

DISCLOSURE OF BUDGETING PLANNING, EXECUTION AND CONTROL PRACTICES: A SURVEY ON BRAZILIAN PUBLIC PORTS

*EVIDENCIAÇÃO DAS PRÁTICAS DE PLANEJAMENTO, EXECUÇÃO E CONTROLE DO ORÇAMENTO:
UM LEVANTAMENTO NOS PORTOS PÚBLICOS DO BRASIL*

MAURICIO MELLO CODESSO¹

Universidade Federal de Santa Catarina
mmcodesso@outlook.com

ROGÉRIO JOÃO LUNKES¹

Universidade Federal de Santa Catarina
rogeriolunkes@hotmail.com

ABSTRACT

Budgeting is one of the oldest planning and control systems adopted by the companies, and continues to receive significant attention. Despite being widely used in the business world, budgeting is also oftentimes the target of criticism. Therefore, this work aims at demonstrating budgeting practices in port companies in Brazil. The work presents a quantitative and qualitative approach, with a descriptive and exploratory objective, and the use of a survey. The research was conducted by sending the survey to Brazilian public ports. The results show that the Brazilian ports use only a few budgeting practices. Among the main features identified in the study there are the lack of alignment between the budgeting and strategic planning and of the internal evaluation of the results and the partial application of control mechanisms. These characteristics show that Brazilian public ports have opportunities for improvement in different budgeting practices.

Keywords: budgeting, ports, planning, execution, control.

RESUMO

O orçamento é um dos sistemas de planejamento e controle mais antigo adotado pelas empresas, e continua a receber significativa atenção na literatura e na pesquisa. Apesar de ser amplamente utilizado no mundo dos negócios, o orçamento também é frequentemente alvo de críticas. Dessa forma, este trabalho tem como objetivo evidenciar práticas orçamentárias em empresas portuárias no Brasil. O trabalho apresenta uma abordagem quantitativa e qualitativa, com objetivo descritivo e exploratório, e utilização de questionário. A pesquisa foi realizada com o envio de questionário aos portos públicos do Brasil. Os resultados mostram que os portos brasileiros, se comparados à literatura, aplicam apenas parcialmente as práticas orçamentárias. Entre as principais características identificadas no estudo, estão a falta de alinhamento entre a elaboração do orçamento e o planejamento estratégico e de avaliação interna dos resultados e a aplicação parcial dos mecanismos de controle. Essas características mostram que os portos públicos do Brasil têm oportunidades de melhoria em diferentes práticas de orçamento.

Palavras-chave: orçamento, portos, planejamento, controle.

¹ Universidade Federal de Santa Catarina. Centro Socioeconômico, Bloco F, Campus Universitário, Trindade, 88040-970, Florianópolis, SC, Brasil.

INTRODUCTION

Ports have a significant importance in international trade and to the economy of the countries. According to Liu (2008), over 85% of the international trade is carried out by the ports, while, in Brazil, 90% of the products are imported or exported through public ports or terminals for private use (ANTAQ, 2013).

Port operations can serve as an indicator of development and economic growth (Giner-Fillol *et al.*, 2013). Van Niekerk (2005) points out that an increasing number of ports are configured as one of the engines of the world economy. Within this context, it must be considered that the poor performance of the activities carried out in ports impact the international trade and the zones of influence of these ports (Giner-Fillol *et al.*, 2007, 2008, 2010).

According to Giner-Fillol *et al.* (2013), the competitiveness factors must be managed in a manner that provides operational and managerial efficiency, integrating issues related to strategy, information management, costs, budgeting and environmental management, among others.

According to *Exame* magazine (2011), Brazil is investing US\$ 39 billion to improve the performance of Brazilian ports by the end of 2014. To ensure that all this investment is valid, and enable port performance gains, it is necessary that ports put strategic planning into practice; one of the systems that determines the relationship between results and expenses to meet the needs, characteristics and objectives of strategic planning is budgeting (Lunkes, 2007).

Budgeting is one of the oldest planning and control systems adopted by the companies, and continues to receive significant attention in the literature and research (Davila and Foster, 2005; King *et al.*, 2010; Otley, 1999; Sandino, 2007). Empirical studies show that budgeting remains as one of the most important instruments for planning and control (Abdel-Kader and Luther, 2006; Libby and Lindsay, 2010; Østergren and Stensaker, 2011; Sivabalan *et al.*, 2009; Uyar and Bilgin, 2011). The budgeting system is one of the mechanisms used by managers to control costs and improve performance (King *et al.*, 2010).

According to Horngren *et al.* (2000), the concept of budgeting can be defined as the quantitative expression of a future action plan of a management period. As budgeting is an important tool in the management of organizations and the Brazilian ports need to improve their management, it is essential to search the budgetary practices used.

Studies on ports are justified by considering that an ineffective behavior of the different activities carried out in a port directly affects the process of distribution of goods, the environment and society, with an impact on the international trade and spheres of influence (Giner-Fillol *et al.*, 2007, 2010; Giner-Fillol and Ripoll-Feliu, 2007). Furthermore, the efficiency of ports and maritime transport, as well as strengthening the intermodal system, are essential for the growth and economic

and social development of countries (Crusey, 2006; Giner-Fillol *et al.*, 2010; González, 2005).

The objective of the data presented above was to introduce the topic of this research – the practice of budgeting in Brazilian ports. Therefore, the focus of this research lies on Brazilian ports, presenting the following research question: What are the budgeting planning, execution and control practices used by Brazilian public ports?

To answer this question, the general objective of this research was established: to demonstrate the budgeting implementation, planning and control practices in public ports in Brazil. For this purpose, specific goals were set in order to operationalize the research: identify which budgetary practices are used by Brazilian ports; confront the budgeting practices identified at the ports with the practices advocated in the literature; identify and assess factors that influence the use of budgeting in Brazilian ports.

Thus, in addition to this introductory contextualization, this paper includes a review of the literature that underlies the bibliography review of budget planning, budgeting implementation, budgeting control and previous studies on budgeting in ports. Subsequently, the methodological procedures are presented. Then, the presentation and analysis of the results are shown in four different sections. Finally, the final comments conclude this paper including appropriate considerations and suggestions for future research.

BIBLIOGRAPHY REVIEW

Horngren *et al.* (2000) define budget as the quantitative expression of a future management action plan for a certain period of time. Budgeting can also be a way to convert the strategic plan of the company into measurable patterns (Adams, 2006). Flamholtz (1983) argues that budgeting must be seen as part of a carefully designed total system of organizational control, and it has to be linked to other essential control systems.

Budgeting represents the effort of the Organization to quantify the uptake and use of resources, which addresses two management purposes: planning and control (Garrison *et al.*, 2003). It is a prediction of the future period, which includes marketing and other information that lead to the establishment of objectives and performance measurement (Harris, 1999). As part of budgeting, the forecast is needed for the planning of better ways to meet the volume of sales (Schmidgall and Defranco, 2006). Hopwood (1983) argues that planning, budgeting and performance monitoring procedures operate at different organizational levels, are subject to different degrees of participation, have different expectations and practices for their revision, and can even consider very different time periods.

The budget can be divided into three parts: planning, execution and control (Frezatti, 2009; Lunkes, 2007). In this way, the key features of each part of the budget will be addressed in the following topics.

BUDGET PLANNING

Several observed practices relate to budget planning. The operating budget includes guidelines, objectives, targets and indicators previously laid down by the organization. Joshi *et al.* (2003) identified that 96.3% of the 54 surveyed companies in Bahrain emit the LDO, and Uyar and Bilgin (2011) show that 63% out of 79 companies surveyed prepare budgeting manuals, a trend also found in the search conducted by Steed and Gu (2009), which checked the establishment of budgetary guidelines for senior management at an average of 4.5 points on a scale of one to five on 121 surveyed companies. Table 1 presents the main planning practices according to the literature.

The Budget Committee is a Committee constituted to guide the process of planning, execution and control, and can include the owners, directors and general managers, Department heads and controllers, etc. The studies of Uyar and Bilgin (2011) and Joshi *et al.* (2003) showed that most firms had a Committee, 87% and 79%, respectively. In addition to these studies, Schmidgall *et al.* (1996) and Uyar and Bilgin (2011) identified the main members and the number of components of the committees.

The time of preparation of the budget involves the period spent for the preparation of the budgeting process. Some studies that have already been carried out have analyzed that information, such as Uyar and Bilgin (2011), Steed and Gu (2009) and Libby and Lindsay (2010), and the results

vary according to the thread of the surveyed companies, from companies that spend only two weeks up to companies that take an average of two months.

The forms of budgeting may involve three types: top-down, bottom-up and a combination of both. The top-down budgets are prepared by senior management and imposed on other members of the organization. For the bottom-up process, the budget is drafted by the person responsible for the centers or departments and referred to the senior management for approval. As to the combined style, the budget is elaborated through an interactive process among managers and senior management centers (Lunkes, 2007).

When drawing up the budgeting process, the organization may have different purposes or specific goals. Previous studies demonstrate some of the main objectives of budgeting as an aid in the short and long-term planning, performance evaluation, operation coordination, motivation, communication plans, cost control and expenses, predictions, increased profits, and bonus calculation performance control through the analysis of variances (Jones, 1998, 2008a; Joshi *et al.*, 2003; Libby and Lindsay, 2010; Pavlatos and Paggios, 2008; Uyar and Bilgin, 2011).

In preparing the budget, you can use information from different sources as a starting point. Previous studies have emphasized the most common practices, such as the results of previous years, statistics and indicators on the industry, market analysis, national economic indicators, local and regional pro-

Table 1. *Planning practices.*

Planning practices	
Budget manual	Includes guidelines, objectives, targets and indicators previously defined by the top management.
Budget Committee	Can include the owners, directors and general managers, heads of departments, controllers, etc.
Forms of elaboration	Top-down – the budget is prepared by the senior management and imposed on other members of the organization.
	Bottom-up – the budget is drafted by the responsible centers or departments and it is forwarded to the senior management for approval.
	Combination – the budget is elaborated through an interactive process between managers and senior management centers.
Period	Less than 1 year, 1 year, over several years.
Review	Monthly, quarterly and semi-annually, etc.
Budget type	Public Budget
	Business Budget
	Zero-based budget
	Flexible Budget
	Budget for activities
	Beyond budgeting

Source: Research data.

jections from previous years (Uyar and Bilgin, 2011). There are polls that indicate the departments or offices of the companies that contribute to the information, following the example of the accounting department, the controller, managers and operating managers (Schmidgall *et al.*, 1996).

IMPLEMENTATION OF THE BUDGET

In implementing the budget process, some items are directly related to the performance. The survey conducted by Uyar and Bilgin (2011) questioned the following items: the budget is prepared in secret by the senior management (3.78), effective leadership is provided in the budgeting process (4.57), a good flow of information is available for budgeting (4.54), coordination among departments is achieved easily (4.22), goals are determined first in the departments and then submitted to the senior management (3.67), goals are determined by the senior management and then opinions are collected within the departments (3.35), targets are determined rationally (4.29). Table 2 presents the main practices singled out in execution.

For a successful use of budgeting, one should consider the human aspects. Yuen (2006) surveyed the effects related to the satisfaction and participation of the employees of the participatory management in the budgeting process in en-

terprises from Macau, China. Among the findings, the study found that the greater the participation of the employees, the greater the responsibility and experience.

Steed and Gu (2009) and Uyar and Bilgin (2011) researched issues such as the connection of the performance bonus to the achievement of the budgetary targets, the implementation of the budget, the budgeting guidelines for the evaluation of the performance, whether the budget is linked to strategic planning and whether managers seek the lowest possible goals. In addition, managers must have clearly defined the individual authority and responsibility over the control of the budget for it to work effectively, the participation to accept its goals and avoid the so-called gamesmanship, which is a participation when the budget is used as a measure of performance and motivation that is within an achievable budget, but which is difficult to be achieved.

The fact that the budget has fixed targets is reason for criticism, since the possibility of unexpected events can cause an underestimation of the revenue and an overestimation of the expenses as a pretext, making the targets easier to be achieved. Jensen (2003) refers to such a process as "paying people to lie". The results found by Libby and Lindsay (2010) indicate that the rate in which respondents indicate a high emphasis on budgeting is 71% and 52%, respectively, in companies of the United States and Canada.

Table 2. *Main practices in implementation.*

Practices in implementation	
Intended Goals	Predictions for the future
	Maximize results
	Introduce new products and services
	Plan, monitor and assess the result
Purposes	Create incentives and rewards
	Assist in long-term planning
	Assist in short-term planning
	Evaluate the performance
	Coordinate operations
	Motivate employees
	Communicate the plan
Control	
Information used in the preparation	Results from previous years
	Statistics
	Market analysis
	National economic indicators
	Local and regional economic indicators

Source: Research data.

BUDGETING CONTROL

The budgeting control process can use criteria or specific points, such as benchmarking, or it may not use reference points. The marks may be in the form of monetary value, percentage or repetition of an adverse variable. They can also be performed with the original budgeting comparisons, actual data from the previous year, revised budget or it can even be based on the values of costs and sales mix performed (Schmidgall *et al.*, 1996; Uyar and Bilgin, 2011).

In budgeting control, an important point is the role that monitoring has on the management system of the Organization. For Uyar and Bilgin (2011), most companies surveyed stated that the budget is the primary indicator of performance (47%), followed by one of the few key performance indicators (37.5%), and low budgets are used as performance measure (10%). In Table 3, it is possible to check the main control practices.

Among other roles, budgeting control can be used as the main performance indicator or as one of the few key indicators used. The study conducted in the United Kingdom by Jones (2008b) found that one of the main reasons for the use of budgeting is to measure the performance, and

companies showed that it was the main or one of the few key performance indicators.

To monitor the performance, different criteria can be used. The study of Uyar and Bilgin (2011) pointed out that the results of previous years are used in 72% of the companies. Budgeting values and industry statistics are identified in 53% of them. Companies already using intercompany comparisons are observed in 13% of them, while the balanced scorecard and comparisons with competitors are present in 16% of the organizations, respectively.

In addition, control assumes as input components of the appointment of those responsible for the evaluation of the reports for budgeting variances. The research suggests principals and senior management, department heads or managers and budgeting committees as the responsible parties, and present their reports in general in monthly, quarterly or semi-annual periods (Joshi *et al.*, 2003; Uyar and Bilgin, 2011). The study by Uyar and Bilgin (2011) shows that 92.5% of businesses generate monthly reports.

The comparative analysis is one of the purposes of the examination of the budgeting variations. The research indicates this practice as a way of controlling costs, expenses, the bud-

Table 3. Main control practices.

Main control practices	Benchmarking
	Does not use reference points
Criteria used to evaluate the results	Uses reference points
	Monetary value
	Percentage
	Repetition of an adverse variable
Role in monitoring	Primary indicator of performance
	One of the few key indicators used
	Used as performance measure
Responsible for variations	Heads of departments
	Senior management
	Budgeting committee
	General manager
Purpose of analysis of variances	Responsibility center
	Evaluate the performance of the manager
	Assess the predictive power of the responsible individual
	Control expenses
	Recognition of a time problem
	Feedback for the next budget period

Source: Research data.

get itself and information for managers. It also includes the evaluation of the performance of managers and their predictive power of recognition of specific problems, and improvements to the budget for the next period through feedback. Usually, when the targets are not reached, the error is assigned to the inability of the department, ineffective planning, goals or the unworkable uncertainties (Joshi *et al.*, 2003; Schmidgall *et al.*, 1996; Uyar and Bilgin, 2011).

The budget may require revisions in the budgeting period due to changes in the economic and environmental conditions. Aspects related to local changes and seasonal fluctuations may affect the amount of revisions. Several studies have found different ways to perform reviews, such as monthly, quarterly, half-yearly, yearly or when there is the need, and indicate the identification and correction of problems, realization of new projections and objectives of performance appraisal of revisions (Jones, 1998, 2008b; Joshi *et al.*, 2003; Libby and Lindsay, 2010; Schmidgall *et al.*, 1996; Schmidgall and Defranco, 2006; Uyar and Bilgin, 2011).

The budgeting report period comprises the time involved in the generation of reports for monitoring the results. The study by Uyar and Bilgin (2011) shows that 92.5% of the companies generate monthly reports. The research by Schmidgall *et al.* (1996) confirms the trend that 76% of the 122 USA companies prepare their budgetary processes for five or more years. Regarding Scandinavian companies, 29.6% of the 57 researched companies indicated that they prepare the budget for five or more years. The most frequent response from Scandinavia was for a period of three years (33.3%) and 22.2% others indicated two years.

PREVIOUS BUDGETING STUDIES IN PORTS

Lunkes *et al.* (2013) studied the implementation of performance-based budgeting in the port authority of Valencia, and observed that changes in the budget have generated greater integration between the performance measures and budget allocations, which are implemented by detailing the process operating level, which includes the investment projects. After the adoption of performance-based budgeting, the budget comprised the objectives of future revisions (with physical and financial data and results); how to maximize the results; plan, monitor and assess the results; create incentives and rewards.

Giner-Fillol *et al.* (2012) conducted a survey comparing budgetary practices of a Spanish port and a Brazilian port, and highlighted the differences between the Spanish model that performs and applies strategic planning for five years, while the Brazilian port does not perform strategic planning.

The port efficiency can be predicted; however, Araujo *et al.* (2011) found that the ports presented variations on the productive efficiency in comparison to the ports without technological variations, and related this variation with the planning and public administration of ports.

Surveys conducted in Spanish ports reported an integrated management model, the costing system, and how to create a budget according to the performance of the ports (Giner-Fillol *et al.*, 2013, 2007, 2008, 2010; Giner-Fillol and Ripoll-Feliu, 2007, 2010, 2011; Lunkes *et al.*, 2013).

RESEARCH METHODOLOGY

In this chapter, we present the methodological procedures that were used for the construction of the bibliographic review and the process of selection and analysis of the results.

BIBLIOGRAPHIC REVIEW

The process used for the selection and analysis of references is divided into three stages: choice of databases, check items and systemic analysis (Afonso *et al.*, 2012). The first stage underlies the selection of databases; the second stage obtains a portfolio of articles from a structured and substantiated process; the third stage provides a systemic analysis of the portfolio. First, a consultation was held in CAPES, and the following collections were surveyed: OneFile GALE, ScienceDirect (Elsevier), Social Sciences Citation Index (Web of Science), Emerald Management e Journals, and MEDLINE (NLM), using the keywords "budgeting" and "ports". 284 articles were selected. From this initial sample, all abstracts were read, in order to select the articles related to budgeting practices. The selected articles form the basis of the Bibliographic Review.

METHODOLOGICAL FRAMEWORK

Regarding the nature of its purpose, this study assumes the descriptive exploratory character, once it seeks to highlight the budgeting practices adopted by Brazilian ports. According to Gil (2007), the aim is to provide an overview of the given fact.

For the data treatment, a quantitative and qualitative approach was considered, since the data were tabulated and treated through a descriptive statistics and data analysis. The data were collected and treated in Excel spreadsheets®, since there is a concern of describing the data collection method, in order to allow their replicability and temporal analysis, which is one of the concerns regarding the quantitative and qualitative research (Bryman, 2003).

Finally, regarding the technical procedures, this paper is constituted by a survey, which aims at determining the information about the current practices or views of a specific population (Gil, 2007; Richardson and Sousa, 1999).

POPULATION AND SAMPLE

The research population is constituted by the 34 Brazilian public ports. The sample of the survey was constituted by 9 public ports that participated in the survey –3 ports located

in Santa Catarina, 2 in Paraná, 3 in Rio Grande de Sul and 1 in Ceará.

The ports transfer mostly containers, bulk cargo and passengers. For a better analysis of the differences of the ports, we used the total cargo handled per ton.

The sample contains 3 ports that mobilized more than 10,000,000 tons and 4 ports that moved less than 10,000,000 tons – two ports did not report on the amount of their activities.

SURVEY

The survey was developed by the Center for Research in Controllershship (NUPECON). It has been drawn from the key features highlighted in the review of the literature (Castro *et al.*, 2012; Jones, 1998, 2008a, 2008b; Pavlatos and Paggios, 2008; Schmidgall *et al.*, 1996; Schmidgall and Defranco, 2006; Schmidgall and Ninemeier, 1989, 1986, 1987; Steed and Gu, 2009; Subramaniam *et al.*, 2002; Uyar and Bilgin, 2011; Winata and Mia, 2005; Yuen, 2006).

The survey was submitted to a pilot test in which items were found that were inserted and adjusted to a better understanding and do not generate doubts about the questions. The issues were elaborated from the practices identified in the literature search. The application of the survey is divided into two phases: the first involved the characterization of the companies, including 6 issues; the second involved 15 questions about the planning of the budget, 4 topics relating to the implementation of the budget, with the use of the Likert Scale, and 7 objective questions about the evaluation and performance control.

The survey was available over the internet through the Google Docs platform. Ports were first contacted by phone, then the survey was explained and we made the first contact. After the contact, the address to access the survey was sent by email. The collection period happened between March 2013 and January 2014.

INTERVIEW

In order to establish a methodological triangulation, after the application of the survey, a semi-structured interview was developed with the main practice adopted by the ports. The interview was carried out with the coordination of the process of budget. The methodological triangulation allows the establishment of measures of reliability and validity (Amis and Silk, 2007).

The interview approached aspects of the practices different than those usually highlighted in the literature, such as the period of preparation of the budget, and the purpose of control, among others. The interview aimed at deepening the knowledge on the use of budgeting in ports, with the identification of the reason, or reasons, as well as key explanatory factors of the use of practices other than those mentioned in the literature on the topic.

PRESENTATION AND ANALYSIS OF THE RESULTS

For a discussion under the perspective of budgeting practices in Brazil, this chapter will present the results separated into planning, implementation, and control. Table 4 presents the ports by State and their cargo moves in tons, operating time and number of employees.

From the ports surveyed, three operates more than 10,000,000 tons/year, while four operates less than 10,000,000 tons/year, and two ports did not report, and neither provided the numbers differently. It is possible to notice the difference in sizes between the ports, with port "Port 05" operating a cargo tonnage greater than the sum of the others ports.

The ports that have been operating for a longer time are those that move more cargo, while the ports with less cargo are also the ones that have been operating for less time. The ports with larger numbers of employees are those that operate with a larger amount of cargoes.

Table 4. *Characteristics of the ports.*

Port	State	Tons Moved	Employees	Operating time
Port 01	SC	11,225,526	100 to 499	100 years
Port 02	SC	1,741,808	20 to 99	92 years
Port 03	SC	Not Informed	20 to 99	111 years
Port 04	PR	46,168,102	100 to 499	314 years
Port 05	PR	1,239,926	20 to 99	96 years
Port 06	RS	Not Informed	20 to 99	37 years
Port 07	RS	33,258,958	100 to 499	277 years
Port 08	RS	349,673	20 to 99	17 years
Port 09	EC	4,094,990	100 to 499	94 years

Source: Research data.

BUDGET PLANNING

The ports mention they own a budgeting manual with guidelines, objectives and goals, in addition to having a specific planning and budgeting department, as it may be seen in Table 5.

Although all the ports have a specific department, 4 ports do not have a Budgeting Committee. This Committee is important because it streamlines the budgeting process, with the participation of people from different levels of the organization. In addition to the establishment of the measures, this is a process that is agreed upon and that counts on the participation of the different levels of the Organization, and which is not a top-down imposition. The studies by Uyar and Bilgin (2011) held in Turkey show that the use of a Committee and the operating budgeting are common in Turkish companies.

The prevailing development method in ports is a combined participation, corroborating with the studies by Uyar and Bilgin (2011) and Steed and Gu (2009), which obtained the same conclusion in the United States, showing that most companies use the combination/participatory approach.

In general, the budgeting is elaborated for a period of four years, according to Table 6, due to a public undertaking, subject to the public administration laws and regulations. In opposition, Schmidgall and Defranco (2006), in the United States, Jones (1998), in the United Kingdom, Uyar and Bilgin (2011), in Turkey, concluded that companies usually draw up the budget for the period of one year.

The ports conduct annual reviews, which possibly makes the budget extremely rigid, not allowing the responsible parties to carry out the necessary adjustments due to market fluctuations.

According to Uyar and Bilgin (2011), in Turkey, and Jones (1998, 2008b), in the United Kingdom, it was observed that the revisions occur, in most cases, mainly on a monthly or quarterly basis.

The type of predominant budget is the budget by activities, closely monitoring the contractors. Although the results do not indicate the use of methods such as zero-based budgeting and the beyond budgeting, studies such as the one conducted by Jones (1998, 2008b) carried out in companies of the United Kingdom found that flexible budgeting was not frequently used, while the zero-based budgeting is applied in 50% of the surveyed companies. The application of zero-based budgeting has been used by Brazilian companies to improve their budgeting process (Lunkes, 2007).

Regarding the strategic planning, ports do not produce and do not apply it. This aspect was detected by Pizzolato *et al.* (2010), who suggest that, in order to meet the challenges of the competitive world, the Brazilian ports must: deploy strategic planning, know the market, identify the service levels demanded by the customers, identify business opportunities that may leverage their moving loads, as well as have an adequate knowledge of the relative advantages of their direct competitors in order to anticipate actions and ensure the expansion of the port.

BUDGETING IMPLEMENTATION

The goals are not aligned with the strategic planning process, which corroborates with the fact that the ports state they do not elaborate and implement the strategic planning. The objectives of budgeting implementation in the ports are

Table 5. Budgeting.

The port uses a "budgeting manual" for the preparation of the budget.			
Yes		No	
9		0	
The port has a Budgeting Committee.			
Yes		No	
5		4	
How many hours are required to prepare and revise the budget?			
Less than 40 hours	From 41 to 80 hours	From 81 to 120 hours	More than 120 hours
0	1	6	2
How is the budget prepared?			
Bottom-up (prepared by the operational centers)	Top-down (prepared by the senior management)	Combination/Participatory (joint development)	Other
0	3	6	0

Source: Research data.

Table 6. *Timeframe and budget review.*

For what timeframe is the budget elaborated?				
1 month	3 months	6 months	1 year	Other
0	0	0	0	9
Does the budget go through some kind of review within this period?				
Monthly	Quarterly	Semi-annually	Other	
0	2	0	7	
What is the periodicity of the reports of the budget?				
Monthly	Biannually	Annually	Other	
6	0	0	3	
Does the port make changes arising from the flexible budget volume?				
Yes		No		
5		4		
Which is the method or type of budget used?				
Business budgeting	Flexible budgeting	Continuous budgeting	Zero-based budgeting	Budgeting for activities
3	0	0	0	6

Source: Research data.

Table 7. *Intended goals.*

Which are the programs (software) or technology used in the preparation of the budget?				
Excel Microsoft	Corporate Internet	Microsoft Excel and other program		Other
6	0	3		0
Does the port develop and practice strategic planning?				
Elaborates and applies	Elaborates but does not apply		Elaborates	
0	0		9	
If so, what is the strategic planning timeframe?				
1 year	3 years	5 years	More than 5 years	Other
0	0	0	0	0

Source: Research data.

related to planning and control, and the communication of plans, as presented in Table 7.

Regarding the intended objectives of budgeting, there is a great similarity in the results, revealing the short- and long-term planning and performance review as one of the main purposes, similarly as shown by the research conducted by Schmidgall *et al.* (1996) and Schmidgall and DeFranco (2006) in companies of the United States and Scandinavia.

The ports prepare the budgeting based on the information of previous periods, but also according to regional and local economic indicators and can also use indicators of the

industry and national economic and market analyses, in accordance with Table 8.

According to Table 8, regarding the information used in the preparation of the budget, it may be observed that the statistical information is used at all times. Therefore, the survey reveals that budgets are formulated using the local and regional economic indicators and figures from previous years with greater frequency.

Regarding the evaluation of motivational aspects, it may be realized that it is linked to their participation in the elaboration and achievement of the planned objectives within

Table 8. Information used.

Implementation of the budget	Completely disagree	Partially disagree	Indifferent	I partially agree	I completely agree
Budget is considered key for senior management	6			1	2
Effective leadership is provided in the budgeting process			2	3	4
A good flow of information is available for budgeting	4	3			2
Coordination among departments is easily achieved	3			4	2
Targets are determined in the departments first and then submitted to the senior management	4			3	2
Targets are determined by the senior management and then opinions are collected within departments		1	4		4
Goals are the product of a structured process and are aligned with the strategic planning			7	2	

Source: Research data.

the budget, which reinforces the results found by Umapathy (1987), on the practices that make budgetary systems more effective. This is because one of the objectives of budgeting is to influence the behavior and decisions of the collaborators in order to translate the goals of the port into action plans, communicate the goals and objectives and to provide a reference to assess the performance (King *et al.*, 2010).

The purpose is to ensure that the decisions and behaviors of the employees are consistent with the goals and strategies of the Organization (Malmi and Brown, 2008). In this sense, Brown (1995) argues that the negative behaviors could be reduced by setting more attainable goals, with a broad participation in the budgeting process.

BUDGETING CONTROL

As seen on Table 9, the results show that only two ports do not use reference points, while seven ports use percentage-based reference points and one uses monetary value. Among the main performance measures are: results of previous years, budgeted values, in addition to industry statistics and comparisons with the competitors.

As shown on Table 9, budgeting control steps are partially applied in ports (comparative analysis and identification of deviations), which can represent limitations to the achievement of the desired results with the implementation of the budget.

The ports did not apply procedures for analysis of variances and corrective actions, which Umapathy (1987) considered essential for successful businesses. Brown (1995) pointed out that some behavioral aspects of the management control may include tension, mistrust, suspicion, resentment and resistance to control.

The implementation of all control stages allows differences and deviations to be identified, with the preparation of

improvement plans and to generate an important feedback for the next planning period.

DISCUSSION OF THE RESULTS

To improve the analysis and to better understand the differences in the results in relation to national and international studies, a semi-structured interview was held with those responsible for coordinating the budgeting process of the ports. The results demonstrate that the ports employ partial practices, however, some can be highlighted.

The budgeting timeframe is held for four years with annual reviews, which is different from the findings of the surveys by Schmidgall and DeFranco (2006), in the United States, Jones (1998), in the United Kingdom, Uyar and Bilgin (2011), in Turkey, which concluded that companies usually draw up the budget for the period of one year. This particularity was questioned with the person responsible for the budget (controller) of one of the ports, and it was pointed out that for the ports subject to a specific legislation, they are demanded to have a budgeting for a period of four years and to make annual reviews, since they must consider both the Pluri-annual Plan (PPA) and the Annual Budgeting Law (LOA) in order to make business with public companies.

The ports do not conduct the strategic planning integrated with budgeting. The controller pointed out that one of the main purposes of the budgeting is to comply with the Tax Charge Law (LRF). Pizzolato *et al.* (2010) stressed the importance of strategic planning for the ports.

In the implementation, the main objectives of budgeting are: to plan and control the values and results; to control and evaluate the performance. This is similar to what was revealed by the research conducted by Schmidgall *et al.* (1996) and Schmidgall and DeFranco (2006) in companies

Table 9. Budgeting control.

Are the criteria used to assess significant differences between values and actual values?						
Benchmarking		Does not use reference points		Uses reference points		
0		2		7		
If so, which methods are used?						
Monetary value		Percentage		Repetition of an adverse variation		
1		6		0		
What is the role of budgeting on the actual performance monitoring of the organization?						
Primary indicator of performance		One of the few key indicators used on the Organization			Little used	
8		1			0	
What are the key performance measures used?						
Results from previous years	Budgeted values	Comparison with ports	Indicators and targets of the Balanced Scorecard	Comparisons with competitors	Industry statistics	Other
7	8	0	0	3	3	0
Who is responsible for the analysis of variations?						
Senior management	Floor Manager	Department heads	Budget Committee	Controller	Other	
8	4	1	0	4	0	
The analysis of variation happens:						
Monthly	Quarterly	Every six months	Annually	Other		
6	0	0	3	0		
What are the purposes of the analysis of variations of the budget?						
Evaluate the performance of the Manager	Assess the predictive power of the Manager	Control costs/ expenses	Identify a potential problem in time to avoid it	Provide feedback for the next budgeting period	Other	
0	0	9	5	8	0	

Source: Survey data.

of the United States and Scandinavia. Corroborating with what the controller said, since budgeting is used to meet LRF, controlling the expenses of managers is important in order to meet the legislation.

Regarding the information used, the more evident were the results of previous years and numbers from previous years. According to the controller, an average of the recent years is taken and, after a few adjustments, an index is applied to predict budgetary revenues, and then the budgeting expenses are generated. The differences can be handled by extra-budgetary revenue and expenditure according to the need. This does not corroborate with the research by Lunkes *et al.* (2013) in a Spanish port, which uses port traffic information, market analyses, economic indicators and national, regional and local strategic planning performance measures.

Regarding the control, budgeting is seen as the primary indicator of performance, corroborating with Jones (1998, 2008b), who revealed the role of budgeting on the actual performance monitoring of the Organization as a primary indicator of performance. According to the controller, since it is necessary to comply with the legislation, budgeting needs to be controlled efficiently, since the Budgeting Balance is presented to the Court of Auditors.

To measure the performance, the main measures are the results from the previous years and the budgeted values, since the approved budget must be met, and the actual expenses must not exceed the performed revenue. Lunkes *et al.* (2013) observed that in Spanish ports the main measures used are the values from previous years, benchmarking with other Spanish ports and from other countries, and the goals of the strategic plan.

The purpose of the analysis of variances is to provide feedback for the budgeting of the following year, which corroborates with the fact that the execution uses mainly the values of the previous years. Controlling costs and expenses that are consistent with the needs of the ports complies with the budgeting requirements of LRF (the Fiscal Responsibility Law), as observed on the research by Schmidgall *et al.* (1996).

The results show that budgeting is used as a control instrument, and its use for other managerial purposes may be neglected. It is possible, since public ports follow a specific legislation, focused on the control of expenses and for the strategic planning to be integrated with budget.

When assessing the impact of the factors on the use of budgeting practices, such as size, activities and cargo handling, time of operation and number of employees, it was not possible to identify the differential use of the practices.

CONCLUSIONS

The application of questionnaires allowed us to explore the budgetary practices in ports of Brazil. It was possible to characterize these ports, as well as to observe their budgeting planning, execution and control.

With the evaluation of the impact factors on the use of budgeting practices, it was possible to verify that variables such as size, activities, undertakings, load time and number of employees do not influence the budgeting practices, due to the fact that the ports are subject to a specific legislation and due to the manner in which the budget is applied.

Brazilian ports have possibilities, as stated in the literature, to implement their budgeting processes with the elaboration and implementation of the strategic planning, creation of the Budgeting Committee, and the establishment of a participatory method, which includes objectives and targets. This will possibly cause improvements in the coordination and motivation of the employees of the port in budgeting preparation, implementation and control. The use of a software to manage the budgeting process itself, together with the improvement of supporting information used in the different stages of the budget, the application of control steps and the indication of the responsible individuals can also contribute to improve the efficiency of the budgeting process.

In general, the results show that budgeting in Brazilian ports is still underused, with partial use of many of its features and techniques. By analyzing the results of this research, one may observe the lack of some of the practices highlighted by Umaphy (1987) and King *et al.* (2010), which, according to the authors, are fundamental in the implementation of the budgeting process and adopted by successful companies.

This survey provides results that may benefit the managers of ports in order to compare their budgetary practices and implement improvements. For researchers, it provides information on budgeting planning, execution and control that can be

used in further research. For future work, it is suggested that budgetary practices from other ports are observed, expanding the research, and it is recommended to analyze the capital budgeting and the environmental performance of the ports.

REFERENCES

- ABDEL-KADER, M.; LUTHER, R. 2006. Management accounting practices in the British food and drinks industry. *British Food Journal*, 108(5):336-357. <http://dx.doi.org/10.1108/00070700610661321>
- ADAMS, D. 2006. *Management accounting for the hospitality, tourism and leisure industries: A strategic approach*. London, Cengage Learning EMEA, 323 p.
- AFONSO, M.H.F.; SOUZA, J.V.; ENSSLIN, S.R. 2012. Como construir conhecimento sobre o tema de pesquisa? Aplicação do processo proknow-c na busca de literatura sobre avaliação do desenvolvimento sustentável. *Revista de Gestão Social e Ambiental*, 5(2):47-62. <http://dx.doi.org/10.5773/rgsa.v5i2.424>
- AMIS, J.M.; SILK, M.L. 2007. The philosophy and politics of quality in qualitative organizational research. *Organizational Research Methods*, 11(3):456-480. <http://dx.doi.org/10.1177/1094428107300341>
- ANTAQ. 2013. Dados do Setor Portuário. Available at: <http://www.antaq.gov.br/Portal/default.asp#>. Accessed on: 24/11/2013.
- ARAUJO, C.E.F.; MARTINS, F.G.D.; ROCHA, C.H.; SILVA, F.G.F. 2011. Análise exploratória da eficiência produtiva dos portos brasileiros. *Transportes*, 19(1):5-12. <http://dx.doi.org/10.14295/transportes.v19i1.480>
- BROWN, J. 1995. Management control in the hospitality industry: behavioral implications. *Accounting and Finance for the International Hospitality Industry*. Oxford, British Library Cataloguing, p. 183-201.
- BRYMAN, A. 1984. The debate about quantitative and qualitative research: a question of method or epistemology? *British Journal of Sociology*, 35(1):75-92. <http://dx.doi.org/10.2307/590553>
- BRYMAN, A. 2003. *Quantity and quality in social research*. New York, Routledge, 197 p.
- CASTRO, J.K.; SOUZA, P.; SANTOS, G.R.; LUNKES, R.J. 2012. Práticas Presupuestarias Aplicadas A Las Empresas Hoteleras De Brasil. *Estudios y Perspectivas en Turismo*, 21(4):904-924.
- CRUSEY, K. 2006. Proyectos de puerto asiáticos. *International Financial Law Review*, p. 1-10.
- DAVILA, A.; FOSTER, G. 2005. Management Accounting Systems Adoption Decisions: Evidence and Performance Implications from Early Stage/Startup Companies. *The Accounting Review*, 80(4):1039-1068. <http://dx.doi.org/10.2308/accr.2005.80.4.1039>
- EXAME. 2011. Maré de investimentos: os portos brasileiros atraem uma onda de capital publico e privado - perto de 39 bilhões de reais - para apagar de vez a velha imagem de ineficiência do setor. *Exame*, 14 maio, p. 164+.
- FLAMHOLTZ, E.G. 1983. Accounting, budgeting and control systems in their organizational context: theoretical and empirical perspectives. *Accounting, Organizations and Society*, 8(2):153-169. [http://dx.doi.org/10.1016/0361-3682\(83\)90023-5](http://dx.doi.org/10.1016/0361-3682(83)90023-5)

- FREZATTI, F. 2009. *Orçamento empresarial: planejamento e controle gerencial*. 5ª ed., São Paulo, Atlas, 248 p.
- GARRISON, R.H.; NOREEN, E.W.; BREWER, P.C. 2003. *Managerial accounting*. New York, McGraw-Hill/Irwin, 693 p.
- GIL, A.C. 2007. *Como elaborar projetos de pesquisa*. 4ª ed., São Paulo, Atlas, 200 p.
- GINER-FILLOL, A.; UBAL, N.P.; RIPOLL-FELIU, V.M. 2007. La contabilidad de costes y el CMI: un apoyo básico al Plan Estratégico de la Autoridad Portuaria de Valencia (APV). *Partida Doble*, 194:60-79.
- GINER-FILLOL, A.; UBAL, N.P.; RIPOLL-FELIU, V.M. 2008. Accounting management and technology information: empirical evidence from the port authority of Valencia. *Journal of Information Systems and Technology Management*, 5(3):469-482. <http://dx.doi.org/10.4301/S1807-17752008000300003>
- GINER-FILLOL, A.; RIPOLL-FELIU, V.M.; AZNAR, C.T. 2010. Una aproximación a la implantación del sistema de costes y gestión basado en las actividades en la Autoridad Portuaria de Valencia. In: *Nuevas tendencias en reducción de costes: bases conceptuales y aplicaciones prácticas*. *Profit: Barcelona*, 11:63-84.
- GINER-FILLOL, A.; RIPOLL-FELIU, V.M.; LUNKES, R.J.; ROSA, F.S. 2012. Práticas Orçamentárias: Um Estudo Comparativo entre um Porto do Brasil e da Espanha. In: VI Congresso Iberoamericano de Contabilidade de Gestão; IX Congresso Iberoamericano de Administração Empresarial y Contabilidad, LIMA, 2012. *Anais... PERU*.
- GINER-FILLOL, A.; LUNKES, R.J.; RIPOLL-FELIU, V.M., ROSA, F.S. 2013. *Gestão Portuária - Com caso prático no Porto de Valência (ValenciaPort)*. Florianópolis, Insular, 192 p.
- GINER-FILLOL, A.; RIPOLL-FELIU, V.M. 2007. De la contabilidad de costes a la contabilidad de gestión: el caso de la autoridad portuaria de Valencia-Valenciaport (APV). *Partida Doble*, 184:62-75.
- GINER-FILLOL, A.; RIPOLL-FELIU, V.M. 2010. Utilidad de la Dirección Estratégica de Costes: El Caso de las Autoridades Portuarias del Sistema Español. *Revista de Contabilidade do Mestrado em Ciências Contábeis da UERJ*, 13(1):1-19.
- GINER-FILLOL, A.; RIPOLL-FELIU, V.M. 2011. Analysis of Processes and Competencies Management Through the Perspectives of Processes and Growth and Learning: The Experience of Valencia's the Port Authority. *Revista Universo Contábil*, 7(2):114-129. <http://dx.doi.org/10.4270/ruc.2011216>
- GONZÁLEZ, F.L. 2005. Posibilidades del sistema portuario de Galicia con el futuro ensanchamiento del canal de Panamá. In: *Jornada Proyecto ATMOS*. Santiago de Compostela, 2005. *Proceedings...* 1:1-15.
- HARRIS, P. 1999. *Profit planning*. Oxford, Routledge, 240 p.
- HOPWOOD, A.G. 1983. On trying to study accounting in the contexts in which it operates. *Accounting, organizations and society*, 8(2):287-305. [http://dx.doi.org/10.1016/0361-3682\(83\)90035-1](http://dx.doi.org/10.1016/0361-3682(83)90035-1)
- HORNGREN, C.T.; FOSTER, G.; DATAR, S.M. 2000. *Contabilidade de Custos*. 9ª ed., Rio de Janeiro, LTC, 526 p.
- JENSEN, M.C. 2003. Paying people to lie: the truth about the budgeting process. *European Financial Management*, 9(3):379-406. <http://dx.doi.org/10.1111/1468-036X.00226>
- JONES, T.A. 1998. UK hotel operators use of budgetary procedures. *International Journal of Contemporary Hospitality Management*, 10(3):96-100. <http://dx.doi.org/10.1108/09596119810210279>
- JONES, T.A. 2008a. Changes in hotel industry budgetary practice. *International Journal of Contemporary Hospitality Management*, 20(4):428-444. <http://dx.doi.org/10.1108/09596110810873534>
- JONES, T.A. 2008b. Improving hotel budgetary practice - A positive theory model. *International Journal of Hospitality Management*, 27(4):529-540. <http://dx.doi.org/10.1016/j.ijhm.2007.07.027>
- JOSHI, P.L.; MUDHAKI, J.A.; BREMSER, W.G. 2003. Corporate budget planning, control and performance evaluation in Bahrain. *Managerial Auditing Journal*, 18(9):737-750. <http://dx.doi.org/10.1108/02686900310500505>
- KING, R.; CLARKSON, P.M.; WALLACE, S. 2010. Budgeting practices and performance in small healthcare businesses. *Management Accounting Research*, 21(1):40-55. <http://dx.doi.org/10.1016/j.mar.2009.11.002>
- LIBBY, T.; LINDSAY, R.M. 2010. Beyond budgeting or budgeting reconsidered? A survey of North-American budgeting practice. *Management Accounting Research*, 21(1):56-75. <http://dx.doi.org/10.1016/j.mar.2009.10.003>
- LIU, C.-C. 2008. Evaluating the operational efficiency of major ports in the Asia Pacific region using data envelopment analysis. *Applied Economics*, 40(13):1737-1743. <http://dx.doi.org/10.1080/00036840600905126>
- LUNKES, R.J. 2007. *Manual de Orçamento*. 2ª ed., São Paulo, Atlas, 192 p.
- LUNKES, R.J.; RIPOLL-FELIU, V.M.; GINER-FILLOL, A.; ROSA, F.S.D. 2013. Estudo sobre a implantação do orçamento baseado em desempenho na Autoridade Portuária de Valência. *Revista de Administração Pública*, 47(1):49-76. <http://dx.doi.org/10.1590/S0034-76122013000100003>
- MALMI, T.; BROWN, D.A. 2008. Management control systems as a package— Opportunities, challenges and research directions. *Management Accounting Research*, 19(4):287-300. <http://dx.doi.org/10.1016/j.mar.2008.09.003>
- ØSTERGREN, K.; STENSAKER, I. 2011. Management control without budgets: a field study of "beyond budgeting" in practice. *European Accounting Review*, 20(1):149-181. <http://dx.doi.org/10.1080/09638180903487842>
- OTLEY, D. 1999. Performance management: a framework for management control systems research. *Management Accounting Research*, 10(4):363-382. <http://dx.doi.org/10.1006/mare.1999.0115>
- PAVLATOS, O.; PAGGIOS, I. 2008. Management accounting practices in the Greek hospitality industry. *Managerial Auditing Journal*, 24(1):81-98. <http://dx.doi.org/10.1108/02686900910919910>
- PIZZOLATO, N.D.; SCAVARDA, L.F.; PAIVA, R. 2010. Zonas de influência portuárias - hinterlands: conceituação e metodologias para sua delimitação. *Gestão Et produção* 17(3):553-566. <http://dx.doi.org/10.1590/S0104-530X2010000300009>
- RICHARDSON, R.J.; SOUSA, J.A. 1999. *Pesquisa social: métodos e técnicas*. 3ª ed., São Paulo, Atlas, 336 p.

- SANDINO, T. 2007. Introducing the First Management Control Systems: Evidence from the Retail Sector. *The Accounting Review*, 82(1):265-293.
<http://dx.doi.org/10.2308/accr.2007.82.1.265>
- SCHMIDGALL, R.S.; DEFRANCO, A.L. 2006. Budgeting and forecasting: current practice in the lodging industry. *Hotel Management and Operations*, 39(6):377.
- SCHMIDGALL, R.S.; BORCHGREVINK, C.P.; ZAHL-BEGNUM, O.H. 1996. Operations budgeting practices of lodging firms in the United States and Scandinavia. *International Journal of Hospitality Management*, 15(2):377.
[http://dx.doi.org/10.1016/0278-4319\(96\)00008-4](http://dx.doi.org/10.1016/0278-4319(96)00008-4)
- SCHMIDGALL, R.S.; NINEMEIER, J. 1989. Budgeting practices in lodging and food service chains: an analysis and comparison. *International Journal of Hospitality Management*, 8(1):35-41.
[http://dx.doi.org/10.1016/0278-4319\(89\)90029-7](http://dx.doi.org/10.1016/0278-4319(89)90029-7)
- SCHMIDGALL, R.S.; NINEMEIER, J.D. 1986. Food-Service Budgeting How the Chains Do It. *Cornell Hotel and Restaurant Administration Quarterly*, 26(4):51-55.
<http://dx.doi.org/10.1177/001088048602600416>
- SCHMIDGALL, R.S.; NINEMEIER, J.D. 1987. Budgeting in hotel chains: coordination and control. *Cornell Hotel and Restaurant Administration Quarterly*, 28(1):79-84.
<http://dx.doi.org/10.1177/001088048702800118>
- SIVABALAN, P.; BOOTH, P.; MALMI, T.; BROWN, D.A. 2009. An exploratory study of operational reasons to budget. *Accounting & Finance*, 49(4):849-871.
<http://dx.doi.org/10.1111/j.1467-629X.2009.00305.x>
- STEED, E.; GU, Z. 2009. Hotel management company forecasting and budgeting practices: a survey-based analysis. *International Journal of Contemporary Hospitality Management*, 21(6):676-697. <http://dx.doi.org/10.1108/09596110910975954>
- SUBRAMANIAM, N.; MCMANUS, L.; MIA, L. 2002. Enhancing hotel managers' organizational commitment: an investigation of the impact of structure, need for achievement and participative budgeting. *International Journal of Hospitality Management*, 21(4):303-320.
[http://dx.doi.org/10.1016/S0278-4319\(02\)00010-5](http://dx.doi.org/10.1016/S0278-4319(02)00010-5)
- UMAPATHY, S. 1987. *Current budgeting practices in US industry: the state of the art*. New York, Quorum Books, 176 p.
- UYAR, A.; BILGIN, N. 2011. Budgeting practices in the Turkish hospitality industry: An exploratory survey in the Antalya region. *International Journal of Hospitality Management*, 30(2):398-408. <http://dx.doi.org/10.1016/j.ijhm.2010.07.011>
- VAN NIEKERK, H.C. 2005. Port reform and concessioning in developing countries. *Maritime Economics & Logistics*, 7(2):141-155.
<http://dx.doi.org/10.1057/palgrave.mel.9100129>
- WINATA, L.; MIA, L. 2005. Information technology and the performance effect of managers' participation in budgeting: evidence from the hotel industry. *International Journal of Hospitality Management*, 24(1):21-39.
<http://dx.doi.org/10.1016/j.ijhm.2004.04.006>
- YUEN, D. 2006. The impact of a budgetary design system: direct and indirect models. *Managerial Auditing Journal*, 21(2):148-165.
<http://dx.doi.org/10.1108/02686900610639293>

Submitted on March 15, 2015

Accepted on March 7, 2016