

**MANAGEMENT ACCOUNTING SOFTWARE AND ACCOUNTING PRACTICES:
EMPIRICAL STUDY ON SMALL AND MEDIUM SIZE ENTERPRISES**

Maria João Cardoso Vieira Machado
Professora Auxiliar
ISCTE- Instituto Universitário de Lisboa
Departamento de Contabilidade
Avenida das Forças Armadas
1649-026 Lisboa
Portugal

Área temática: D) Contabilidad y Control de Gestión

Key words: management accounting software, SME, overhead rate

**MANAGEMENT ACCOUNTING SOFTWARE AND ACCOUNTING PRACTICES:
EMPIRICAL STUDY ON SMALL AND MEDIUM SIZE ENTERPRISES.**

Abstract

There appears to be a paradox between the methods of product valuation considered theoretically most suitable and those effectively used by enterprises according to empirical studies already made. This research strives to clarify which factors explain enterprises continued use of theoretically inadequate methods. The study aims to identify the methods used by Portuguese small and medium size enterprises to value products and to analyze if the management accounting software influences the methods used. Accounting managers from 58 enterprises in 11 Portuguese districts were interviewed. The interviewees stated that the management accounting software influences the method of indirect cost distribution, and the association of these two variables is statistically significant. However, the individual analysis of the interviews led to the detection of a third variable, namely the way in which the product valuation was conceived, and this influences the previous two variables simultaneously. This evidence suggests that the conditioning that accounting managers believed was exerted by the management accounting software on indirect cost distribution was in fact the result of the direct influence of a third variable on the first two, namely the way in which the method was conceived.

1 – INTRODUCTION

This work aims to contribute to knowledge of the influence of the management accounting software on the valuation of the products in Portuguese small and medium industrial enterprises (SME'S). More specifically, this study identifies how enterprises distribute indirect costs by product, and analyze if the management accounting software influences the methods used.

Researchers continue to demonstrate interest in whether enterprises use the methods of product valuation which theory considers most suitable (Innes et al., 2000; Blake et al., 2000; Cotton and Jackman, 2002; Cohen et al., 2005; Xiao, 2007). Empirical studies have shown that this is not the rule and that many enterprises prefer simpler methods to those that are theoretically more appropriate (Drury and Tayles, 1994; Clarke, 1997; Lukka and Granlund, 1996; Chun et al., 1996; Joshi, 2001; Haldma and Lääts, 2002). The combination of these two aspects justifies research that clarifies factors for this apparent paradox between theory and practice. Thorp & Kipfer (1991) and Shields (1998) suggest that this may be explained by the conditioning exerted by the management accounting software used although they do not support this with empirical studies. As a result, an empirical study of the possible influence of this factor on the product valuation practices is warranted.

The universe under study was restricted to SME's due to their great importance in the Portuguese business fabric. A study made in Portugal (IAPMEI, 2008) reveals that 99.6% of the national enterprises are small and medium, thus making it relevant to use this type of enterprise to characterize the country's situation.

Nevertheless, restrictions must be made to the universe under study given the large number of SME's in Portugal, 297,000 enterprises in 2005 (IAPMEI, 2008) Enterprises classified as excellence-industries were therefore chosen for two reasons. The industrial SME's belong to the activity sector that historically, has the longest tradition in the use of management accounting systems. As the excellent SMEs are a group of enterprises classified both for financial and economic performances and management, their goals are therefore convergent with those of this study (IAPMEI, 2002).

Only enterprises that received the excellence classification in both 2000 and 2001 were included in our study. This enabled us to work with the most recent data available and to work with enterprises that had consistently met premium requirements.

The universe under analysis comprises 163 enterprises consistently classified as excellence-industry SME's. The data was collected by interviewing accounting managers as they are in command of the relevant information. Interviews were conducted in 58 enterprises in 11 Portuguese districts with a 36% response rate. Treatment of the non-response revealed no statistically significant differences between responding and non-responding enterprises.

2 - LITERATURE REVIEW

The necessary information to the management of any corporation demands the valuation of several cost objects (Drury, 2008). In order to make a good valuation, accurate information is required about all resources they consume, namely direct and indirect costs (Drury, 2008).

Classification as a direct or indirect cost depends on the cost object to be valued, which must be previously, defined (Drury, 2008). This study focuses on the distribution of indirect costs on a specific object costs: the products manufactured by the industrial enterprises.

The easiest way to distribute indirect costs to the products is by using overhead rates related to direct consumption (Cooper, 1987), in particular direct material, direct labor and machine hours. Several reviews have targeted this method of product valuation (Cooper, 1988; Dearman and Shields, 2001) because all of these rates are influenced by the amount of each product produced, which determines over-valuation of the products manufactured in large quantities and the under-valuation of the products made in small quantities (Cooper, 1988). Dearman and Shields (2001) generalize this distortion to other factors. These authors state that many enterprises distribute indirect costs to the products using volume-related rates e.g. the direct labor hours and machine hours; this distorts the product cost when there are significant differences in terms of resource consumption that are unrelated to the amount produced.

However, a number of empirical studies report the use of these methods in several countries such as the United Kingdom, Ireland, Finland, Malaysia, Estonia and India (Drury and Tayles, 1994; Clarke, 1997; Lukka and Granlund, 1996; Chun et al., 1996; Haldma and Lääts, 2002; Joshi, 2001). All of these studies conclude that enterprises

continue to value products using the overhead rates of indirect costs considered theoretically inadequate as they are influenced by production volume.

Some authors give clear preference to Activity Based Costing to determine the cost to each product (Cooper, 1988; Swenson, 1995; Johnson, 1988; Kennedy and Affleck-Graves, 2001). In this method, costs are treated in relation to factors like the number of the production orders or the number of products as opposed to production volume. Nevertheless, most empirical studies report use rates equal to or less than 20%, e.g. in the United Kingdom (Innes and Mitchell, 1995; Innes et al., 2000), New Zealand (Cotton and Jackman, 2002), Japan (Hopper et al., 1999), Ireland (Clarke and O' Dea, 1994; Clarke et al., 1999), Spain (Blake et al., 2000), Singapore (Ghosh and Chan, 1997).

Empirical research is required to analyze the possible causes for this apparent paradox, namely that enterprises continue to use product valuation methods that theory considers inadequate. Thorp and Kipfer (1991) and Shields (1998) suggest, though without empirical support, that the management accounting software used by the enterprise might be one of the factors that leads to the indirect cost distribution method and the consequent product valuation. Thorp and Kipfer (1991) suggest that the development of integrated computerized packs caused French enterprises to stop contributing to the development of management accounting systems. As these packs were developed by computer experts and not by accounting managers, there was a non-produced output adequate to the management needs. Thorp and Kipfer (1991) concluded that the use of integrated computerized packs was not propitious for the French enterprises and that accounting managers must be aware of the danger of this approach and the need for their early involvement in management accounting systems design. Shields (1998) reviewed studies about management accounting practices used in several European countries and suggests that the software used by the accounting department is one of the factors affecting them.

Granlund and Malmi (2002) carried out an empirical study on this so-called influence, but using a small sample. They conducted interviews in ten Finnish enterprises that used Enterprise Resource Planning (ERP) systems in order to analyze how the introduction of these systems influenced the accounting management practices. The conclusions were not what the authors had expected, as the accounting management practices were not influenced by the introduction of the ERP systems in eight out of ten enterprises; in fact they used the same methods of management accounting, and they

are operated in separate systems. The complexity of ERP systems was the reason the enterprises gave for this.

3 – RESEARCH QUESTIONS

Some authors, like Chua (1986), defend that the research process is affected by three sequential factors. First, the aim assumed by the researcher about the social nature of reality, which characterizes his/her ontological position. Second, the way the researcher believes knowledge can be acquired about the event under study, which characterizes his/her epistemological position. Third, the methodology considered most suitable to obtain valid evidence about the event.

The way knowledge is acquired about the event is conditioned by the way the researcher sees the reality, in other words the researcher's epistemological position must be coherent with his/her ontological position. Equally, the chosen research methodology must be coherent with the researcher epistemological position. Based on these three factors, some authors classify accounting research by identifying large paradigms (Bhimani, 2002).

One of the most commonly used classifications to characterize research paradigms in accounting is from Burrell and Morgan and is based on two criteria (Belkaoui, 2000). The first defines the researcher's position about the nature of social sciences, which must be put in two extremes: objectivity and subjectivity. The second gives the researcher's perspective about the nature of society, from radical change to regulation. The crossing of these two criteria leads to four research paradigms (Belkaoui, 2000). The functionalist paradigm is characterized by an objective vision of reality and the permanent pursuit of social stability so as to maintain order. The interpretive paradigm is based on the same social balance but with a more subjective vision of reality. Radical humanism is characterized by a subjective vision of reality but assumes that social transformations exist. Radical structuralism is based on the same vision of society as humanism but has a much more objective perspective of reality.

Only three of these four paradigms were identified in the empirical studies of accounting management reviewed. Some authors, like Watts and Zimmerman (1990), Chambers (1993) and Zimmerman (2001), follow functionalism, also known as positivism. Interpretive research is conducted by Scapens (1990), Humphrey and Scapens (1996), Covalleski and Dirsmith (1988) and Burns and Scapens (2000),

among others. Radical humanism and radical structuralism usually come together in a single category, the critical research (Covaleski and Dirsmith, 1996; Bhimani, 2002; Baxter and Chua, 2003) which is followed by authors like Miller and O' Leary (1987), Laughlin (1987) and Hopper and Armstrong (1991).

Critical research is distinct from the other paradigms as special attention is given to the question of social and organizational conflict with a view to contributing to the construction of a more just and ethical society (Tilling and Tilt, 2004). The critical researchers systematically question the capitalist social order of societies (Bhimani, 2002). The distinctive characteristic of this paradigm in accounting research is the specific attention given to the relation between accounting and sources of conflict, domination and power. The issues analyzed by critical research in an attempt to understand accounting practices include class struggle, domination of the elite and the power of the professionals (Covaleski and Dirsmith, 1996).

Interpretive researchers defend a social construction of reality. In this perspective, the social reality becomes a human construction created in social interaction (Covaleski and Dirsmith; 1996, Bhimani, 2002). This vision of reality leads to the recognition of interaction between the researcher and the research object in which the researcher makes an interpretation of the reality with which he/she interacts (Chua, 1986). These ontological pretexts determine the interpretive researchers' epistemological position of which theory and practice are not apart. Theory is used to obtain explanations for the actions observed in practice (Chua, 1986). In the study of accounting, this approach considers that accounting practice must be studied in the social and organizational contexts in which it is developed and applied which involves the analysis of three dimensions: organizational, social and personal (Morgan and Willmott, 1993). The first analyzes how accounting practices are introduced in the organization; the second studies how they appeared and integrated themselves in various societies; the third assesses the accounting effects for each person particularly with reference to performance evaluation.

The positivist paradigm started to be used in accounting research in the late 1960s (Chambers, 1993). This approach has an objective conception of reality (Bhimani, 2002; Chua, 1986) and the existence of reasoning in the decision taken which is based on the accounting information (Bhimani, 2002; Covaleski and Dirsmith, 1996); it does not include the issue of organizational conflict. It leads to reality being seen as something external to the researcher, this implies that the participants in the

organizations are passive and do not influence the environment in which to insert (Chua, 1986). This paradigm is characterized by the fact that the observation of the events is separate from the theory and can be used for validation (Chua, 1986).

On determining the most appropriate paradigm for accounting research, Covaleski and Dirsmith (1996) considered that the different paradigms deal with different kinds of problem, or perhaps the same problem but with a different perspective about its nature. Accordingly, they do not identify one research paradigm as better than the others; they defend paradigmatic pluralism to improve the understanding of the multiple roles played by accounting management in organizations and societies. Chua (1986) analyzes the results obtained by positivist, interpretive and critical research and concludes that the three paradigms present advantages and disadvantages, which are not quantifiable and can not be rationally evaluated.

Following an analysis of the accounting research paradigms, the positivist research paradigm was selected, as the type of information sought is compatible with an objective conception of reality. It is considered to be external to the researcher and requires the existence of a logic of rationality in decision making, based on accounting information. These characteristics are associated with the positivist research paradigm (Chua, 1986). The goals of this work are not compatible either with a subjective vision of the reality associated to interpretivism, or with the need to recognize and analyze existing conflict sources with accounting associated to critical research. Based on the positivist paradigm, the following study questions were generated:

- Research question A – Are the methods used by the Portuguese industrial SME's to allocate indirect costs influenced by the production volume?
- Research question B – Do the accounting managers consider that the use of these methods is conditioned by the software used?

4 - RESEARCH METHOD

The research questions defined above limited the data collection method to two alternatives, namely surveys or interviews, as enterprises do not publicly report the information required. It was necessary to define which was the most suitable. Although Abernethy et al. (1999) defend that there is no ideal research method and that all have

advantages and disadvantages, they say that finding the right method to collect evidence about the defined research questions is the key issue.

The main advantage of interviews for this study is that the data required is about information that is not standardized in Portugal which could lead to different terminology being used in the various enterprises. Interviews allow the concepts to be explained to the interviewee thus making their answers more reliable (Bell, 2005). Semi-structured interviews are particularly useful to collect information about concepts that are potentially confusing (Abernethy et al., 1999). In this particular case, as little is known about the accounting management practices in Portuguese SME's, it was thought that interviews would allow additional information to be gleaned that might prove useful in future research although not initially sought by the researcher (Bell, 2005).

Surveys are suitable for collecting information about standard concepts that are accepted and shared by all those involved and should therefore not be used for this work (Abernethy et al., 1999). The results of the research could be prejudiced by the fact that the respondents do not have the opportunity to clarify any interpretive doubts.

On the other hand, the use of interviews for this study raises a number of problems that could be overcome by surveys. Firstly, in an interview the information is collected from a single source whereas a survey would obtain data from various respondents in the same enterprise. Nevertheless, Abernethy et al. (1999) believed this could be offset if the researcher is confident the interviewee is in control of the required information. Secondly, interviews are more time-consuming than surveys (Bell, 2005), mainly if conducted in large geographical areas. Thirdly, the interviewer can lead the interviewee into certain answers (Bell, 2005) making it a more subjective method than surveys. However, Abernethy et al. (1999) believe this does not produce more bias than the subjective interpretation of survey results.

It was decided to use interviews as the research method, asking questions that would elicit a broad range of data on the subject of interest. Semi-structured interviews were conducted with a selection of topics on which the interviewee can reflect (Bell, 2005). Only accounting managers were interviewed as they were understood to have the necessary information at their fingertips and, given the size of the enterprises, a global vision of their own.

5 - DATA COLLECTION

The aim of this study is to analyze the universe of the Portuguese industrial SME's classified with excellence in 2000/2001. Just one hundred and sixty three enterprises were awarded this classification in both these years. After three contacts, meetings were arranged in fifty-eight enterprises. The interviews were conducted with the accounting manager between June 2005 and July 2006. Enterprises from eleven districts of the initial universe (fourteen) were analyzed and this is considered a good geographical coverage of the universe under study. The fifty-eight enterprises that agreed to participate correspond to a response rate of 36%, which is comparable with other similar studies in the literature review e.g. Drury and Tayles (1994) with a response rate of 35%; Haldma and Lääts (2002) with 34%, Innes and Mitchell (1995), Innes et al. (2000), Joshi (2001) with just 25%, 23% and 24%, respectively.

Nevertheless, non-responses may cause a bias in the results, notably if the enterprises that did not agree to participate have uniform characteristics and are not dispersed and therefore define a category with specific characteristics (Young et al., 2005). The latter authors consider this problem to be more related to the fact that the enterprises that answered are different from those which did not than to the actual response rate. In this study, no indications were found of a non-response bias following the analysis of three factors: 1) the geographical coverage of the Portuguese territory; as there were enterprises from 79% of the districts in the universe, and the three not covered had only one enterprise each, geographical representation is not considered to bias results; 2) the activity segments of both responding and non-responding enterprises were very diverse which also indicates a lack of bias; 3) the dimension of the enterprises, which according to Young et al. (2005) may be measured by number of employees. A comparison of the respondents and non-respondents in terms of size, measured as the average number of employees, was performed. The t-student test with a value of 1.165, for 161 degrees of freedom, with a p-value of 0.246, revealed no significant difference in average size between groups.

It can be concluded from the analyses that, although not valid for all Portuguese industrial SME's, these results may characterize a sub-group of these enterprises, i.e. those classified with excellence in both 2000 and 2001. Abernethy et al. (1999) conclude that the extrapolation from a single study must be limited regardless of the research method used. They believe that generalization in management accounting

must be achieved through constant application in new populations, places and time periods.

6 – RESULTS

6.1 – Allocation method of indirect costs

In relation to the industrial indirect costs, a variable was built that reflects the method used by its allocation and its non-existence; this was named “industrial indirect costs” and presents four categories of answers shown in Table 1. The results reveal that 24% of the enterprises do not allocate industrial indirect costs to products, in 48% of the enterprises use a single allocation base, in 28% of the enterprises use multiple allocation bases. All the allocation bases used are influenced by the production volume and are therefore considered theoretically inadequate. The most used are machine hours and the direct labor hours. None of the enterprises uses the Activity Based Costing. The allocation of the non-industrial indirect costs is even less frequent in the analyzed enterprises. The majority of the enterprises (57%) do not allocate these costs by the products.

Table 1 –“Industrial indirect costs” variable

6.2 – Influence of management accounting software

Three procedures are required to analyze if the management accounting software conditions the allocation methods of the indirect costs. First, a variable must be built that presents the types of software used by the enterprises. Second, another variable must be defined which represents the information given by the interviewees on the conditioning, or not, from the software used on the management accounting with regard the methods used to allocate the indirect costs by the products. Third, these two variables must be connected.

a) - Management accounting software

In relation to the management accounting software used in the forty-four enterprises that allocate indirect costs, three categories were found and are presented in Table 2. In 41% of the enterprises, product costs are determined using spreadsheets. In 29.5% of the enterprises, there are integrated computer systems for the whole enterprise

which do the financial accounting and management accounting using the same software. In the remaining enterprises (29.5%), the product valuation is integrated in the management production software and the financial accounting is done in an other software.

Table 2 – Management accounting software

b) – The influence of management accounting software

The “conditioning” variable with two answer categories (see Table 3) expresses the managers’ opinions about the influence, or not, of the management accounting software on the method of allocating indirect costs. A significant number (41%) of managers claim that the management accounting software determines the method used to allocate the indirect costs. It is now interesting to determine whether or not this conditioning is associated to the type of management accounting software.

Table 3 –“Conditioning” variable

c) – “Conditioning” and “management accounting software” variables

When the answer categories of these two variables are crossed, (see Table 4 and Figure 1), it find some heterogeneity in the distribution of frequencies across the various answer categories. In the enterprises that use integrated software for the whole enterprise, most managers (69%) consider that it conditions the product valuation. In the enterprises that use an integrated system with production management, 62% of managers also believe conditioning occurs. In the enterprises that use spreadsheets, 94% of the managers felt their management accounting software did not condition the product valuation.

Table 4 –“conditioning” and “management accounting software” variables

Figure 1 –“conditioning” and “management accounting software” variables

There appears to be a relationship between the “conditioning” variable and the use of integrated systems. The application of the Pearson Chi-Square test to the relationship between the two variables results in the value of 15.909 for two degrees of freedom, with a p-value less than 0.001; the null hypothesis of independence can therefore be

rejected and the alternative hypothesis of the existence of a relationship between the two variables is accepted. Nevertheless, some interesting questions are raised when the two variables are crossed (see Table 4) and suggest that there are additional factors, thus justifying a more detailed analysis of the interviews. The conditioning phenomenon is more common in the enterprises with integrated systems. However, not all, enterprises that used these systems felt conditioned, namely in five using integrated systems with production management and in four enterprises with global integrated systems. The analysis of their interviews revealed that all these enterprises had a common factor: they were distinct from the others because they did not have a standard integrated systems, but developed a system internally and in line with the management demands. Moreover, the relationship between the “conditioning” and “management accounting software” variables may be indirect and caused by a third variable i.e. the way the indirect cost allocation method was designed which influences both simultaneously. This is analyzed below.

6.3 – New conditioning perspective

Although no empirical studies were found on the relationship between the person responsible for the design process and the product valuation methods used by the enterprises, two articles make partial references to this question (Bjornenak, 1997; Cohen et al., 2005) but reach conflicting results. Both studies analyze the influence of the external consultants in the diffusion of the Activity Based Costing, even though Cohen et al. (2005) concludes there is no statistically significant relationship between the use of external consultants and the use of this method in Greek enterprises. Bjornenak (1997) notes that all Norwegian enterprises analyzed that use or are implementing the Activity Based Costing acquire the services of external consultants.

Three procedures were required in our analysis of the possible influence of the design process on the methods used in Portuguese industrial SME's. Firstly, a variable was built to characterize the way in which the methods were conceived. Secondly, this new variable was linked with the information obtained in the interviews on whether or not there was conditioning. Lastly, we checked to see if this new variable also conditioned the “management accounting software” variable. If the new variable influences the “management accounting software” and “conditioning” variables simultaneously, the relationship between the latter two variables is indirect due to the influence of a new variable.

a) – Design process of the indirect cost allocation method

A new variable called “design process” was built for which the categories of answers presented in Table 5 were found. The majority of the enterprises (61%) conceived the method for indirect cost allocation internally. Some enterprises (30%) requested an IT consultant that recommended management software that would, among other things, allow the products to be valued. Only 9% requested management consultants to design the indirect cost allocation method.

Table 5 – Design process of the indirect cost allocation method

b) – “conditioning” and “design process” variables

It is now interesting to confirm whether there is a relationship between the “design process” and the “conditioning” variables. The answer categories of these two variables are crossed in Table 6 and Figure 2. The managers of the enterprises in which the method was designed by management consultants all consider that indirect cost allocation method is being conditioned. The same occurs in enterprises where IT consultants recommended the software for valuing the products. Only 4% of the managers of enterprises where the indirect cost allocation method was designed internally consider the existence of the conditioning phenomenon.

Table 6 – “conditioning” and “design process” Variables

Figure 2 – “conditioning” and “design process” variables

The Pearson Chi-Square test is not a valid way to analyze the existence of a relationship between the two variables. The expected frequencies are very small, due to the few situations in which management consultants were called in. To solve this problem, the two answer categories of the “design process” variable were aggregated to form a new variable named “reclassified design process”. All cases in which management and IT consultants were called in were aggregated in a new category named “external consultant”. The crossing of the “conditioning” and “reclassified design process” variables is presented in Table 7. All the managers in the enterprises where the indirect cost allocation method was designed by external consultants consider the existence of the conditioning phenomenon.

Table 7 – “Conditioning” and “reclassified design process”

The value obtained by the Pearson Chi-Square test is 40.016, with one degree of freedom, with a p-value of less than 0.001; this allows us to reject the null hypothesis and accept the existence of a relationship between the design process of the indirect cost allocation method and the conditioning phenomenon. To measure the intensity of this relationship, Cramer’s coefficient was applied with the value of 0.954, with a p-value of less than 0.001; this allows us to reject the null hypothesis of independence between the variables and consider the existence of a strong association between them. It is then advisable to validate the direction of this association using the Lambda Asymmetric. The Lambda value is 0.944 when the “conditioning” variable is considered dependent and has a p-value of less than 0.001. It can therefore be concluded that knowledge of the “reclassified design process” variable allows a 94.4% reduction in the prediction error about the “conditioning” variable category; in other words if it is known who designed the method, we can easily predict if the manager considers it is conditioned. As each of the variables presents only two answer categories, Relative Risk can be used to confirm the results obtained (see Table 8). As value 1 does not belong to the 95% confidence interval, it can reject the null hypothesis of independence and accept the alternative hypothesis that there is a relationship between the variables. The value of the Relative Risk of eighteen means that accounting managers in enterprises that design the product valuation system internally are eighteen times more likely not to feel conditioned.

Table 8 – Relative Risk: “conditioning” and “reclassified design process”

The evidence collected reveals that the conditioning phenomenon felt by the accounting managers is influenced by the fact that the indirect cost allocation method is designed by external consultants. An analysis must now be made to determine if there is a relationship between the design process and the management accounting software used in product valuation.

c) –“management accounting software” and “design process” variables

When the two variables analyzed separately above - “management accounting software” used and the “design process” – are crossed (see Table 9 and Figure 3), it is found that the enterprises that brought in management consultants all adopted integrated computerized solutions for the entire company. Although all the enterprises

that used IT consultants also have integrated solutions, 62% of them have only applied these solutions in production management. Enterprises that designed indirect cost allocation methods internally mainly use spreadsheets (67%) to support management accounting. However, a detailed analysis of each interview is required as nine of these enterprises have integrated systems. This resulted in the same conclusion as those presented in Table 4. They are the enterprises in which the indirect cost allocation method is not conditioned.

Table 9 –“management accounting software” and “design process” variables

Figure 3 –“management accounting software” and “design process” variables

The Pearson Chi-Square is not a valid test to analyze the relation between the behaviors of these two variables. The expected frequencies are very small, due to the small number of situations with integrated systems. The “reclassified design process” variable was therefore used (see Table 10).

Table 10 –“management accounting software” and “reclassified design process” Variables

The Pearson Chi-Square test result from this association presents a value of 19.342, for two degrees of freedom, with a p-value of less than 0.001; the null hypothesis is therefore rejected and the alternative hypothesis that there is a relationship between the “design process” and “management accounting software” variables is accepted. The value of Cramer’s coefficient is 0.663, with a p-value of less than 0.001 thus leading to the rejection of the null hypothesis of the variables’ independence; their association is considered moderate though it is weaker than the association between the “conditioning” and “reclassified design process” variables. Lambda Asymmetric is used to validate the direction of the association. The Lambda Value is 0.346, when the “management accounting software” variable is considered to be dependent. Knowledge of the “reclassified design process” variable allows a 34.6% reduction in the prediction error for the “management accounting software” variable. The results are statistically significant given that the p-value is 0.001 and confirms the direction of the relationship, i.e. the “design process” variable influences the IT solution used in the management accounting.

7 – CONCLUSION

As there appears to be a paradox between the methods of product valuation considered theoretically more suitable and those effectively used by enterprises according to empirical studies already made, research clarifying the explanatory factors for this is justified. The first goal was to identify the methods used by Portuguese industrial SME's to value products. In line with empirical studies made in other countries, it is possible to conclude that enterprises continue to use methods that are theoretically unsuitable. About a quarter of the enterprises analyzed do not allocate indirect costs to products; allocation in the remaining enterprises is influenced by production volume. The use of these allocation bases may not reflect the real consumption of organizational resources required by each product. As a result, those items produced in large scale may be over-valued while products made in small quantities may be under-valued. If the resulting product costs are used for any managerial decision, e.g. to determine the sales' price or to perform a profitability analysis, there may be important strategic implications as managers may use the resources for products manufactured in smaller quantities incorrectly. Activity Based Costing, which theory considers the most suitable method, is not used in any of the enterprises under analysis.

This paradox between the methods defended by theory and those used by the companies requires further study. The reviewed literature suggests that management accounting software may condition the methods used to value the products, although this is not supported with empirical studies. Results confirm a statistically significant relationship between two variables: the conditioning felt by the accounting managers and the management accounting software. Managers of the enterprises using integrated software in the management accounting feel most conditioned.

However, the individual analysis of the interviews led to the detection of a third variable, namely the way the indirect cost allocation method was designed, which simultaneously exerted an influence on the previous two variables. A statistically significant relationship was found between two variables: design process of the indirect cost allocation method and the phenomenon of conditioning felt by the accounting managers. The accounting managers of enterprises where the method was designed by external consultants all felt the phenomenon of conditioning. In the enterprises where the design was developed internally, 96% of the managers did not experience any conditioning. A statistically significant relationship was also found between the

design process variable and the management accounting software used. The methods designed by external consultants use (100%) integrated IT systems. When designed internally, management accounting software mainly uses spreadsheets (67%).

This evidence suggests that the conditioning of the management accounting software on the indirect cost allocation method identified by accounting managers is, in fact, the result of a third variable, namely the way the method was designed, and this has a direct influence on the first two.

The number of enterprises that agreed to participate in this study and the potential influence of the data collection method i.e. interviews, on the results are recognized shortcomings of this study. However, this study makes two contributions to knowledge of accounting management. Firstly, the results do not suggest a causal relation between the management accounting software and the methods used for product valuation. Secondly, this study find a new conditioning factor for product valuation methods used by industrial enterprises: the way the indirect cost allocation method was designed, this fills a gap in our understanding of the relation between accounting software choices and determining the value of products. Further empirical research is required to detect other explanations for enterprises continued use of product valuation methods considered theoretically unsuitable.

REFERENCES:

- Abernethy, Margaret A., and Chua, Wai Fong, and Lockett, Peter F., and Selto, Frank H., 1999. Research in managerial accounting: Learning from others' experiences. *Accounting and Finance*, 39, 1-27.
- Baxter, Jane, and Chua, Wai Fong, 2003. Alternative management accounting research – whence and whither, *Accounting, Organizations and Society*, 28, 97-126.
- Bell, Judith, 2005. *Doing Your Research Project: a guide for first-time researchers in education and social science*, 4th edition. Open University Press, Buckingham.
- Belkaoui, Ahmed Riahi, 2000. *Accounting Theory*, 4th edition. Business Press, Thomson Learning.
- Bhimani, Alnoor, 2002. European management accounting research: traditions in the making. *European Accounting Review*, 11, 1, 99-117.
- Bjornenak, Trond, 1997. Diffusion and accounting: the case of ABC in Norway. *Management Accounting Research*, 8, 3-17.
- Blake, John, and Wraith, Philip, and Amat, Oriol, 2000. Developing a new national management accounting framework – the Spanish case. *European Business Review*, 12-3, 122-128.
- Burns, John, and Scapens, Robert W., 2000. Conceptualizing management accounting change: an institutional framework. *Management Accounting Research*, 11, 3-25.

- Chambers, R. J., 1993. Positive Accounting Theory and the PA Cult. *ABACUS*, Volume 29, nº 1, 1-26.
- Chua, Wai Fong, 1986. Radical developments in accounting thought. *Accounting Review*, LXI, 4, 601-632.
- Chun, Loo Sin, and Kassim, Nor Aziah H. A., and Minai, Badriyah, 1996. Are management accounting systems in Malaysia outmoded? *Singapore Management Review*, 18, 1, 55-67.
- Clarke, Peter J., and O' Dea, Tony, 1994. Management accounting systems: some field evidence from sixteen multi-national companies in Ireland. *Irish Accounting Review*, Spring, 199-216.
- Clarke, Peter J., 1997. Management accounting practices in large Irish manufacturing firms. *IBAR- Irish Business and Administrative Research*, 18, 136-152.
- Clarke, Peter J., Hill, and Nancy Thorley, and Stevens, Kevin, 1999. Activity-Based Costing in Ireland: Barriers to, and opportunities for, change. *Critical Perspectives on Accounting*, 10, 443-468.
- Cohen, Sandra, and Venieris, George, e Kaimenaki, Efrosini, 2005. ABC: adopters, supporters, deniers and unawares. *Managerial Auditing Journal*, 20, 9, 981-1000.
- Cooper, Robin, 1987. Does Your Company Need a New Costs System? *Journal of Costs Management*, Spring, 45-49.
- Cooper, Robin, 1988. The Rise of Activity-Based Costing – Part One: What Is an Activity-Based Costs System? *Journal of Costs Management*, Summer, 45-54.
- Cotton, Bill, and Jackman, Susan, 2002. Activity based costing: not a “easy ABC”. *Chartered Accountants Journal of New Zealand*, 81- 4, 35-37.
- Covaleski, Mark A., and Dirsmith, Mark W., 1988. An Institutional Perspective on the Rise, Social Transformation, and Fall of a University Budget Category. *Administrative Science Quarterly*, 33, 562-587.
- Covaleski, Mark A., and Dirsmith, Mark W., 1996. Managerial accounting research: the contributions of organizational and sociological theories. *Journal of Management Accounting Research*, 8, 1-35.
- Dearman, David T, and Shields, Michael D., 2001. Costs knowledge and costs-based judgment performance». *Journal of Management Accounting Research*, 13, 1-18.
- Drury, Colin, and Tayles, Mike, 1994. Product costing in UK manufacturing organizations. *European Accounting Review*, 3:3, 443-469.
- Drury, Colin, 2008. *Management and Costs Accounting*, 7th edition. Thomson Business Press.
- Ghosh, B. C., and Chan, Yoke-Kai, 1997. Management accounting in Singapore - well in place? *Managerial Auditing Journal*, 12, 1,16-18.
- Granlund, Markus, and Malmi, Teemu, 2002. Moderate impact of ERPS on management accounting: a lag or permanent outcome? *Management Accounting Research*, 13, 299-321.
- Haldma, Toomas, and Lääts, Kertu, 2002. Contingencies influencing the management accounting practices of Estonian manufacturing companies. *Management Accounting Research*, 13, 379-400.
- Hopper, Trevor, and Armstrong, Peter, 1991. Costs accounting, controlling labor and the rise of conglomerates. *Accounting, Organizations and Society*, 16, 405-438.
- Hopper, Trevor, and Koga, Tsutomu, and Goto, Jitsuo, 1999. Costs accounting in small and medium sized Japanese companies: an exploratory study. *Accounting and Business Research*, 30, 1, 73-86.
- Humphrey, Christopher, and Scapens, Robert W., 1996. Methodological themes. Theories and case studies of organizational accounting practices: limitation or liberation? *Accounting Auditing & Accountability Journal*, 9, 4, 86-106.
- IAPMEI, 2002. *Estrutura Empresarial Nacional*. Gabinete de estudos do Instituto de Apoio às Pequenas e Médias Empresas e ao Investimento, Lisboa.

IAPMEI, 2008. Sobre as PME's em Portugal. Direcção de Planeamento e Estudos do Instituto de Apoio às Pequenas e Médias Empresas e ao Investimento, Lisboa.

Innes, John, and Mitchell, Falconer, 1995. A survey of activity-based costing in the U.K.'s largest companies. *Management Accounting Research*, 6, 137-153.

Innes, John, and Mitchell, Falconer, e Sinclair, Donald, 2000. Activity-based costing in the U.K.'s largest companies: a comparison of 1994 and 1999 survey results. *Management Accounting Research*, 11, 349-362.

Johnson, H. Thomas, 1988. Activity-Based Information: A Blueprint for World-class Management accounting. *Management Accounting*, June, 23-30.

Joshi, P. L., 2001. The international diffusion of new management accounting practices: The case of India. *Journal of International Accounting Auditing & Taxation*, 10, 1, 85-109.

Kennedy, Tom, and Affleck-Graves, John, 2001. The Impact of activity-Based Costing Techniques on Firm Performance. *Journal of Management Accounting Research*, 13, 19-45.

Laughlin, Richard C., 1987. Accounting systems in organizational contexts: a case for critical theory. *Accounting, Organizations and Society*, 12, 479-502.

Lukka, Kari, and Granlund, Markus, 1996. Costs accounting in Finland: current practice and trends of development, *The European Accounting Review*, 5, 1, 1-28.

Miller, Peter, and O' Leary, Ted, 1987. Accounting and the construction of the governable person. *Accounting, Organizations and Society*, 12, 235-265.

Morgan, Glenn, and Willmott, Hugh, 1993. The "New" Accounting Research: On Making Accounting More Visible. *Accounting Auditing & Accountability Journal*, 6, 4, 3-36.

Scapens, Robert W., 1990. Researching Management Accounting Practice: The Role of Case Study Methods. *British Accounting Review*, 22, 259-281.

Shields, Michael D., 1998. Management accounting practices in Europe: A view from the States. *Management Accounting Research*, 9, 501-513.

Swenson, Dan, 1995. The Benefits of Activity-Based Costs Management to the Manufacturing Industry. *Journal of Management Accounting Research*, 7, 167-180.

Thorp, John, and Kipfer, Jacqueline, 1991. The French Approach to Management Accounting. *Management Accounting*, December, 32-36.

Tilling, Matthew, and Tilt, Carol A., 2004. Alas poor critical accounting, we knew him, Karl. *Critical Perspectives on Accounting*, 15, 557-563.

Young, S. Mark, and Wim, A. Van der Stede, e Chen, Clara Xiaoling, 2005. Assessing de quality of evidence in empirical management accounting research: the case of survey studies. *Accounting, Organizations and Society*, 30, 655-684.

Watts, Ross L., and Zimmerman, Jerold L., 1990. Positive Accounting Theory: A Ten Year Perspective. *Accounting Review*, 65, 1, 131-156.

Xiao, Jason Zezhong, 2007. Management accounting in China. *Financial Management*, December/January, 32-36.

Zimmerman, Jerold L., 2001. Conjectures Regarding Empirical Managerial Accounting Research. *Journal of Accounting and Economics*, 32, 411-427.

FIGURES

Figure 1 –“conditioning” and “management accounting software” variables

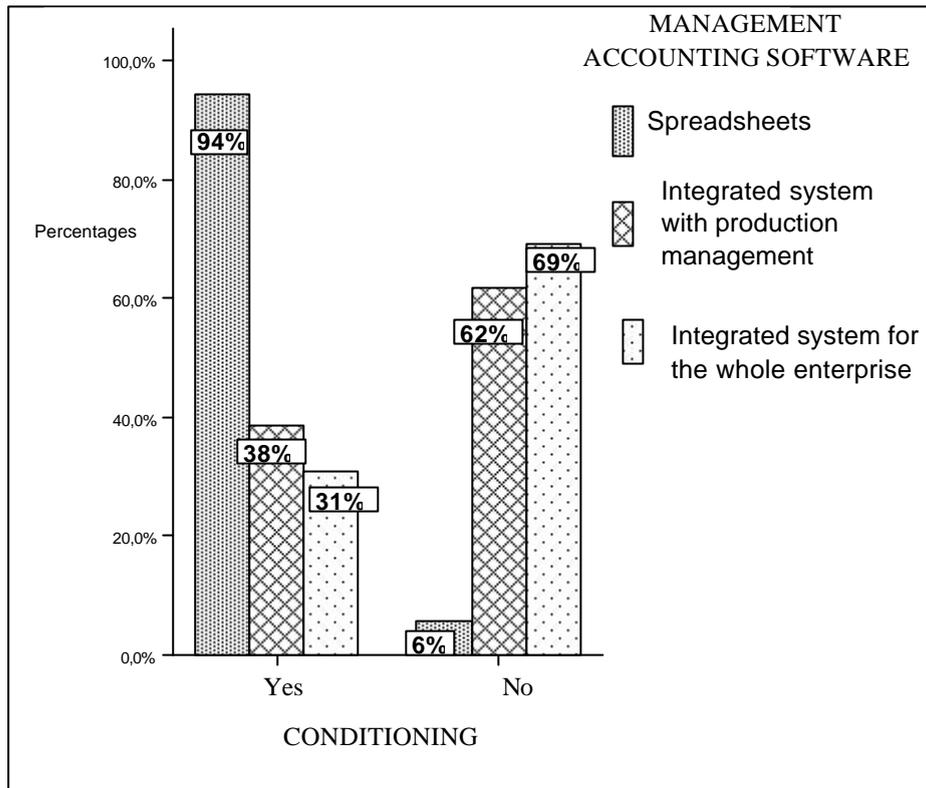


Figure 2 –“conditioning” and “design process” variables

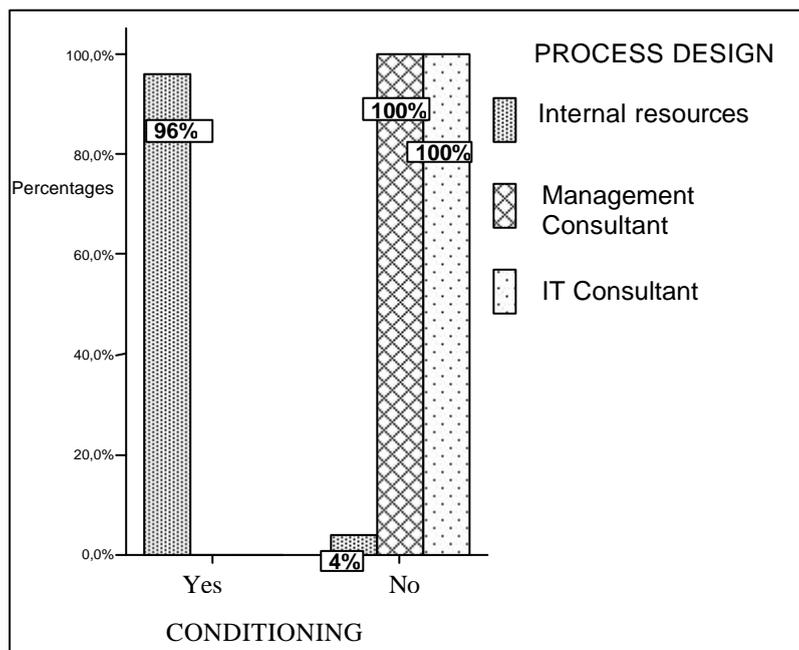
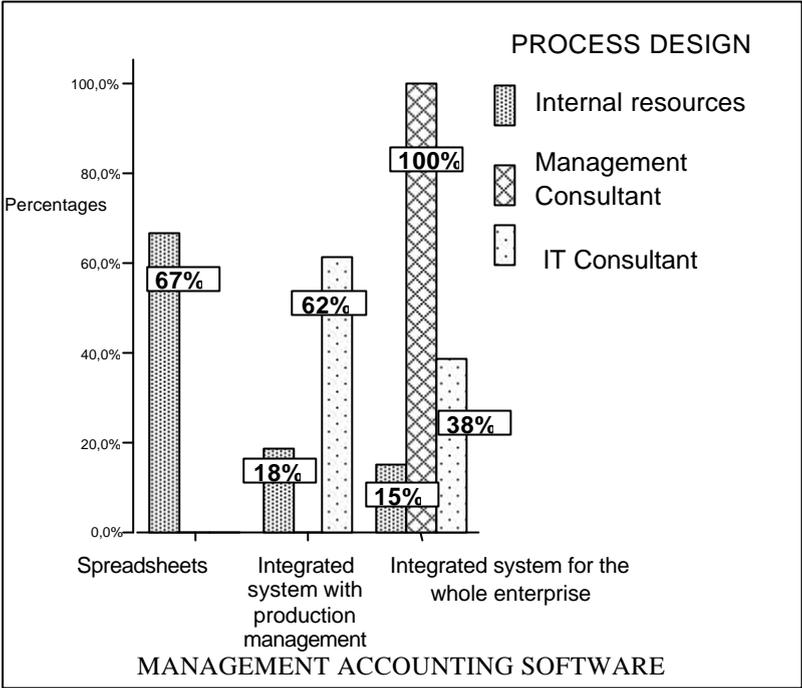


Figure 3 –“management accounting software” and “design process” variables



TABLES

Table 1 –“industrial indirect costs” variable

Industrial indirect costs	Frequencies	Percentages
Indirect costs not allocated	14	24%
A single allocation base influenced by volume	28	48%
Multiple allocation bases influenced by volume	16	28%
Activity Based Costing	0	0%
Total	58	100%

Table 2 – Management accounting software

Management accounting software	Frequencies	Percentages
Spreadsheets	18	41%
Integrated system with production management	13	29.5%
Integrated system for the whole enterprise	13	29.5%
Total	44	100%

Table 3 –“conditioning” variable

Conditioning	Frequencies	Percentages
The management accounting software does not determine the indirect cost allocation method	26	59%
The management accounting software determines the indirect cost allocation method	18	41%
Total	44	100%

Table 4 –“conditioning” and “management accounting software” variables

		Management accounting software			Total
		Spreadsheets	Integrated system with production management	Integrated system for the whole enterprise	
Conditioning	No	17	5	4	26
	Yes	1	8	9	18
Total		18	13	13	44

Table 5 – Design process of the indirect cost allocation method

Design process	Frequencies	Percentages
Internal resources	27	61%
Management Consultant	4	9%
IT Consultant	13	30%
Total	44	100%

Table 6 –“conditioning” and “design process” variables

		Design process			Total
		Internal resources	Management Consultant	IT Consultant	
Conditioning	No	26	0	0	26
	Yes	1	4	13	18
Total		27	4	13	44

Table 7 –“conditioning” and “reclassified design process” variables

		Reclassified design process		Total
		Internal resources	External consultant	
Conditioning	No	26	0	26
	Yes	1	17	18
Total		27	17	44

Table 8 – Relative Risk: “conditioning” and “reclassified design process”

	Value	95% Confidence Interval	
		Lower	Upper
For cohort: reclassified design process = internal resources	18,000	2,679	120,918
N of Valid Cases	44		

Table 9 –“management accounting software” and “design process” variables

		Design process			Total
		Internal resources	Management Consultant	IT Consultant	
Management accounting software	Spreadsheets	18	0	0	18
	Integrated system with production management	5	0	8	13
	Integrated system for the whole enterprise	4	4	5	13
Total		27	4	13	44

Table 10 –“management accounting software” and “reclassified design process” variables

		Reclassified design process		Total
		Internal resources	External consultant	
Management accounting software	Spreadsheets	18	0	18
	Integrated system with production management	5	8	13
	Integrated system for the whole enterprise	4	9	13
Total		27	17	44