), demand planning team (hiring an demand manager and an analyst), operations planning team (operations manager, purchasing manager and financial manager), pre-S&OP team (demand manager, demand analyst, purchasing manager, financial manager, operations manager), and S&OP executive team (administrative director, technical director, clinical director, demand manager, operations manager, people management manager and controller).

3) Definition of product families: a priori will be proposed the implementation of the S&OP for the "medical clinic" product family, since it represents 70% of the attendance in the emergency care of the hospital, and the main unit of measurement will be time (hours).

4) Development of the S&OP worksheet: the S&OP worksheet for hospitals is similar to the one developed by Wallace (2001), with some modifications, such as: the unit of measurement is attendance; as it is not possible to stockpile this type of product/service, the aspect of service capacity versus demand transformed in the need of man-hours will be treated; the creation of planned and real capacity in hourly manpower to construct finite capacity graphs and human resource utilization rates, as well as to create the performance indicator called the actual capacity utilization rate, which will make comparative of actual capacity over planned capacity; and the creation of the goal of the occupancy rate of the personnel involved in direct care and the goal of the lead time per patient during care, enhancing the S&OP worksheet so that it elaborates not only planning and man-load but also performance indicators. 90% occupancy rate targets were created for the attendance in the emergency room, so that S&OP is already allocated a safety margin of 10% for eventual excesses of demands, thus ensuring the quality of care. It is vital to review rates, targets, and the number of hours per hour always, at least bimonthly, so that planning is efficient and as close to reality as possible.

5) Definition of one or two families for pilot testing: the product family chosen was the medical specialty because it represented 70% of the visits.

6) Elaboration of S&OP policy: the policy will be elaborated in the implementation.

7) Creation of capacity reports: these reports allocate the resources with their respective workloads determined in specific periods by internal sector and coming from the S&OP worksheet, from the share of capacity in planned versus actual man-hours. It

is important to remember that actual capacity below planned is a sign that there is a likelihood of increased waiting times for medical care, and actual capacity above planned, if more than 10% above, means that there will be idleness in the industry.

8) Integration of all families into the S&OP: after the S&OP deployment, add the other specialties served in the hospital's emergency care to the S&OP worksheet. They are: pediatrics, orthopedics, obstetrics and surgery. Because these other specialties compete for the same resources as the medical specialty, they can also be added to the same worksheet.

9) Automation of the process: in the first year after implantation, the author suggests that the hospital's Information Technology (IT) team create mechanisms that collect data in the hospital's integrated system and transport them to the worksheets so that the collection of the data is no longer manual. Thus the risks of errors due to inaccurate data would be diminished. Subsequently, with S&OP already working well with spreadsheets and properly trained staff, the search for specific S&OP software starts. With them the time spent will be much lower and the efficiency greater.

10) Continuous improvement: continuous improvement begins with an analysis of S&OP's efficiency, through the review of the goals (such as total lead time of each patient), to improving the hospital services provided to clients and their perceptions. It is important to always seek to align capacity to demand. In addition, simulations of future scenarios can be made, new performance indicators can be created to assist in the management of the hospital with the support of the data processed in the S&OP, and the S&OP should be taken to all other hospital sectors.

3.4. Development of the S&OP worksheet

It was initially defined the family of products to be treated in this worksheet, which will be the medical specialty clinic. The unit of measurement will be consultations, since as it is being treated the provision of medical services and not tangible products, one of the purposes of the S&OP worksheet adapted to the hospital is to align demand and capacity, both being treated in human capacity of attendance, where the human factor is the main resource in this process. Clients are the means, and the products are the service specialties. As it is not possible to stockpile this type of product/service, the aspect of attendance versus demand demand will be treated in the need of men-hour in sequence.

Two other novelties were incorporated by the author of this research: the goal of the occupancy rate of the personnel involved in the direct care and goal of the lead time per patient during care. They are considered news because they are not treated in the literature regarding S&OP.

Table 1 presents the S&OP spreadsheet developed by Wallace (2001), but with specific modifications for application in hospitals, prepared by the author of this research. Note that there are some necessary and strategic changes to make the S&OP worksheet the best possible for the health care industry.

Table 1. S&OP worksheet for the pre-service, in the medical clinic specialty.

HOSPITAL - READY-ATTENDANCE - SALES AND OPERATIONS PLAN (S&OP) FOR 2017

Family: Specialty Medical Clinic

Occupancy rate target: 90%

Unit of measurement: consultations

Total Lead Time Goal per Patient: 300min

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Next 12 months	Last Projection	Business plan
DEMAND															
Old forecast	2992	3370	3941	3841	3528	3083	3377	3186	3415	3602	3252	3582	45286	\$ 9.057.180,00	\$12.000.000,00
New forecast	3590	4044	4729	4609	4234	3700	4052	3823	4098	4322	3902	4298	54343	\$ 10.868.616,00	\$12.000.000,00
Old x new forecast	598	674	788	768	706	617	675	637	683	720	650	716	9057	\$ 1.811.436,00	\$ -
Real demands	3470	3907	4890	4710	4130	3860	4120	4007	3789	4122	4211	3410			
Difference: monthly	478	537	949	869	602	777	743	821	374	520	959	-172			
Difference: accumulate	478	1015	1964	2833	3435	4212	4955	5776	6150	6670	7629	7457			
PRODUCTION															
Old plane	2992	3370	3941	3841	3528	3083	3377	3186	3415	3602	3252	3582			
New plan	3989	4493	5255	5121	4704	4111	4503	4248	4553	4803	4336	4776			
New Plan x Old	997	1123	1314	1280	1176	1028	1126	1062	1138	1201	1084	1194			
Actual production	3200	3340	4100	5010	4509	3002	3209	3990	4356	4760	3210	3640			
Difference: monthly	208	-30	159	1169	981	-81	-168	804	941	1158	-42	58			
Difference: accumulate	208	178	337	1506	2487	2406	2238	3042	3983	5141	5099	5157			
CAPACITY (hh)															
Planned	1461	1646	1925	1876	1723	1506	1649	1556	1668	1759	1588	1749			
Real	1172	1223	1502	1835	1652	1100	1175	1462	1596	1744	1176	1333			
Actual occupancy rate	80,21%	74,33%	78,03%	97,83%	95,85%	73,03%	71,27%	93,93%	95,67%	99,11%	74,03%	76,21%			
LEAD TIME (min/aten)															
Planned	300	300	300	300	300	300	300	300	300	300	300	300			
Real	290	310	301	298	278	329	345	356	332	321	309	358			
Efficiency lead time	103,45%	96,77%	99,67%	100,67%	107,91%	91,19%	86,96%	84,27%	90,36%	93,46%	97,09%	83,80%			

Source: Autor (2017).

3.5 Hospital demand management

The quality and credibility of hospital services provided by the hospital are some of the strongest marketing tools the hospital holds, and often do not use them properly. The researcher previously suggested hiring a demand manager for the hospital, with the aim of creating a sector in which it may be possible to guide all management strategies based on demands, voluntary and involuntary. This professional will be able to work in a team with the operations manager (another hiring suggestion given by the researcher) in order to align demand and service capacity in the most diverse simulated or real scenarios, respecting the seasonalities and specificities of each sector. In this way, in line, the trend is that idle and overload will decrease, as well as the undesired costs arising from the outdated practice of putting out fires.

3.6 Hospital capacity management

In the hospital's capacity management, the demand plan is aligned with the production plan, according to the level of care and use of resources. The capacity utilization level, also called the occupancy rate target, will be adopted at 90% capacity. Any index below that means idleness and loss of revenue, and any index above that means that the hospital runs a serious risk of creating queues and generating dissatisfaction with care. In this way, the emergency care will always work with a margin of 10% of security, to attend to unplanned emergencies.

3.7 Level of hospital service to the client

The levels of hospital service to the client involve both qualifying factors (parameters of expected quality) as well as punctuality and price practiced. For this purpose, two indicators were created: capacity utilization goal and goal of the total lead time of the patient in the emergency room. These two indicators should be periodically reviewed and monitored closely as they directly influence the perception of quality in the provision of the hospital service, in addition to reflecting on the reduction of care costs.

4. FINAL CONSIDERATIONS

It is expected that, with the future deployment of S&OP, the hospital will be able to increase the level of hospital service to clients, reduce the overload and underload (idleness) of the allocated resources, decrease the total lead time (time elapsed between patient arrival and its subsequent discharge), improve occupancy rates of installed capacity, and increase productivity and efficiency in the provision of hospital services. In addition, it is expected that there will be greater commitment and teamwork, better decision-making and better control and confidence in the execution of the work.

The general objective of this research was to analyze and elaborate the adaptation of the S&OP to the hospital services sector and propose its implementation through a preliminary step-by-step implementation process in the scope of the university hospital object of the study, more specifically in the emergency care. This goal was successfully achieved, since it was proved that after some adaptations suggested by the researcher, it is possible to carry out this implantation in hospital settings, something that has not yet been addressed in Brazilian research.

In this way, it is clear that S&OP can be used in the intermediation between strategic planning and operations of companies, not only manufacturing, that produce in scale and in a pushed way, but it also fits in companies that provide service, hospital or other, and in companies that produce to order, just that some adaptations are made, such as those elaborated by the author of this research.

Therefore, it is possible to affirm also that this research contributed to the expansion of theoretical reference and research on the S&OP topic applied to the service sector, more specifically in the health care sector, in which there was total lack of studies and research related to the S&OP and the aforementioned sector in Brazil until the year of the development of this research, 2017.

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