


## ORGANIZATIONAL CHARACTERISTICS AND THE USAGE OF COSTS MANAGEMENT IN DECISION-MAKING PROCESS

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### ABSTRACT

The objective of this study is to verify the determinants of costs management practices used in decision-making process of companies in the westside of Santa Catarina. The data collection was carried out using a questionnaire answered by 41 companies managers from different market sectors. The descriptive research used a quantitative approach using the Chi-Square and Kruskal-Wallis tests. The results indicated that the variable costing method is widely used by the studied companies. The market sector, tax regime and annual turnover were decisive factors for the use of production costing and budget tools. The market sector proved to be a decisive factor in the use of costs information for the selling price formation and negotiation with suppliers and customers. The uptime pointed to differences in the use of costs information for the selling price formation and expenses controlling. The tax regime and the number of employees were decisive for the use of costs information that complies with the tax legislation, identifying possible hindrances in the productive process and also in the set prices.

**Keywords:** Organizational characteristics. Costs management. Costs practices. Costs tools.

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## **1 INTRODUCTION**

The managing of a company, regardless the business market sector, demands costs information to be part of an increasingly competitive market. Kim, Han, Yi, and Chang (2016) note that, for business growth, management must commit itself to adequate costs management.

Organizations should use costing methods as an important tool for management process, providing key information for decision-making (Zanievicz, Beuren, Santos & Kloppel, 2013), e. g., those for selling price formation. Under the company's view, the higher the price, the higher the profit and the better the result. However, it is necessary to be aware of the market, because price limit are defined by the consumer market and by the perceived value attributed to the product and / or service marketed (Bruni & Famá, 2012; Nakamura & Steinsson, 2011).

On this matter, small-sized companies have not given proper attention to costs management and selling price formation (Heidhues & Kőszegi, 2014). This demeanor generates managerial interference, since, additionally to selling price, many other decisions are made based on costs, such as: what and how much to produce; minimum sales volume; budget and costs management (Martins, 2011; Afonso, Wernke & Zanin, 2018; Souza & Diehl, 2009).

Abbas, Gonçalves and Leoncine (2012) consider that the utility of cost accounting does not differ between companies of different sizes, since it performs the same basic functions of arrangement and analysis of expenses, rating and accounting of costs, reports generation and information production costs. In turn, Callado and Pinho (2015) report that costs management practices have been associated with the nature of operational aspects of economic activity and size of companies.

Zuccolotto and Colodeti Filho (2007) consider that many small-sized companies have not evolved yet, even in their models of managerial decisions, presenting only an individual owner controlling. Besides, Mazo (2003) reports that these companies have a structural and organizational nature that generates ordinary problems, such as information system deficiency and dependence on the management involvement in all company decisions.

Callado and Pinho (2015) reinforce the tactics that benefit small-sized companies performance, as is the case of the National Simple tax regime. This system has the purpose of encouraging them, since, in general, small-sized companies do not have enough financial and technological resources at their starting point, and this has contributed to the fragility in management and control systems.

From this angle, the guiding question of the study is: what factors can determine costs management practices in the decision-making process of companies in the westside of Santa Catarina? The objective is to investigate these factors.

The rationale for this study is linked to the importance of information produced in cost management, given the fierce competition between companies in the worldwide market, where pressure for cost reduction is the bottom line for survival. It provides explanations to the business characteristics that shape companies' cost management, offering a way to understand the reasons behind these business management weak point.

## **2 COSTS MANAGEMENT AND COSTING METHODS**

The pressure to market products with good quality and competitive prices has been the main focus of business managers, regardless of size. Costs management has been important in maintaining profitability and competitiveness in business. Therefore, companies need to make efforts to manage and reduce costs, as well as define pricing strategies for products / services (Motta & Escrivão Filho, 2002; Beuren & Schlindwein, 2008).

An effective control of producing costs goes beyond accounting ascertainments and can be useful in managerial assistance (Bornia, 2010; Chapko, Perkins, Fortney & Maciejewski, 2009). In addition to this, such control may also provide the manager with products cost calculation as

one of the criteria for pricing and analyzing the profitability of the company's activities and products (Callado, Miranda & Callado, 2003; Gonzalez, Nachtmann & Pohl, 2017).

Before defining the costing method, it is necessary to classify the cost, which according to the form of allocation, can be direct and indirect. Bruni & Famá (2012) define the direct ones as the ones that can quantify and grant directly to the product, without margins of error. Indirect costs are those that need bases or rates for their allocation, since they are common to a lot of products (Zanievicz *et al.*, 2013).

Another important classification occurs due to production volume variation, which can be fixed or variable. Fixed costs are those that do not vary according to the volume of production (such as rent and salaries), while the variables ones change in a way directly proportional to the volume of production, such as raw materials and packaging materials (Souza & Clemente, 2011; Lauscher & Beuren, 2004).

After determining the costs and their classification, it is necessary to define the costing method, including: a) absorption costing: indirect costs allocated to the products by production volume, machine hour, direct labor and raw materials; b) variable costing: indirect costs not taken to the analysis of product outcome, evaluated by contribution margins; c) activity-based costing: it allows companies to estimate manufacturing costs and also the cost to different consumers; d) activity-based and time-based costing (TDABC): it simplifies the application of activity-based costing and uses time as the main driver of cost to the products; (e) production-effort unit method: a model for calculating the production of the period by determining a unit of measure common to products and processes; d) Standard costing: its objective is to establish a basis of comparison between what has happened to cost and what should have occurred (Rizzi & Zanin, 2018, Kaplan & Anderson, 2007, Aillón, Rocha & Marques, 2018). Therefore, in order to define the ideal costing method, the kind of information that managers expect and their implementation costs must be taken into account. (Afonso *et al.*, 2018; Hoozée & Hansen, 2017; Markantonis, Meyer & Schwarze, 2012).

### **3 COST-BASED DECISIONS**

There are many cost-based decisions, including: selling price formation; cost analysis x volume x profit; products contribution margin; point of equilibrium; safety margin. Therefore, establishing cost-based selling price is crucial for business longevity, regardless of the market sector or size of the organization (Dalci, Tanis & Kosan, 2010; Heidhues & Kőszegi, 2014).

Price formulation is linked to market conditions, government requirements, costs, activity level and return on invested capital. The selling price calculation should lead to a valuation that brings a profit maximization to the business; maintaining quality, taking into account the market pressure and taking advantage of the levels of production or services (Souza & Diehl, 2009; Nakamura & Steinsson (2011); Rizzi & Zanin, 2018).

Santos (2012) argues that, in order to form the selling price, different methods are used: the cost of goods method, which takes into account the cost of goods, products or services; based method, which follows the market price; method based on market characteristics, highlighting the minimum product quality, cultural issues, and so on; and the mixed method, which starts from the merchandise costs, checking up on the market prices and the market that is intended to meet.

Other cost-based information is used by companies for decision-making, among which the break-even point stands out. It starts with the calculation of the contribution margin, which is the difference between the selling price and variable costs and expenses (Martins, 2011; Bruni & Famá, 2012). The contribution margin contributes to the ranking of the products, allowing managers to define the products that should be prioritized in order to improve the result (Santos, 2012; Machado & Souza, 2006).

The accounting break-even point is the minimum amount that the company must sell to balance the revenue with the total costs and expenses (Martins, 2011), that is, the company will

have positive results from the break-even point, being able to make promotions and / or sales in other regions with reduced margins. The economic break-even point, in addition to covering the entire structure of costs and expenses, seeks to define the minimum value of revenues to cover the profit margin desired by the shareholders / owners (Bruni & Famá, 2012).

Considering the theoretical context presented, it is possible to see the complexity of an organization to set up efficient costs management in decision-making process, considering also inherent businesses factors such as: market sector, tax regime, uptime, ratio between company size and the number of employees and turnover.

#### 4 METHODOLOGY

The study has characteristic of descriptive research, with data collection by survey and quantitative data analysis. Research population is comprised of 208 clients from an accounting office in the westside of Santa Catarina.

Data collection was performed using a scientifically developed questionnaire to measure key aspects of individuals and companies (Hair, Babin, Money & Samouel, 2005), which was sent to these 208 clients, returning 41 answers (19.7% of the population) - the research sample. The questionnaire was developed according to the authors' perception of costs methods used in companies' decision-making processes.

Table 1 shows the categorical variables construct of organizational factors and costing methods used by the company in decision-making.

Table 1  
**Categorical variables construct of organizational factors and costing methods used by the company**

	Variables	Measurement
Organizational Factors	Market sector	Industry; Commercial; Services; Transportation
	Uptime	Up to 3 years; from 4 to 8 years; from 9 to 15 years; from 16 to 30 years; over 30 years.
	Tax regime	Simple national; Real profit; Presumed profit.
	Number of employees	Up to 25; from 26 to 50; from 51 to 75; 76 to 100; over 100.
	Annual turnover (R\$)	Up to 180,000.00; from 180,000.01 to 360,000.00; from 360,000.01 to 1,200,000.00; from 1,200,000.01 to 4,800,000.00; above 4,800,000.01.
	Costing method used by the company	Absorption; Variable; Activity Based Costing (ABC); Activity-based Costing (TDABC); Production Effort Unit (PEU); Standard Cost; Other (specify): Specify; none.

Source: prepared by the authors.

According to Table 1, five variables of organizational factors were measured: market sector, uptime, tax regime, number of employees and annual turnover in R\$. Finally, we have the investigation variable of the costing method used by the company in decision-making.

It is noteworthy that all the variables stated in Table 1 are categorical, and therefore, for its statistical treatment, which seeks to determine the association between the organizational factors and the company's costing method, the chi-square test was used. Following, Table 2 demonstrates the measurement variables of costs management used by the researched companies.

Table 2  
Variables on a scale construct of cost management practices

Variable	Statement	Scale	Short
<b>Company reality about cost management practices</b>	The company uses costing method for the formation of the sale price.	Likert 5 points(1 - totally disagree, and 5 - totally agree).	RAE1
	The company is satisfied with the costing method employed in the formation of the sale price.		RAE2
	The company uses integrated software to calculate costs and to operationalize the costing method.		RAE3
	There is some kind of internal control that helps management, such as spreadsheets, notes, etc.		RAE4
	In calculating costs, the company considers the segregation between fixed and variable cost.		RAE5
	In calculating costs, the company considers the segregation between direct and indirect costs.		RAE6
	The company calculates costs by departments.		RAE7
	Indirect costs are allocated to products.		RAE8
	The company determines cost goals (standard costs) for products as a form of control.		RAE9
	The company analyzes the variations of direct materials and direct labor.		RAE10
	The company analyzes the changes in indirect production costs.		RAE11
	Costs control is tied to the budget or strategic planning of the company.		RAE12
	The company uses the cost of the product for the formation of its selling price.		RAE13
	The establishment of the sale price is consistent with the needs for investments return.		RAE14
	The company is satisfied with the established price of its product /service.		RAE15
	The sale price is well accepted by its customers, ie its selling price makes your company competitive before the competition.		RAE16
<b>Hypothesis for the selling price to be higher than the market price</b>	Review the costs.		PDPV1
	Uses strategies / partnerships / alliances to reduce distribution costs, advertising, packaging, etc.		PDPV2
	Review the value chain.		PDPV3
	Reduces profit margin.		PDPV4
	Simply tracks the price competition.		PDPV5
<b>Tools using</b>	Use of profitability and contribution margin indicators for products / services or product / service lines, in order to aid decision making.	Likert 5 points (1 - does not use; and 5 - always uses).	UFC1
	Use of production costs for decision making.		UFC2
	Use of budgets for decision making.		UFC3
	Use of estimated cost (standard cost) for decision making.		UFC4
<b>Purpose of cost information</b>	To comply with tax legislation.		OBIC1
	For sale price formation.		OBIC2
	For negotiation with suppliers and customers.		OBIC3
	To control expenses.		OBIC4
	To identify potential bottlenecks in production processes and prices.		OBIC5

Source: prepared by the authors.

Table 2 shows the existence of four variables for the measurement of cost management practices. To analyze the data on the association between categorical and ordinal variables it was applied the Kruskal-Wallis test. For the application of statistical tests it was used the SPSS® software.

## 5 RESULTS AND DISCUSSIONS

Initially, the descriptive statistics of the organizational factors and the costing method used in the decision-making process of the companies studied are presented in Table 3.

Table 3  
Descriptive statistics of the organizational factors and costing methods in the decision-making process

Market sector	Organizational Factors				
	Industry	Commercial	Services	Transportation	
Frequency	21	13	3	4	
Percentage	51,2%	31,7%	7,3%	9,8%	
<b>Uptime</b>	<b>Up to 3 anos</b>	<b>4 to 8</b>	<b>9 to 15</b>	<b>16 to 30</b>	<b>Above 30</b>
Frequency	3	10	6	17	5
Percentage	7,3%	24,4%	14,6%	41,5%	12,2%

<b>Tax Regime</b>	<b>National Simple</b>		<b>Real profit</b>	<b>Presumed profit</b>	
Frequency	16		15	10	
Percentage	39%		36,6%	24,4%	
<b>Number of employees</b>	<b>Up to 25</b>	<b>26 to 50</b>	<b>51 to 75</b>	<b>76 to 100</b>	<b>Above 100</b>
Frequency	27	9	0	2	3
Percentage	65,9%	22%	0,0%	4,9%	7,3%
<b>Annual turnover R\$ (millions)</b>	<b>180.000</b>	<b>180.000 to 360.000</b>	<b>360.000 to 1.200.000</b>	<b>1.200.000 to 4.800.000</b>	<b>Above 4.800.000</b>
Frequency	1	3	8	14	15
Percentage	2,4%	7,3%	19,5%	34,2%	36,6%
<b>Costing method used in the decision-making process</b>					
<b>Costing Method</b>	<b>Absorption</b>	<b>Variable</b>	<b>Standard</b>	<b>ABC-TDABC-UEP</b>	<b>Not in use</b>
Frequency	11	15	6	0	9
Percentage	26,8%	36,6%	14,6%	0,0%	22%

Source: survey data

Table 3 shows the highest concentration of companies in the industrial and trade sectors. In the uptime, companies are proportionally distributed, being possible to point out a greater presence of companies that have been in the market for more than 16 years. As for the tax regime, there is a homogeneous distribution among the tax frameworks, which can provide satisfactory results between the association of tax regimes and cost management practices. With regard to companies size, by the number of employees and annual turnover, it is considered the existence of employment level concentration of 50 employees and, on the other hand, a relevant portion of companies with above R \$ 1,200,000, 00 annual turnovers.

Finally, the findings indicate that companies use, to a greater extent, the absorption and variable costing methods in decision-making. On the other hand, there are a significant number of companies that do not use any costing methods to support the decision-making process. Moreover, the companies surveyed have not used the costing methods that demand greater professional skills, commitment, advanced software, integrated systems, as is the case with ABC, TDABC e UEP.

The findings corroborate Kaplan & Anderson (2007) and Van Der Merwe (2009), who have identified that a lot of companies face difficulties while implementing and maintaining ABC. Moreover, similar to that identified in the Brazilian context, specifically in the South region, Zhou (2013) reports that there is also low adherence to the use of ABC in cost management in China. It is suggested that the findings can be explained by the high cost of implementation and complexity in its process, factors that have inhibited small-size companies.

In addition, Aillón *et al.* (2018) make some criticisms to the ABC, pointing that no company studied by the authors managed to reach the stage of total ABC costing method institutionalization. When assessing the ABC abandonment factors, the social pressure assumption was the most relevant, since it did not bring informational innovation and it was expensive to implement.

As a complementary analysis of cost management practices, Table 4 shows the descriptive statistics of cost management practices in the organizational decision-making process.

Table 4

**Descriptive statistics of cost management practices in the decision-making process**

Variable	Mean	Standard deviation	Variable	Mean	Standard deviation
<b>Company's reality about cost management practices questions</b>			<b>Using costing tools questions</b>		
RAE1	4,073	1,3673	UFC1	3,902	1,2411
RAE2	3,756	1,2606	UFC2	3,000	1,7029
RAE3	2,683	1,7527	UFC3	3,463	1,5984
RAE4	4,634	0,7986	UFC4	3,659	1,6219
RAE5	4,439	1,2855	<b>Objectives of costing information questions</b>		
RAE6	3,268	1,7033	OBIC1	3,317	1,5722
RAE7	2,415	1,7026	OBIC2	4,585	0,9213

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RAE8	2,756	1,8409	OBIC3	4,146	1,2760
RAE9	2,854	1,5900	OBIC4	4,171	1,0701
RAE10	3,049	1,7022	OBIC5	2,488	1,6143
RAE11	2,512	1,4684	<b>Decision-making process questions</b>		
RAE12	3,220	1,3877	PDPV1	3,976	1,1065
RAE13	4,463	1,0271	PDPV2	3,390	1,3394
RAE14	3,951	1,0943	PDPV3	2,878	1,5032
RAE15	3,756	0,9945	PDPV4	3,415	1,1827
RAE16	4,244	0,7342	PDPV5	3,268	1,5170

Notation: N = 41; Minimum = 1,0; Maximum = 5,0.

Source: survey data.

Table 4 shows that companies use some costing method (RAE1) and production cost control (RAE13) for selling price formation, also considering the segregation of direct and indirect costing (RAE5). Most companies use internal controlling (RAE4), causing consumer price acceptance (RAE16).

On the other hand, evidence indicates that companies have shown low concern with using integrated software for costing and operational definition of costing methods (RAE3), with costing by department (RAE7), as well as the analysis of changes in indirect production costs. These factors are decisive for efficient cost control, being essential to the costing method adopted and establishing consistent and secure decision making.

Regarding to costing tools, the findings indicate the usage of profitability and contribution margin for products / services or product lines / services (UFC1), as well as the estimated cost (UFC4). Nevertheless, production costs have been the least used item as a costing tool (UFC2). This low utilization can be explained by a high incidence of use of this kind of industrial companies controlling, however, some of the companies surveyed belong to other market sectors of activity.

Companies reported that the objective of the cost information is based on sale price formation (OBIC2), suppliers / customers negotiation (OBIC3) and costing control (OBIC4). On the other hand, the bottlenecks in production processes and market prices were less useful for the companies studied (OBIC5). In this sense, it is necessary to stimulate companies on the importance of the analysis of the bottlenecks in the productive process, considering that this factor can influence in the increase of costs and, consequently, in market prices and at the company's profit margin.

Finally, it should be noted that companies go over their costs (PDPV1), enter strategic alliances for distribution, advertising and packaging (PDPV2) and follow the competition pricing (PDPV3), assuming the sale price is higher than the market. It is concluded that companies have set up strategies to make the sale price affordable and competitive to the market, since the cost review can demonstrate important waste aspects; the alliance strategy can bring bargaining gains; and the follow up of the competition pricing can cause controversy that make managers adjust, maintaining the quality and reducing costs.

Considering the presented scenario, it is relevant to verify the association between the organizational factors and the usage of certain costing methods, as well as outline the different costs management practices used in decision-making process.

Table 5 shows organizational factors that explain the choice for a given costing method, using the chi-square test.

**Table 5**  
**Chi-square test between organizational factors and costing methods used in the decision-making process**

Organizational Factors		Score	Costing methods in the decision-making process					Sig.
			1	2	3	4	Total	
Market sector	Industry	Verified	9	3	5	4	21	0,005*
		Expected	5,6	7,7	3,1	4,6	21	
		Verified	0	10	0	3	13	

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	Commercial	Expected	3,4	4,8	1,9	2,9	13	
	Services	Verified	0	0	1	2	3	
		Expected	0,8	1,1	0,4	0,7	3	
	Transportation	Verified	2	1	0	1	4	
		Expected	1,0	1,5	0,6	0,9	4	
Tax Regime	National Simple	Verified	1	7	2	6	16	0,064**
		Expected	4,3	5,9	2,3	3,5	16	
	Real profit	Verified	6	3	4	2	15	
		Expected	4,0	5,5	2,2	3,3	15	
	Presumed profit	Verified	4	5	0	1	10	
		Expected	2,7	3,7	1,4	2,2	10	
Number of employees	Up to 25	Verified	5	11	3	8	27	0,036*
		Expected	7,2	9,9	4,0	5,9	27	
	26 to 50	Verified	4	3	1	1	9	
		Expected	2,4	3,3	1,3	2	9	
	76 to 100	Verified	0	0	2	0	2	
		Expected	0,5	0,7	0,3	0,5	2	
	Above 100	Verified	2	1	0	0	3	
		Expected	0,8	1,1	0,4	0,7	3	
Annual turnover (R\$)	Up to 180.000,00	Verified	0	0	0	1	1	0,028*
		Expected	0,3	0,4	0,1	0,2	1	
	180.000,01 to 360.000,00	Verified	0	0	0	3	3	
		Expected	0,8	1,1	0,4	0,7	3	
	360.000,01 to 1.200.000,00	Verified	0	5	1	2	8	
		Expected	2,1	2,9	1,2	1,8	8	
	1.200.000,01 to 4.800.000,00	Verified	4	6	2	2	14	
		Expected	3,8	5,1	2,0	3,1	14	
	Above 4.800.000,01	Verified	7	4	3	1	15	
		Expected	4,0	5,5	2,2	3,3	15	

Caption: Costing methods: 1 - absorption costing; 2 - variable costing; 3 - standard costing; 4 - does not use costing method.

\* 5% level of Significance

Source: survey data.

It should be noted that the uptime did not present statistically significant association with the costing methods used in the decision process and, thus, this variable was not presented in Table 5. The number of employees in the 51 to 75 scale was not included because none of the companies had this characteristic.

Overall, the results indicate that the industry, taxation regime, number of employees and annual turnover are determinants of the costing method chosen by companies. It can be inferred that industrial sector companies are associated to the use of the absorption costing method, while commercial ones are associated to variable costing, and the service companies do not use costing methods.

Borgert and Silva (2005) had already pointed out that the industrial segment has more traditionally turned to the use of the absorption costing method. Still, such assertion can not be addressed to service companies, confirming the findings of this research, as already mentioned by Cardoso, Pereira and Guerreiro (2004). In addition, the findings indicated that industries also have a predominance of the standard costing method, corroborating the findings of Souza, Fontana and Boff (2010), which reported that the standard method is by large the most common method used by big-sized industries in the city of Caxias do Sul / RS.

Regarding to the tax regime, it should be noted that companies under the National Simple regime use variable method and / or use no costing method at all. On the other hand, companies under the Real Profit regime are associated to the use of the absorption method and, also, companies under the Presumed Profit regime use the variable method followed by the absorption method. This fact can be explained by the corporate income tax legislation, which determines that all costs are allocated to the products, regardless of direct or indirect (absorption), since these affect the final result, basis for calculating the corporate income tax and social contribution on net income.



The findings indicate that small-sized companies, by the criterion of number of employees, are associated to the use of the variable costing method. In addition, larger companies tend to use both the variable method and the absorption method, with greater evidence for absorption method, since this one meets fiscal legislation, and variable method serves as the basis for obtaining the contribution margin of their products and making short-term decisions. The results by the annual turnover criteria were similar, and companies with lower turnovers do not use costing methods, but, as growth occurs, they prone to the use of variable method followed by the absorption method.

Table 6 presents the *Kruskal-Wallis* test result, with the difference between company reality in cost management practices and organizational factors.

Table 6

**Differences between company reality on cost management practices and organizational factors**

Company reality	Market sector	Uptime	Tax Regime	Number of Employees	Annual Turnover
RAE1	0,003*	0,001*	0,841	0,089	0,131
RAE2	0,002*	0,002*	0,709	0,087	0,062
RAE3	0,131	0,026*	0,106	0,315	0,019*
RAE4	0,185	0,280	0,167	0,503	0,216
RAE5	0,046*	0,254	0,149	0,215	0,007*
RAE6	0,050*	0,013*	0,011*	0,114	0,003*
RAE7	0,723	0,155	0,000*	0,018*	0,000*
RAE8	0,207	0,160	0,000*	0,090	0,004*
RAE9	0,097	0,147	0,137	0,014*	0,024*
RAE10	0,005*	0,008*	0,146	0,000*	0,002*
RAE11	0,085	0,490	0,196	0,110	0,268
RAE12	0,556	0,036*	0,148	0,569	0,663
RAE13	0,001*	0,273	0,273	0,674	0,870
RAE14	0,001*	0,170	0,954	0,528	0,203
RAE15	0,235	0,062	0,987	0,975	0,060
RAE16	0,008*	0,553	0,691	0,712	0,782

\* 5% level of Significance.

Source: survey data.

In Table 6, it can be seen in that the Market sector associated with the following aspects: use of costing method for selling price formation; satisfaction on the costing method used in the sale price formation; fixed and variable costs segregation as well as direct and indirect costs segregation; analysis of the direct materials and direct labor variations; use of product costs in the selling price formation, with the set up of the selling price in accordance with the reaching demand of investments return; and customers' good-acceptance of prices.

The uptime was associated with the use of the costing method for the selling price formation; satisfaction of the company against the costing method used; resort to integrated software to calculate costs; fixed and variable costs segregation as well as direct and indirect costs segregation; analysis of the direct materials and direct labor variations; and cost control tied to budget or strategic planning.

The tax regime was associated with costs calculation by the segregation between direct and indirect costs; costing by departments; allocation of indirect costs to products. On the other hand, the number of employees showed an association with the departmental costs; determination of product cost targets; and the analysis of direct materials and direct labor variations.

Finally, the annual turnover was associated with the resort to integrated software to calculate costs; calculation of costs considering the segregation between fixed and variable costs and also between direct and indirect costs; determination of costs by departments with indirect costs allocated to products; determination of products' cost targets and analysis of variations in materials and direct labor.

For that matter, in order to demonstrate the determinants of the company's reality related to costing management practices, the *Kruskal-Wallis* test was used as it is shown in Table 7.

Table 7

**Kruskal-Wallis test of organizational factors related to costing management practices**

Market sector	Company reality about costing management practices							
	RAE1	RAE2	RAE5	RAE6	RAE10	RAE13	RAE14	RAE15
Industry	23,69	25,81	22,98	23,57	26,57	22,93	23,10	23,76
Commerce	23,62	20,50	19,12	16,77	17,73	25,19	25,73	20,38
Services	7,50	9,50	10,00	10,17	10,17	10,00	7,00	16,50
Transportation	8,50	6,00	25,00	29,38	10,50	5,50	5,13	11,88
Uptime	RAE1	RAE2	RAE3	RAE6	RAE10	RAE12		
Up to 3 years	15,67	11,50	19,33	15,83	15,50	16,17		
4 to 8 years	15,65	16,70	16,55	22,75	16,80	29,10		
9 to 15 years	9,58	10,08	11,33	7,25	10,83	11,00		
16 to 30 years	26,79	26,71	26,56	23,91	25,03	20,15		
Above 30 years	28,90	29,00	23,60	27,20	31,20	22,60		
Tax regime	RAE6	RAE7	RAE8					
National Simple	14,47	15,72	16,59					
Real profit	27,13	30,43	30,63					
Presumed profit	22,25	15,30	13,60					
Number of employees	RAE7	RAE9	RAE10					
Up to 25	18,04	17,72	16,09					
26 to 50	23,67	25,00	31,17					
51 to 75	25,00	22,50	20,50					
76 to 100	37,00	37,50	35,00					
Above 100	No answer	No answer	No answer					
Annual turnover (R\$)	RAE3	RAE5	RAE6	RAE7	RAE8	RAE9	RAE10	
Up to 180.000	35,50	2,50	33,00	37,00	35,00	37,50	35,00	
180.000,01 to 360.000	9,50	11,17	6,00	11,50	18,67	22,00	16,67	
360.000,01 to 1.200.000	16,94	17,19	14,00	15,25	15,06	14,00	12,25	
1.200.000,01 to 4.800.000	18,50	23,75	20,61	16,61	15,96	17,36	17,25	
Above 4.800.000,01	26,83	23,67	27,30	29,00	28,40	26,80	29,10	

Source: survey data.

Firstly, table 7 shows that the industry uses costing method for selling price formation (RAE1), complacent with the method in use (RAE2). Transportation sector has segregated fixed and variable costs (RAE5) and, in the segregation, between direct and indirect costs (RAE6), since it is a sector that differs from industry that deal with several costs centers in the production process. Thus, transportation encompasses the administrative and warehouse management sector, however, its higher cost is linked to transport itself, with variable costs taking precedence.

The findings indicate that the commercial sector is related to the use of product costs in the selling price formation (RAE13), in accordance with the reaching demand of investments return (RAE15). One of the possible explanations is that commercial business usually tend to worry about products purchasing costs, giving less emphasis to overhead and fixed costs. Finally, satisfaction with products/services set price follows the scale of preference in the industrial, commerce, services and transportation sectors.

It should be noted that companies with the highest uptime are associated with the utilization (RAE1) and satisfaction (RAE2) of the costing method using to selling price formation. Moreover, companies with longer uptime are associated with the use of integrated software for costs calculation (RAE3), segregating costs between direct and indirect (RAE6) and materials and direct labor variations analysis (RAE10).

Finally, the findings indicate that companies with uptime between 4 and 8 years are associated with costs control linked to budget and / or strategic planning. In this regard, it is inferred that the uptime has not been a conclusive factor for the use of costs control linked to the budget and / or strategic planning, both linked to the generation of information for the decision-making process.

In the taxation regime, the results show that companies under the Real Profit regime tend to calculate costs by segregation in direct and indirect (RAE6), determination of costs by departments (RAE7) and allocation of indirect costs to products (RAE8). It can be suggested that the adaptation to the Real Profit tax regime hasn't been decisive to chose the integrated software and control of costs by departments also not linked to the budget. Overall, it is concluded that, even with the need for the companies under the Real Profit regime to maintain periodic information of costs for the calculation of the taxable profit, they do not employ some costs management practices important for decision-making process.

The findings reflect the fact that big-sized companies, by the criterion of number of employees, tend towards management practices in costs determination by departments (RAE7), in the determination of cost targets for products (RAE9) and in direct materials and direct labor variation analysis (RAE10).

Furthermore, there were surplus in company through annual turnovers, in which smaller and larger ones employed an integrated software (RAE3), calculated the costs considering the segregation between direct and indirect (RAE6), calculated costs by departments (RAE7), allocated indirect costs (RAE8), determined cost targets (RAE9), and analyzed the variations of direct materials and direct labor (RAE10).

It is surprising that small-sized companies present costs management characteristics that are closer to larger companies. Finally, it should be noted that only the big-sized companies are associated with the segregation of costs between fixed and variable (RAE5). Therefore, inconclusive results were obtained by size in the company' annual turnover, as determinant of the practices of costs management.

Table 8 presents the *Kruskal-Wallis* test result of the difference between the use of costs tools and organizational factors.

Table 8

**Differences between the use of costs tools and organizational factors**

Use of costs tools	Market Sector	Uptime	Tax Regime	Number of Employees	Annual Turnover
UFC1	0,459	0,897	0,184	0,945	0,790
UFC2	0,012*	0,001*	0,042*	0,001*	0,001*
UFC3	0,027*	0,138	0,073**	0,613	0,091**
UFC4	0,154	0,096**	0,193	0,054**	0,321

**Note.** \* 5% level of significance; \*\* 10% level of significance.

Source: survey data.

Table 8 shows that the market, tax regime and annual turnover sectors presented statistical significance with use of production costs tools (CFU2) and budgets (CFU3). According to the results, the use of the cost of production and the budget can be determined by the Market sector, tax regime chosen and annual turnover. In addition, the uptime and the number of employees determine the use of production costs (UFC2) and estimated costs (UFC4). To set forth organizational factors that determine the use of costs tools, the *Kruskal-Wallis* test is presented in Table 9.

Table 9  
**Kruskal-Wallis test for organizational factors using costs tools**

Use of costs tools					
Market sector	UFC2	UFC3	Number of employees	UFC2	UFC4
Industry	25,79	23,12	Up to 25	17,22	18,37
Commerce	19,38	19,00	26 to 50	29,11	26,50
Services	8,00	4,50	51 to 75	0,00	0,00
Transportation	10,88	28,75	76 to 100	13,75	15,25
<b>Uptime</b>	<b>UFC2</b>	<b>UFC4</b>	Above 100	35,50	32,00
Up to 3 years	17,83	9,33			
4 to 8 years	13,70	21,65			
9 to 15 years	11,83	15,08			
16 to 30 years	25,38	22,35			
Above 30 years	33,60	29,20			
<b>Tax regime</b>	<b>UFC2</b>	<b>UFC3</b>	<b>Annual turnover (R\$)</b>	<b>UFC2</b>	<b>UFC3</b>
National Simple	18,47	16,34	Up to 180.000	35,50	33,00
Real profit	26,93	22,03	180.000,01 to 360.000	17,17	14,00
Presumed profit	16,15	26,90	360.000,01 to 1.200.000	11,69	13,13
			1.200.000,01 to 4.800.000	18,00	23,39
			Above 4.800.000,00	28,57	23,57

Source: survey data.

It is concluded that industrial business use the production costs in the decision-making process. On the other hand, transportation business, followed by industries, have a greater tendency to use it in the budget. Also, it can be inferred that companies with the longest uptime use both the production costs and estimated costs.

Regarding to the tax regime, companies under the Real Profit regime are associated with the use of production costs and, on the other hand, companies under the Presumed Profit regime use the budget. Larger companies, by the number of employees criterion, use production costs and estimated costs. Smaller companies, by the annual turnover criterion, showed to be associated with the production costs and budget. Table 10 presents the *Kruskal-Wallis* test of the difference between costs information and organizational factors.

Table 10  
**Differences between costs information objectives and organizational factors**

Objectives of costs information	Market sector	Uptime	Tax regime	Number of employees	Annual Turnover
OBIC1	0,520	0,163	0,006*	0,044*	0,103
OBIC2	0,000*	0,009*	0,517	0,189	0,173
OBIC3	0,050*	0,163	0,908	0,511	0,355
OBIC4	0,116	0,049*	0,139	0,814	0,413
OBIC5	0,333	0,821	0,047*	0,024*	0,324

**Note.** \* 5% level of significance.

Source: survey data.

Table 10 reveals that the market sector presented a statistically significant difference with the use of costs information for the selling price formation and negotiation with suppliers and customers. Uptime indicated differences in the use of costs information for the selling price formation and expenses control. Regarding tax regime and the number of employees, there is a statistically significant difference between the use of costs information to comply with tax legislation and the identification of bottlenecks in production processes and prices. Table 11 presents the *Kruskal-Wallis* test to identify differences between organizational factors with costs information objectives.

Table 11  
**Kruskal-Wallis test of organizational factors with cost information objectives**

Objectives of costs information					
Market sector	OBIC2	OBIC3	Tax regime	OBIC1	OBIC5
Industry	23,79	20,69	National Simple	14,69	20,47
Commerce	24,12	23,58	Real profit	27,97	25,83
Services	9,50	5,50	Presumed profit	20,65	14,60
Transportation	4,88	25,88			
Uptime	OBIC2	OBIC4	Number of employees	OBIC1	OBIC5
Up to 3 years	19,50	10,50	Up to 25	20,93	17,78
4 to 8 years	14,90	26,55	26 to 50	14,67	23,44
9 to 15 years	15,42	12,50	51 to 75	0,00	0,00
16 to 30 years	25,50	23,12	76 to 100	29,50	34,75
Above 30 years	25,50	19,20	Above 100	35,00	33,50

Source: survey data.

The findings suggest that companies in the commerce and industry sectors use costs information for selling price formation more closely and, differently, companies in the transportation and commerce sectors use costs information for negotiations with customers and suppliers. Companies with longer uptime use costs information to properly form the selling price, while smaller companies use it to control expenses. Also, larger companies use them to comply with legislation and to define the bottlenecks in the processes and market prices.

In the tax regime, results show that Real Profit regime companies use costs information to comply with legislation and identify bottlenecks in production processes and prices. Overall, Real Profit regime companies need to control costs more accurately for the correct setting of costs of products/merchandise sold, associating their objectives with the demands of law complying. In addition, inspection is more inflexible in the way Real Profit regime companies control costs, and this tax regime is demanded in terms of obligations and controlling to provide information to the treasury.

Table 12 presents the results of the *Kruskal-Wallis* test to verify the existence of a statistically significant difference between the decision-making process when selling price is higher than the market price and organizational factors.

Table 12  
**Kruskal-Wallis test between selling price decision-making process and organizational factors**

Decision-make process when selling price is higher than market price	Market sector	Uptime	Tax regime	Number of employees	Annual turnover
PDPV1	0,117	0,582	0,036*	0,531	0,804
PDPV2	0,784	0,711	0,842	0,767	0,368
PDPV3	0,353	0,948	0,283	0,371	0,412
PDPV4	0,142	0,052**	0,402	0,794	0,285
PDPV5	0,067*	0,082**	0,373	0,818	0,350

**Note.** \* 5% level of significance; \*\* 10% level of significance.

Source: survey data.

Table 12 reveals that market sector presented a statistical difference with price competition follow-up, in the event that the selling price is higher than the market price. Uptime showed significance with the reduction of profit margin and price competition follow-up. Finally, the tax regime is associated with the costs review, when selling price is higher than market price.

Following, the *Kruskal-Wallis* test results in Table 13, to verify the existence of differences between the organizational factors and the decision-making process in the hypothesis that the selling price is higher than the market price.

Table 13  
**Kruskal-Wallis test for organizational factors regarding to price formation decision-making process**

when selling price is higher than market price			
Uptime	PDPV4		PDPV5
Up to 3 years	18,67		18,00
4 to 8 years	12,25		29,30
9 to 15 years	28,00		22,83
16 to 30 years	23,65		16,21
Above 30 years	22,40		20,30
Market sector	PDPV5	Tax regime	PDPV1
Industry	19,71	National Simple	19,44
Commerce	17,46	Real profit	17,43
Services	29,50	Presumed profit	28,85
Transportation	32,88		

Source: survey data.

Table 13 results indicate that services and transportation sectors are more likely to follow up price competition in the event of a selling price higher than market price. It is concluded that companies of these two sectors are less concerned with selling price formation using costs information for decision making, since they only monitor price competition.

Moreover, companies with longer uptime reduce the profit margin in the event that the selling price is above the market. Companies with four to eight years of uptime follow the price competition. Finally, companies in the Presumed Profit tax regime seek to reduce costs, when selling price is higher than market price.

## 5 FINAL CONSIDERATIONS

The findings suggest that a large number of companies do not use costing methods which is a concerning factor due to the importance of these methods in the selling price formation process and in the costs controlling in decision processes. Companies that use costing methods focus on absorption method and variable method, which are the least complex for implementation and therefore present reasonable cost-benefit. We conclude that more advanced costing methods have not been usable tools in the context of the organizations studied.

There are indications of production costs controlling in the selling prices formation, as well as in internal control to set a more-accessible-to-customers selling price. A concern factor is related to the lack of interest of companies in resorting to an integrated software to calculate costs, as well as the low relevance in the bottlenecks analysis, in the hypothesis of a selling price higher than the competition price. Therefore, it appears that companies are concerned about adapting to the market, still, such decision may lead to a reduction in profit margins, due to the non-observance of factors that may be associated with competitors bottleneck costs.

It is understood that companies in the industrial sector use the absorption costing method, the ones in the commerce sector use the variable costing method, and the others do not use any costing method at all. In addition, Real Profit regime companies use the absorption method for compliance with the laws that guides organizations that use this method of forming sold products costs for tax deduction. This finding corroborates the study by Pereira and Beuren (2004), who concluded that companies with the lowest number of employees use the absorption method, which initially would have the purpose of meeting fiscal and corporate requirements.

Furthermore, the findings suggest that companies in the commerce sector use products costs form selling prices, and theses companies are the ones that are most concerned with acquisition costs, with emphasis on indirect and fixed costs. Finally, it is understood that absorption costs may provide greater satisfaction when defining product prices, considering that the most preferred scale was visualized in industrial sector companies.

Services and transportation sectors are concerned with selling price formation and for it, these companies have basically resort to monitoring price competition. This result is worrying, since the monitoring of costs is something very relevant for setting up selling prices. Costs controlling in services and transportation sectors is quite simple compared to other sectors, however, these types of business have not shown concern with such factors.

It is also concluded that companies under the National Simple and Presumed Profit tax regimes resort to variable costing method when determining the selling price. Big-sized companies tend to use absorption costing method, while smaller ones resort to variable costing method and, in some cases, do not use costing methods to make decisions. These evidences corroborate the evidence of Callado and Pinho (2015), which emphasized that small and medium-sized companies have simple managerial and operational structures, making it possible for their costs management use resemble one to another and indicating that there is a mimetic isomorphism between organizations.

Generally, companies with longer uptime resort to an integrated software to calculate costs, segregating between direct and indirect, with materials and direct labor variations analysis. A fact to be considered is that older companies have a greater financial and organizational structure for investment in integrated software, which allows for accuracy in costs segregation for decision-making, as can be noted in the findings. Finally, it is considered that market sector, tax regime, uptime and company size determine the use for costs management.

It is recommended that more research could be done with observance of costs for management and its organizational characteristics in big-sized companies. Besides, the study of other managers behavioral characteristics could be usable as explanatory factors of a given choice in costs management.

## REFERENCES

- Abbas, K., Gonçalves, M. N., & Leoncine, M. (2012). Os métodos de custeio: vantagens, desvantagens e sua aplicabilidade nos diversos tipos de organizações apresentadas pela literatura. *Contexto*, 12(22), 145-159.
- Afonso, P. S. L. P., Wernke, R., & Zanin (2018). A. Managing the cost of unused capacity: An integrative and comparative analysis of the ABC, TABC and UEP Methods. *Revista Del Instituto Internacional de Costos*, 13, 150-163.
- Aillón, H. S., Rocha, W., & Marques, K. C. M. (2018). Deinstitutionalization of activity basic costing: analysis from the new institutional sociology perspective. *Revista Contabilidade Vista & Revista*, 29, 101-129.
- Beuren, I. M., & Schlindwein, N. F. (2008). Uso do custeio por absorção e do sistema RKW para gerar informações gerenciais: Um estudo de caso em hospital. *ABCustos*, 3(2), 27-53.
- Borgert, A., & Silva, M. Z. (2005). Método de custeio híbrido para gestão de custos em uma empresa prestadora de serviços. *Anais do Congresso Brasileiro de Custos*, Florianópolis, SC, Brasil, 19.
- Bornia, A. C. (2010). *Análise gerencial de custos: aplicação em empresas modernas* (3a ed.). São Paulo: Atlas.
- Bruni, A. L., & Famá, R. (2012). *Gestão de custos e formação de preços: com aplicações na calculadora HP 12C e Excel* (6a ed.). São Paulo: Atlas.

- Callado, A. L. C., Miranda, L. C., & Callado, A. A. C. (2003). Fatores associados à gestão de custos: um estudo nas micro e pequenas empresas do setor de confecções. *Revista Produção*, 13(1), 64-75.
- Callado, A. A. C., & Pinho, M. A. B. (2015). Evidências de isomorfismo mimético sobre práticas de gestão de custos entre micro e pequenas empresas de diferentes setores de atividade. *Contabilidade Vista & Revista*, 25(2), 119-137.
- Cardoso, R. L., Pereira, C. A., & Guerreiro, R. (2004). A produção acadêmica em custos no âmbito ENANPAD: uma análise entre 1998 a 2003. *Anais do Encontro Anual da Associação Nacional dos Programas de Pós-Graduação em Administração*, Curitiba, PR, Brasil, 28.
- Chapko, M. K., Liu, C. F., Perkins, M., Li, Y. F., Fortney, J. C., & Maciejewski, M. L. (2009). Equivalence of two healthcare costing methods: bottom-up and top-down. *Health economics*, 18(10), 1188-1201.
- Dalci, I., Tanis, V., & Kosan, L. (2010). Customer profitability analysis with time-driven activity based costing: A case study in a hotel. *International Journal of Contemporary Hospitality Management*, 22(5), 609-637.
- Gonzalez, M., Nachtmann, H., & Pohl, E. (2017). Time-driven activity-based costing for health care provider supply chains. *The Engineering Economist*, 62(2), 161-179.
- Hair, J., Babin, B., Money, A., & Samouel, P. (2005). *Fundamentos de métodos de pesquisa em administração*. Porto Alegre: Bookman.
- Heidhues, P., & Kőszegi, B. (2014). Regular prices and sales. *Theoretical Economics*, 9(1), 217-251.
- Hoozée, S., & Hansen, S. C. (2017). A comparison of activity-based costing and time-driven activity-based costing. *Journal of Management Accounting Research*, 30(1), 143-167.
- Kaplan, S. R., & Anderson, R. S. (2007). *Custeio baseado em atividades e tempo*. Rio de Janeiro: Elsevier.
- Kim, Y. W., Han, S. H., Yi, J. S., & Chang, S. (2016). Supply chain cost model for prefabricated building material based on time-driven activity-based costing. *Canadian Journal of Civil Engineering*, 43(4), 287-293.
- Lauscher, M. A., & Beuren, I. M. (2004). Gestão estratégica de custos. *Revista de Contabilidade Vista & Revista*, 15(2), 53-84.
- Machado, D. G., & Souza, M. A. (2006). Análise das relações entre a gestão de custos e a gestão do preço de venda: um estudo das práticas adotadas por empresas industriais conserveiras estabelecidas no RS. *Revista Universo Contábil*, 2(1), 42-60.
- Markantonis, V., Meyer, V., & Schwarze, R. (2012). Review Article” Valuating the intangible effects of natural hazards—review and analysis of the costing methods”. *Natural Hazards and Earth System Sciences*, 12(5), 1633-1640.
- Martins, E. (2011). *Contabilidade de custos* (10a ed.). São Paulo: Atlas.



- Mazo, E. M. (2003). *Benchstar: metodologia de benchmarking para análise da gestão da produção nas micro e pequenas empresas*. Dissertação de Mestrado em Engenharia de produção, Curso de Pós-Graduação em Engenharia de produção, Departamento de Engenharia de produção, Universidade de Santa Catarina, Florianópolis, SC, Brasil.
- Motta, F. G., & Escrivão Filho, E. (2002). Fatores influentes na adoção de métodos de custeio em pequenas empresas: estudo multicase. *Produto & Produção*, 6(1).
- Nakamura, E., & Steinsson, J. (2011). Price setting in forward-looking customer markets. *Journal of Monetary Economics*, 58(3), 220-233.
- Pereira, C. C., & Beuren, I. M. (2004). Fatores determinantes na escolha do sistema de custos para dar suporte ao processo de gestão: um estudo nas grandes empresas de Santa Catarina. *Revista Catarinense da Ciência Contábil*, 3(9), 9-30.
- Rizzi, D. I., & Zanin, A. (2018). Estratégia de formação de preço de venda/serviço dos empreendedores incubados na recepção. *Holos* (Natal. Online), 2, 111-127.
- Santos, J.J. (2012). *Fundamentos de custos para formação do preço e do lucro* (5a ed.). São Paulo: Atlas.
- Souza, A., & Clemente, A. (2011). *Gestão de custos: aplicações operacionais e estratégicas* (2a ed.). São Paulo, Atlas.
- Souza, M. A., & Diehl, C. A. (2009). *Gestão de custos: uma abordagem integrada entre contabilidade, engenharia e administração*. São Paulo, Atlas.
- Souza, M. A., Fontana, F. B., & Boff, C. D. S. (2010). Planejamento e controle de custos: um estudo sobre as práticas adotadas por empresas industriais de Caxias do Sul-RS. *Contabilidade Vista & Revista*, 21(2), 121-151.
- Van Der Merwe, A. (2009). Debating the principles: ABC and its dominant principle of work. *Cost Management*, 23(5), 20-28.
- Zanievicz, M., Beuren, I. M., Santos, P. S. A., & Kloeppe, N. R. (2013). Métodos de Custeio: uma meta-análise dos artigos apresentados no Congresso Brasileiro de Custos no período de 1994 a 2010. *Revista Brasileira de Gestão de Negócios*, 15(49), 601-616.
- Zhou, Y. (2013). Costing methodologies and cost management practices: A survey of Chinese companies. In *2013 International Conference on Computational and Information Sciences* (pp. 454-457). IEEE.
- Zuccolotto, R., & Colodeti Filho E. (2007). Gerenciamento de preços em empresas de pequeno porte por meio do custeio variável e do método de Monte Carlo. *Enfoque: Reflexão Contábil*, 26(3), 39-52.