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QUALITY IN MANAGEMENT ACCOUNTING: APPROACH BY ACTIVITIES IN LARGE COMPANIES

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ABSTRACT

This study intends to contribute to the knowledge about the approach by activities, a management accounting method that promotes the quality of information. As specific objectives we have identified the following: to analyze the knowledge rate regarding the approach by activities, and identify whether there is a link between it and the financial officers' characteristics; to analyze the utilization rate of the approach by activities, and the factors conditioning it; to analyze whether there is a link between a company's features, and the use of the approach by activities. The data collection method used was the application of a survey to the financial officers of the largest Portuguese companies, which yielded 61 valid responses. The results found allowed us to conclude the following: the Time Driven Activity Based Costing is very little known and used in Portugal; there is a link between the knowledge of the approach by activities and the financial officers' gender, age and educational background; there is a link between the use of the approach by activities and two company features: the legal form and the capital holding.

Keywords: Time Driven Activity Based Costing; quality; management accounting; Portugal; large companies.

1 – INTRODUCTION

This study intends to contribute to the knowledge about the approach by activities, a management accounting method that promotes the quality of information. As specific goals we have identified the following: to analyze the knowledge rate of the approach by activities, and identify the variables responsible for its dissemination; to analyze the utilization rate of

the approach by activities and the factors conditioning it; to analyze whether there is a link between a company's features and the use of the approach by activities.

The relevance of this subject is fundamentally justified by three factors. Firstly, following the development of the markets in recent years, and in view of the current economic crisis, the quality practices deserve increased attention from organizations (Jourabchi et al., 2014; Mantri and Jaju, 2015; Nair and Choudhary, 2016) and researchers (Gorantiwar and Shrivastava, 2014; Para-González, 2016). Secondly, the theory (Kaplan and Anderson, 2004, 2005) has been presenting the approach by activities as a management support tool with the ability to create value (Anggadini, 2015; Chiarini, 2014; Hoozée and Bruggeman, 2010; Nassar et al., 2011; Schoute, 2011; Stout and Propri, 2011) and promote the quality of information (Meddaoui and Bouami, 2013, 2014). continuing this approach to merit the attention of researchers. Thirdly, several authors (Clarke et al., 1999; Cohen et al., 2005; Haldma and Lääts, 2002; Machado 2012, 2013; Nunes and Machado, 2014) consider that it is important to know the contingency variables responsible for the dissemination of knowledge on management accounting methods, associated with the company and the financial officers' characteristics.

Jha and Nanda (2013) concluded that they are large organizations that are more concerned with the quality of information. Thus, the data collection method used in this study was the application of a survey to the financial officers of the 300 largest companies in Portugal with available email contact. We received 61 valid responses.

2 - LITERATURE REVIEW

Due to competitive markets, most organizations promote quality as a critical success factor (Jourabchi et al., 2014; Mantri and Jaju, 2015). Several authors identify the use of management accounting methods based on activities as a practice that promotes the quality of information (Chiarini, 2014; Meddaoui and Bouami, 2013, 2014).

The approach by activities continues to be considered as the most innovative method of products or services valuation (Abdallah and Li, 2008; Arsénio and Machado, 2013; Machado, 2012). Standing apart from the older methods, in which the product cost is influenced by the production volume, the approach by activities calculates the product cost using the number of setups, number of machine hours, number of commands, number of orders, etc. respecting the activity hierarchy (Rivero & Emblemståg, 2007; Schoute, 2011).

The first approach by activities appeared in the US in the 80s of the twentieth century and was called Activity Based Costing (ABC), presenting as major benefits (Cooper, 1990; Cooper and Kaplan, 1991, 1992): a more accurate product cost calculation; an increased understanding of the economic factors inherent to the production process, both in terms of efficiency and effectiveness; and the offer of an overall picture of the economic activities performed. Another advantage of the information obtained using the ABC is the performance increase in the supply chain, and in the negotiations between the companies that are part of that chain (Drake and Haka, 2008; Masschelein, et al., 2012).

Despite the advantages attributed to the ABC, the empirical studies conducted in recent years do not report the existence of very high utilization rates. Most studies shown in Table 1 present ABC utilization rates below 22%.

Table 1 – ABC utilization rates

Article	Universe	Utilization rate
Sartorius, et al. (2007)	181 South-African companies	12%
Tomás, et al. (2008)	500 Portuguese companies	22%
Kallunki e Silvola (2008)	500 Finish companies	21%
Banker, et al. (2008)	27.000 American industrial companies	20%
Stratton, et al. (2009)	348 Industrial companies and global services	50%
Schoute (2011)	191 Dutch industrial companies	11%
Arsénio and Machado (2013)	46 Listed Portuguese companies	31%

The lowest ABC utilization rate (11%) is reported by Schoute (2011) in a study conducted in the Netherlands to 191 medium-sized industrial companies. An identical percentage (12%) was found by Sartorius et al. (2007) in 181 South African companies. Three studies conducted in the same year, but in different countries, showed very close ABC utilization rates: the study of Tomás et al. (2008), conducted in Portugal in the 500 largest non-financial companies had a rate of 22%; Kallunki and Silvola (2008) reported an utilization rate of 21% in 500 Finnish companies from various activity sectors; Banker et al. (2008) analyzed 27,000 American industrial companies, and found an ABC utilization rate of 20%. After the study of Tomás et al. (2008), another research was conducted in Portugal with widely varying results (Machado, 2012). This study, conducted in small and medium industrial companies, classified by a public institute as excellent, reported that none of the companies surveyed used the ABC. Machado (2012) also reports that most financial officers do not know this approach. This study follows, in terms of the ABC utilization rate, another study by Arsénio and Machado (2013) in listed Portuguese companies, which reports a utilization rate of 31%. The highest utilization rate is reported by Stratton et al. (2009) in a study conducted in 348 worldwide industrial and service companies. This study was conducted in 2003 and 2005, and presented an ABC utilization rate of 50% and 52% respectively.

Studies by Sartorius et al. (2009), Tomás et al. (2008), and Arsénio and Machado (2013) have also identified the key inhibitors to adopting the ABC: the complexity of the method; the high implementation costs; the lack of interest in the method by the managers; weaknesses in terms of their knowledge; and satisfaction with the alternative method in use.

Sartorius et al. (2007), Kallunki and Silvola (2008), and Arsénio and Machado (2013) have also analyzed the main reasons for the implementation of the method: cost reduction; an increase in competitiveness; an improvement in performance evaluation; obtaining accurate information to support the decision-making process; and an accuracy increase in indirect cost allocation.

As the main difficulties in implementing the ABC, Tomás et al. (2008), and Arsénio and Machado (2013) have identified the following: a difficulty in identifying the activities and their respective cost drivers, and the high consumption of resources. Stratton et al. (2009), and Arsénio and Machado (2013) have also identified the main advantages resulting from implementing the ABC: a better cost control; a better understanding of the cost causes; a better management of resources; and increased financial performance.

The low utilization rates found in the reviewed studies may be related to the various criticisms already stated about the ABC, namely: the complexity of the method, due to the need to interview the company employees in order to identify the activities and their respective labor times (Hoozée and Bruggeman, 2010; Kaplan and Anderson, 2004; Stout and Propri, 2011;); and the time and cost spent in creating and maintaining the method (Kaplan and Anderson, 2007).

In response to these criticisms, Kaplan and Anderson (2005) proposed a new approach by activities, the Time Driven Activity Based Costing (TDABC). It is a simpler, cheaper and more powerful approach than the ABC, because it allows the costs of the resources to be assigned to the processes, products, services and clients in a simple and precise way (Kaplan and Anderson, 2005). The main advantages of the TDABC are the following: it is not necessary to conduct interviews with the employees, because the identification of the activities and their respective labor times is achieved by direct observation; is easier to computerize, which allows for a more rapid and economic maintenance; it allows to identify the cost of the unused capacity; and it increases the ability to forecast the demand for resources (Kaplan and Anderson, 2007; Pineno, 2012). Several authors conclude that the use of TDABC promotes the quality of information required for decision-making (Anggadini, 2015; Chiarini, 2014; Meddaoui and Bouami, 2013, 2014).

Several authors argue that it is not only necessary to study the utilization rate of the management accounting methods, but also their dissemination within the corporate environment (Dearman and Shields, 2001; Machado, 2013; Nassar et al., 2011). Dearman and Shields (2001) concluded, through an experimental study, that even when using methods considered as theoretically inadequate, those in charge can make good management decisions, as long as they know the most appropriate alternative methods. These findings mean that it is important to study not only the utilization rate of the approach by activities, but also its knowledge dissemination among the financial officers.

Several authors consider important to know two types of contingency variables responsible for disseminating the knowledge on management accounting methods: the company's features, such as its legal form and capital holding; and the characteristics of the financial officers, such as gender, age, and the educational background.

Regarding the first group of contingency variables, the capital holding was studied by Haldma and Lääts (2002), and Nunes and Machado (2014), although with conflicting results. Haldma and Lääts (2002) based themselves on other previous studies, which reported that the subsidiaries of multinational organizations use more sophisticated management accounting methods, when compared to companies in the region. However, these authors found no relation between both variables in Estonian companies. Nunes and Machado (2014) concluded that there is a link between the capital holding and the management accounting methods used by four and five star hotels: the hotels with foreign shareholders use more sophisticated methods. The legal form, as a contingency variable regarding management accounting methods, was studied by Machado (2011), and Nunes and Machado (2014), also with conflicting results. Machado (2011) concluded that there is no link between the legal form and the management accounting methods used by the small and medium industrial companies (SMCs). Nunes and Machado (2014) concluded that there is a link between the legal form and the management accounting methods used by four and five star hotels: public limited liability companies use more sophisticated methods.

Regarding the second group of variables responsible for disseminating the management accounting methods, several authors (Clarke et al., 1999; Cohen et al., 2005; Machado 2012, 2013) have analyzed some financial officers' characteristics such as the educational background, gender and age. Clarke et al., (1999) concluded that the officers' poor educational background is one of the main inhibitors to change in the methods used by the Irish companies. Cohen et al., (2005) found a high percentage of financial officers who do not know the most modern methods of management accounting, and concluded that this phenomenon is due to their high age range and lack of update in their educational background. Machado (2012, 2013) concluded that there is a link between knowledge of the more advanced methods of management accounting and two characteristics of the financial officers: age and educational background. The more advanced management accounting methods are better known by those officers with a college level educational background, regardless of their academic area, than by those officers without university degrees (Machado, 2012, 2013). The older officers do not know the most advanced management accounting methods (Machado, 2012, 2013). Although several studies have suggested the influence of gender on knowledge dissemination about management accounting methods, this link was not found by Machado (2012, 2013) regarding the financial officers in small and medium industrial companies.

3 – RESEARCH AND METHODOLOGY ISSUES

Several authors, including Chua (1986), classify the accounting research into three categories: positivist, interpretive and critical. This study follows the positivist research methodology, since it formulates research questions and uses empirical treatment, in order to respond to the problem at hand and achieve the objectives defined (Chua, 1986).

The general goal of this study is to contribute to the knowledge about the approach by activities, a management accounting method that promotes the quality of information. As specific objectives we have identified the following: to analyze the knowledge rate of the approach by activities and identify the variables responsible for its dissemination; to analyze the utilization rate of the approach by activities and the factors conditioning it; to analyze whether there is a link between a company's features and the use of the approach by activities. Based on these objectives and the reviewed literature, the following research questions were formulated:

Research question 1 – Is there a link between the knowledge rate of the approach by activities and the characteristics of the financial officers?

Research Question 2 - What is the utilization rate of the approach by activities and which factors motivate or inhibit it?

Research question 3 – Is there a link between the utilization rate of the approach by activities and a company's features?

After the formulation of the objectives and the research questions, we defined the study universe as the 300 largest companies in Portugal with email contact available, having as support the conclusions of Jha and Nanda (2013) that they are large organizations that are more concerned with the quality of information. Regarding the data collection method, it was

decided to conduct a survey directed to the company’s financial officer, due to the geographical dispersion of the universe and the high amount of resources necessary to conduct interviews instead. The survey was first tested in a convenience sample of CFOs and has not been detected errors or difficulties with its interpretation. The final survey (Annex 1) was conducted through the online platform *surveymonkey*, and the respective link was sent by email together with a cover letter about the study addressed to the financial officer. The data collection process had two stages: in the first stage only 35 responses were obtained, and a second insistence increased to 71 the number of inquiries received. The validation of the questionnaires required the exclusion of 10 responses, since they were not complete, which generated a total of 61 valid questionnaires corresponding to a response rate of 20%.

4 - RESULTS ANALYSIS AND DISCUSSION

4.1 - Knowledge of the approach by activities

Regarding the knowledge of the approach by activities, the data collected show the following: most officers know the ABC (82%); 43% of the respondents know the TDABC; and only 16% of the officers do not know either approach by activities. These results are different from those reported by Machado (2012) regarding industrial SMCs of the same country, where the majority of the financial officers did not know the ABC. No other studies were found analyzing the knowledge dissemination about the TDABC.

To analyze the link between the knowledge of the approach by activities and the financial officers’ characteristics, the following variables were defined: gender; age; and educational background.

Regarding the gender of the officers, the data collected show that the majority are male (70%). Table 2 analyzes the link between gender and the knowledge of the approach by activities, making it clear that there are more men who know simultaneously the ABC and the TDABC, than women.

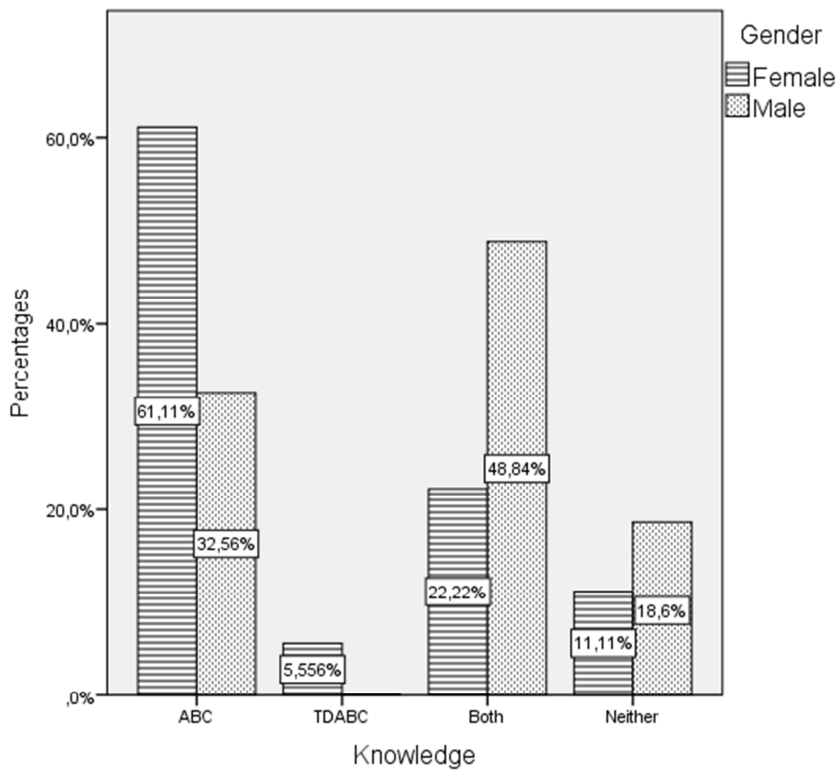
Table 2 - Knowledge of the approach by activities and gender of the officers

Knowledge	Gender		TOTAL
	Female	Male	
ABC	11	14	25
TDABC	1	0	1
Both	4	21	25
Neither	2	8	10
TOTAL	18	43	61

Figure 1 represents graphically the above link and shows that the ABC knowledge rate is identical for both genders (83% in women and 81% in men). There is, however, a difference between genders regarding the TDABC knowledge, which is much higher in men (49%) than in women (28%). This link between the knowledge of the approach by activities and the gender of the financial officers can be statistically validated using the chi-square independence test (value=7.541; p-value=0.041). Using Cramer's V, the link may be considered moderate (V Cramer=0.352; p-value=0.041). These results are contrary to those of

other studies conducted in Portugal (Machado, 2012, 2013), which report that there is no gender influence in the knowledge dissemination regarding the ABC.

Figure 1 - Knowledge of the approach by activities and gender of the officers



As regards the age of the financial officers, the data collected show that the majority are between 36 and 55 years of age (52%), but the percentage of officers older than 55 is still significant (41%). Only 7% of the financial officers are younger than 36. Table 3 allows us to analyze the link between age and the knowledge of the approach by activities, making it clear that the higher knowledge rate belongs those officers between 36 and 55 years old.

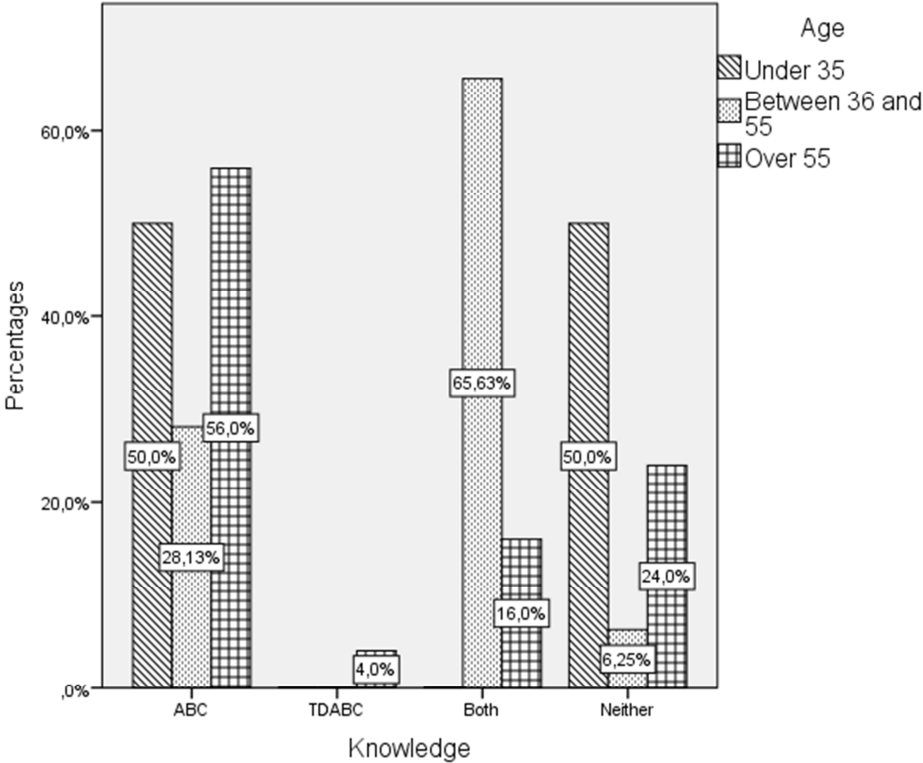
Table 3 – Knowledge of the approach by activities and the officers’ age

Knowledge	Age			TOTAL
	Under 35	Between 36 and 55	Over 55	
ABC	2	9	14	25
TDABC	0	0	1	1
Both	0	21	4	25
Neither	2	2	6	10
TOTAL	4	32	25	61

Figure 2 represents graphically the above link and shows that there is great heterogeneity in the approach by activities knowledge rate between the different age groups. Almost all officers between 36 and 55 years of age know the ABC (94%), while only 72% of the older officers know this method. This heterogeneity is even more evident when examining the TDABC, known by 66% of the officers aged between 36 and 56, and known only to 20% of the older officers. The age group of the younger officers presents results that are not

compatible with an evolution line of knowledge regarding age, since none of them knows the TDABC. These results may suggest that the knowledge of the TDABC does not stem from the academic background, but instead from the requirements of corporate practice. However, these results must be interpreted with some caution due to the low representativeness of this age group among the total of respondents. This link between the knowledge of the approach by activities and the age of the financial officers can be statistically validated using the chi-square independence test (value=20.02; p-value=0.012). Using the Cramer's V, the link may be considered strong (V Cramer=0.405; p-value=0.012). These results are consistent with the findings of Cohen et al. (2005), and Machado (2012, 2013), which state that the older officers do not know the more advanced methods of management accounting.

Figure 2 – Knowledge of the approach by activities and the age of the officers



With regard to the educational background, the data collected show that the financial officers have more frequently a master's degree (46%), than just a college degree (39%), being also significant the percentage of officers with a doctorate (12%). Only 3% of the financial officers are not college graduates. Table 4 allows to analyze the link between the educational background and the knowledge of the approach by activities, making it clear that the officers with a higher educational background have a higher knowledge rate regarding the TDABC.

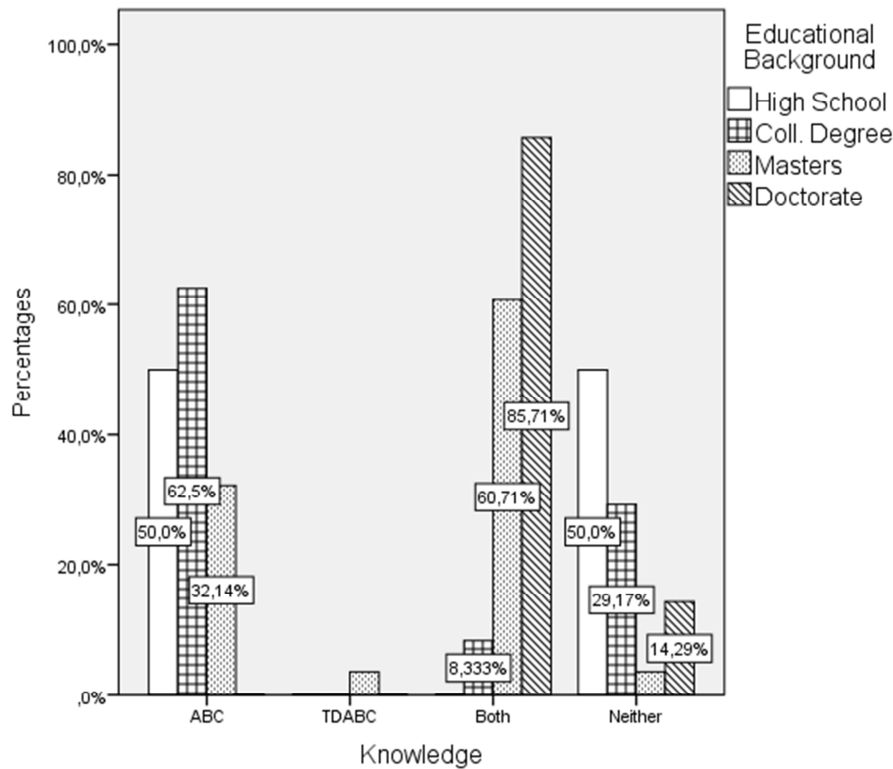
Table 4 - Knowledge of the approach by activities and the officers' education

Knowledge	Educational Background				TOTAL
	High School	Coll. Degree	Masters	Doctorate	
ABC	1	15	9	0	25
TDABC	0	0	1	0	1
Both	0	2	17	6	25

Neither	1	7	1	1	10
TOTAL	2	24	28	7	61

Figure 3 represents graphically the link above and shows that there is some heterogeneity in the approach by activities knowledge rate among the different academic degrees.

Figure 3 – Knowledge of the approach by activities and the officers’ educational background



Almost all officers with a doctorate know the ABC (86%), while only 71% of the college graduates know this method. This heterogeneity is even more evident when examining the TDABC, known by 86% of those with a PhD, and only by 8% of the college graduates. Half of the officers without a higher education do not know either approach by activities. This link between the knowledge of the approach by activities and the financial officers’ education can be statistically validated using the chi-square independence test (value=27.065; p-value=0.033). Using the Cramer's V, the link may be considered moderate (V Cramer=0.385; p-value=0.033). These results are convergent with those found by Clarke et al. (1999), and Machado (2012, 2013), who concluded that the more advanced management accounting methods are better known by the officers with a tertiary level educational background.

4.2 - Using the approach by activities

Regarding the use of the approach by activities, the data collected show that only 36% of the companies use it (Table 5), being the ABC more used (25%) than the TDABC (11%). Many companies allocate the products or services’ indirect costs using allocation bases based on direct cost consumption, namely using a single base (5%) or multiple bases (12%). Only 16% of the companies use the sections method. It is noteworthy that a significant percentage of the

companies reported not using any of the methods listed (31%). These results are in line with some reviewed studies that report ABC utilization rates close to 25%, especially in the largest Portuguese companies (Tomás et al., 2008), in Finnish companies from various sectors (Kallunki and Silvola, 2008), and in American industrial companies (Banker, et al., 2008).

Table 5 – Use of the approach by activities

Methods of Valuation Used	Frequencies	Percentages (%)
One allocation base	3	5%
Multiple allocation bases	7	12%
Sections method	10	16%
ABC	15	25%
TDABC	7	11%
None	19	31%
Total	61	100%

We have also questioned non-users of the approach by activities in order to identify the major inhibitors to the implementation of activity-based methods. The two most frequently mentioned factors were: lack of interest in the approach (19%); and the high costs associated with its implementation (18%). These factors are convergent with those identified by Sartorius et al. (2007), Tomás et al. (2008), and Arsénio and Machado (2013).

We have also inquired the users of the approach by activities in order to identify the main motivations for its implementation, the main difficulties of implementation, and the main advantages arising from its use.

The main motivations we identified were the following: the need to obtain relevant and accurate information on the actual costs of each product, service or client (31%); and the need for more efficient and effective processes (29%). The reasons given by the respondents are also convergent with other reviewed studies (Arsénio and Machado, 2013; Kallunki and Silvola, 2008; Sartorius et al., 2007).

We identified as the main implementation problems: a difficulty in finding the more suited cost drivers for each activity (33%); and a difficulty in creating a clear organizational goal (27%). The difficulties presented by the respondents are also in line with other reviewed studies (Arsénio and Machado, 2013; Tomás et al., 2008).

The main advantages identified as arising from the use of this approach were the following: obtaining more accurate information to support the decision-making process (27%); and process improvement (27%). These results are also in line with other reviewed studies (Arsénio and Machado, 2013; Stratton et al., 2009).

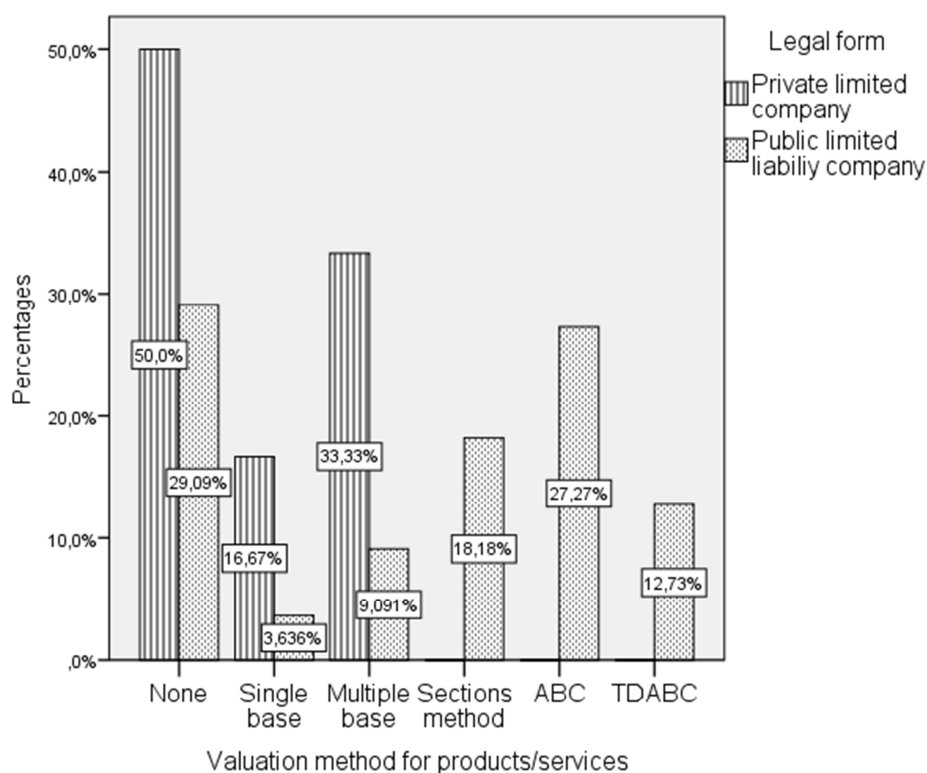
We analyzed the possible associations between the use of the approach by activities and two company features: legal form and capital holding. Regarding the legal form, 90% of the companies are public limited liability companies, and 10% are private limited companies. Table 6 allows us to analyze the link between the legal form and the use of the approach by activities, making it clear that private limited companies do not use this approach.

Table 6 – Use of the approach by activities and the company’s legal form

Valuation Method for products/services	Legal form		TOTAL
	Private limited company	Public limited liability company	
None	3	16	19
Single base	1	2	3
Multiple base	2	5	7
Sections method	0	10	10
ABC	0	15	15
TDABC	0	7	7
TOTAL	6	55	61

Figure 4 represents graphically the above link and shows that 40% of the public limited liability companies use an approach by activities, being the ABC more used (27%) than the TDABC (13%). Half of the private limited companies do not use any of the products or services valuation methods identified, while the remaining 50% use indirect cost allocation bases based on their own direct consumptions. This link between the use of the approach by activities and the legal form of the companies can be statistically validated using the chi-square independence test (value=8.888; p-value=0.098). Using the Cramer's V, the link may be considered moderate (V Cramer=0.382; p-value=0.098). These results converge with those presented by Nunes and Machado (2014), which concluded that there is a link between the legal form and the management accounting methods used by the hotels; however, it goes against what was found by Machado (2011), where no link was found between the legal form and the management accounting methods used by the industrial SMCs.

Figure 4 – Use of the approach by activities and the company’s legal form



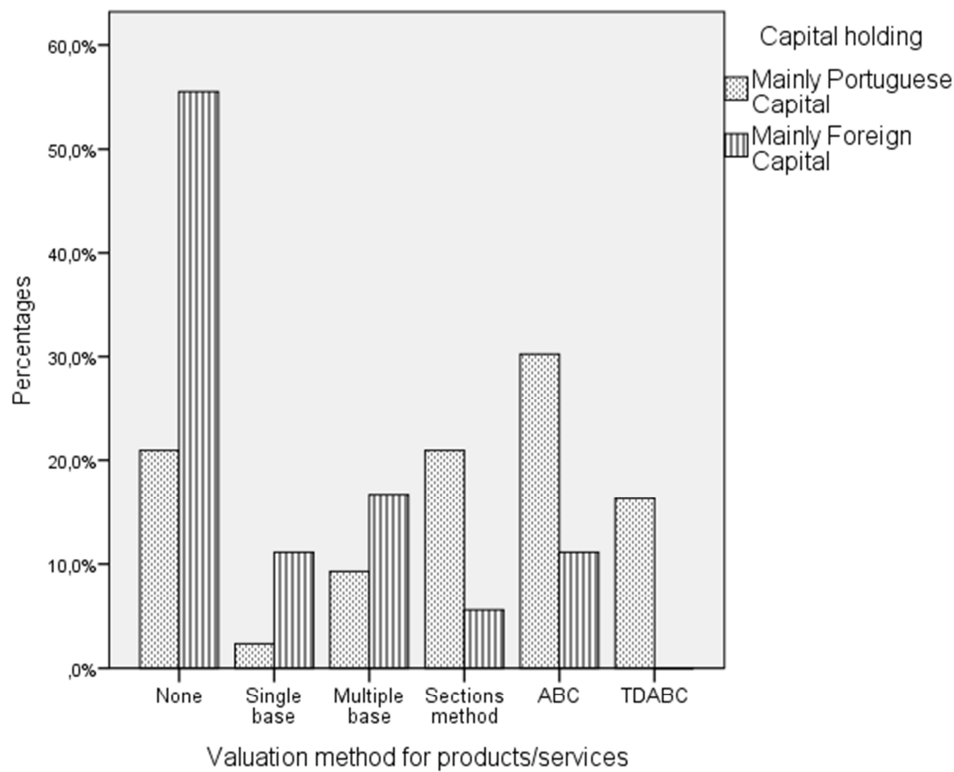
With regard to the capital holding, 70% of the companies are held by a majority of Portuguese capital, while the remaining 30% are held by a majority of foreign capital. Table 7 allows us to analyze the link between the capital holding and the use of the approach by activities, making it clear that this approach is more used in companies of mainly Portuguese capital.

Table 7 – Use of the approach by activities and the capital holding

Valuation Method for products/services	Capital holding		TOTAL
	Mainly Portuguese Capital	Mainly Foreign Capital	
None	9	10	19
Single base	1	2	3
Multiple base	4	3	7
Sections method	9	1	10
ABC	13	2	15
TDABC	7	0	7
TOTAL	43	18	61

Figure 5 represents graphically the above link and shows that only 11% of the companies held mainly by foreign capital use the ABC, being the TDABC not used by any of these companies. About 46% of the companies with mainly Portuguese capital use the approach by activities, being the ABC more used (30%) than the TDABC (16%).

Figure 5 – Use of the approach by activities and the capital holding



This link between the use of the approach by activities and the capital holding can be statistically validated using the chi-square independence test (value=14.122; p-value=0.012). Using the Cramer's V, the link may be considered strong (V Cramer=0.481; p-value=0.012). These results are in line with those presented by Nunes and Machado (2014), which concluded there is a link between capital holding and the management accounting methods used by the hotels; however, it goes against what was found by Haldma and Lääts (2002), who did not find any association between capital holding and the management accounting methods used by the Estonian companies.

5 – CONCLUSION

This study has three specific objectives: to analyze the knowledge rate of the approach by activities and identify the variables responsible for its dissemination; to analyze the utilization rate of the approach by activities and the factors conditioning it; to analyze whether there is a link between a company's features and the use of the approach by activities.

Regarding the first specific objective, the data collected show that about four-fifths of the financial officers know the ABC, but the majority does not know the TDABC. These results go against those of another study conducted in Portuguese industrial SMCs, which may suggest the existence of differentiating characteristics between the financial officers of small and large companies. No other studies allowing a comparison of the dissemination on the knowledge about the TDABC were found. We discovered a link between the knowledge of the approach by activities and the gender, age, and the financial officers' educational background. With regard to gender, the results now obtained are different from those from other studies conducted in Portugal, which do not report the existence of a gender influence in the knowledge dissemination regarding the ABC. In terms of age and educational

background, the results are in line with those from other reviewed studies, concluding that the older officers and the non-college graduates do not know the more advanced methods of management accounting.

Regarding the use of the approach by activities, the second specific objective of this study, the data collected show that only a third of the companies uses the approach by activities, and the ABC is more used than the TDABC. These results are convergent with some reviewed studies that report the use of the ABC in about a quarter of the companies. The main identified inhibitors to the implementation of activity based methods were the following: lack of interest in the approach, and the high costs associated with its implementation. The main reasons for its implementation were identified as the following: the need to obtain relevant and accurate information on the actual costs of each product, service or client; and the need for more efficient and effective processes. The main difficulties regarding the implementation were identified as the following: a difficulty in finding the more suited cost drivers for each activity; and a difficulty in creating a clear organizational goal. The main advantages identified as arising from the use of the approach by activities were the following: obtaining more accurate information to support the decision-making process; and process improvement.

Regarding the third specific objective, the data collected show that there is a link between the use of the approach by activities and two company features: the legal form, and the capital holding. These results contribute to the knowledge on the influence of these two variables, regarding which, however, conflicting results continue to arise from the different studies already conducted.

The limitations of the study are the low number of responses obtained, and the choice of online questionnaires as a data collection method, since it was found that in most companies the corporate email addresses are not used. However, this study has contributed to the knowledge about the use of management accounting methods that promote the quality of information, namely the approach by activities, since its results show that the TDABC is very little known in Portugal, which is a deterrent to its use. These results suggest the need to develop training activities on this approach, addressed to the financial officers in the companies. In terms of future research we suggest the replication of this study in other European countries, in order to investigate whether the low diffusion of the TDABC found in Portugal is also common in other European countries. New studies are still needed to allow us to determine the influence of the two contingency variables not yet stabilized: the legal form and the company's capital holding.

REFERENCES

- Abdallah, A. and Li, W. (2008) 'Why Did ABC Fail at the Bank of China?', *Management Accounting Quarterly*, Vol. 9, No. 3, pp. 7-14.
- Anggadini, S. (2015) 'The effect of top management support and internal control of the accounting information systems quality and its implications on the accounting information quality', *Information Management and Business Review*, Vol. 7, No. 3, pp. 93-102.
- Arsénio, M. O. and Machado, M. J. (2013) 'Contabilidade Gestão em Portugal: Estudo empírico nas empresas cotadas na Bolsa Portuguesa', *Revista Iberoamericana de Contabilidad de Gestión*, Vol. 11, No. 22, pp. 1-20.

- Banker, R. D., Bardhan, I. R. and Chen, T.-Y. (2008) 'The role of manufacturing practices in mediating the impact of activity-based costing on plant performance', *Accounting, Organizations and Society*, Vol. 33, No. 1, pp. 1-19.
- Chiarini, A. (2014) 'A comparison between time-driven activity costing and value stream accounting in a lean Six Sigma manufacturing case study', *International Journal of Productivity and Quality Management*, Vol. 14, No. 2, pp. 131-148.
- Chua, W. F. (1986) 'Radical developments in accounting thought', *The Accounting Review*, Vol. LXI, No. 4, pp. 601-632.
- Clarke, P. J.; Hill, N. T., and Stevens, K. (1999) 'Activity-Based Costing in Ireland: Barriers to, and opportunities for, change', *Critical Perspectives on Accounting*, Vol. 10, No. 1, pp. 443-468.
- Cohen, S.; Venieris, G. and Kaimenaki, E. (2005) 'ABC: adopters, supporters, deniers and unawares', *Managerial Auditing Journal*, Vol. 20, No. 9, pp. 981-1000.
- Cooper, R. (1990) 'Implementing an activity-based cost system', *Journal of Cost Management*, Vol. 4, No. 1, pp. 33-42.
- Cooper, R. and Kaplan, R. S. (1991) 'Profit Priorities from Activity-Based Costing', *Harvard Business Review*, Vol. 1, No. May-June, pp. 130-135.
- Cooper, R. and Kaplan, R. S. (1992) 'Activity Based Systems: Measuring the Costs of Resource Usage', *Accounting Horizons*, Vol.1, No. September, pp. 1-12.
- Dearman, D. T. and Shields, M. D. (2001) 'Cost knowledge and cost-based judgment performance', *Journal of Management Accounting Research*, Vol. 1, No. 13, pp. 1-18.
- Drake, A. R. and Haka, S. F. J. (2008) 'Does ABC Information Exacerbate Hold-Up Problems in Buyer-Supplier Negotiations?', *The Accounting Review*, Vol. 83, No. 1, pp. 29-60.
- Gorantiwar, V. and Shrivastava, R. (2014) 'Identifications of critical success factors for quality-productivity management approach in different industries', *International Journal of Productivity and Quality Management*, Vol. 14, No. 1, pp. 66-106.
- Haldma, T. and Lääts, K. (2002) 'Contingencies influencing the management accounting practices of Estonian manufacturing companies', *Management Accounting Research*, Vol. 1, No. 13, pp. 379-400.
- Hoozée, S. and Bruggeman, W. (2010) 'Identifying operational improvements during the design process of a time-driven ABC system: The role of collective worker participation and leadership style', *Management Accounting Research*, Vol. 21, No. 3, pp. 185-198.
- Jha, J. and Nanda, J. (2013) 'Corporate social responsibility: employee perspective', *International Journal of Productivity and Quality Management*, Vol. 11, No. 3, pp. 311-333.
- Jourabchi, S., Arabian, T., Leman, Z. and Ismail, Y. (2014) 'Contribution of lean and six sigma to effective cost of quality management', *International Journal of Productivity and Quality Management*, Vol. 14, No. 2, pp. 311-333.
- Kallunki, J.-P. and Silvola, H. (2008) 'The effect of organizational life cycle stage on the use of activity-based costing', *Management Accounting Research*, Vol. 19, No. 1, pp. 62-79.

- Kaplan, R. and Anderson, S. (2004) 'Time-driven activity-based costing', *Harvard Business Review*, Vol. 82, No. 11, pp. 131-138.
- Kaplan, R. and Anderson, S. (2005) 'Time-driven activity-based costing: response', *Harvard Business Review*, Vol. 83, No. 2, pp. 144-145.
- Kaplan, R. and Anderson, S. R. (2007) *Time-driven Activity-based Costing: A Simpler and More Powerful Path to Higher Profits*, Harvard Business School Press, Boston.
- Machado, M. (2011) 'Variáveis contingenciais aos métodos de valoração dos produtos: estudo empírico em PME's industriais portuguesas', *RBGN - Revista Brasileira de Gestão de Negócios*, Vol. 13, No. 41, pp. 396-414.
- Machado, M. (2012) 'Activity Based Costing Knowledge: Empirical study on small and medium size enterprises', *Revista Contemporânea de Contabilidade*, Vol. 9, No. 18, pp. 167-186.
- Machado, M. (2013) 'Balanced Scorecard: Empirical Study on Small and Medium Size Enterprises', *RBGN – Review of Business Management*, Vol. 15, No. 46, pp. 129-148.
- Mantri, S. and Jaju, S. (2015) 'Emerging trends in cost of quality practices: an overview', *International Journal of Productivity and Quality Management*, Vol. 15, No. 4, pp. 469-485.
- Masschelein, S., Cardinaels, E. and Abbeebe, A. V. (2012) 'ABC Information, Fairness Perceptions, and Interfirm Negotiations', *The Accounting Review*, Vol. 87, No. 3, pp. 951-973.
- Meddaoui, A. and Bouami, D. (2013) 'Cost modelling in maintenance using time-driven activity-based costing', *International Journal of Productivity and Quality Management*, Vol. 12, No. 3, pp. 247-270.
- Meddaoui, A. and Bouami, D. (2014) 'Decision making in maintenance using analytical hierarchy process and time-driven activity based costing', *International Journal of Productivity and Quality Management*, Vol. 13, No. 4, pp. 450-470.
- Nair, G. and Choudhary, N. (2016) 'Influence of critical success factors of total quality management on financial and non-financial performance of hospitality industry: an empirical study', *International Journal of Productivity and Quality Management*, Vol. 17, No. 4, pp. 409 - 436.
- Nassar, M., Al-Khadash, H. A. and Sangster, A. (2011) 'The diffusion of activity-based costing in Jordanian industrial companies', *Qualitative Research in Accounting and Management*, Vol. 8, No. 2, pp. 180-200.
- Nunes, C. and Machado, M. (2014) 'Performance Evaluation Methods in the Hotel Industry', *Tourism & Management Studies*, Vol. 10, No. 1, pp. 23-29.
- Para-González, L., Jiménez-Jiménez, D. and Martínez-Lorente, A. (2016) 'Do total quality management and the European Foundation for Quality Management model encourage a quality-oriented human resource management system?', *International Journal of Productivity and Quality Management*, Vol. 17, No. 3, pp. 308 - 327.
- Pineno, C. J. (2012) 'Simulation of the Weighting of Balanced Scorecard Metrics Including Sustainability and Time-Driven ABC Based on the Product Life Cycle', *Management Accounting Quarterly*, Vol. 13, No. 2, pp. 21-38.

- Rivero, E. J. R. and Emblemståg, J. (2007) 'Activity-based life-cycle costing in long-range planning', *Review of Accounting & Finance*, Vol. 6, No. 4, pp. 370-390.
- Sartorius, K., Eitzen, C. and Kamala, P. (2007) 'The design and implementation of Activity Based Costing (ABC): a South African survey', *Meditari Accountancy Research*, Vol. 15, No. 2, pp. 1-21.
- Schoute, M. (2011) 'The relationship between product diversity, usage of advanced manufacturing technologies and activity-based costing adoption', *The British Accounting Review*, Vol. 43, No. 2, pp. 120-134.
- Stout, D. E. and Propri, J. M. (2011) 'Implementing Time-Driven Activity-Based Costing at a Medium-Sized Electronics Company', *Management Accounting Quarterly*, Vol. 12, No. 3, pp. 1-11.
- Stratton, W. O., Desroches, D., Lawson, R. and Hatch, T. (2009) 'Activity-Based Costing: Is It Still Relevant?', *Management Accounting Quarterly*, Vol. 10, No. 3, pp. 31-40.
- Tomás, A., Major, M. J. and Pinto, J. C. (2008) 'Activity-Based Costing and Management (ABC/M) nas 500 Maiores Empresas em Portugal', *Contabilidade e Gestão*, Vol. 1, No. 6, pp. 33-66.

ANNEX 1: Survey

RESPONDENT DATA

1. Gender
 - a. Female
 - b. Male
2. Age
 - a. Under 35 years
 - b. Between 36 and 55 years
 - c. Over 55 years
3. Educational Background
 - a. High School
 - b. College Degree
 - c. Master
 - d. Doctorate
 - e. Other

COMPANY DATA

1. Company name
2. What is the legal form of your company
 - a. Private Limited company
 - b. Private Limited company
 - c. Other
3. Capital holding
 - a. Mainly Portuguese capital
 - b. Mainly Foreign capital

ACTIVITY BASED COSTING INFORMATION

1. Know you any of these costing systems?
 - a. Activity Based Costing
 - b. Time Driven Activity Based Costing
 - c. None
2. What is the costing system that the company uses
 - a. Single base
 - b. Multiple base
 - c. Sections method
 - d. Activity Based Costing
 - e. Time Driven Activity Based Costing
 - f. None
3. Inhibitors to the implementation of activity-based methods
 - a. Lack of interest in the approach
 - b. They are satisfied with the current method
 - c. Too complex
 - d. High costs associated with its implementation
 - e. Other
4. Main motivations for its implementation
 - a. Improve the allocation of indirect costs
 - b. The need to obtain relevant and accurate information on the actual costs of each product, service or client

- c. The need for more efficient and effective processes
 - d. Increasing competitiveness
 - e. Other
5. Main difficulties of implementation
- a. Difficulty in finding each activity
 - b. High consumption of resources
 - c. Difficulty in finding the more suited cost drivers for each activity
 - d. Difficulty in creating a clear organizational goal
 - e. Other
6. Main advantages arising from its use
- a. Improve financial performance
 - b. Obtaining more accurate information to support the decision-making
 - c. Improved management of resources
 - d. Process improvement
 - e. Other