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Mind the Gap: The Interplay between Management Control and Enterprise Resource Planning

A Case Study of Aluminium Company

by

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Abstract

- Title:** Mind the Gap: The Interplay between Management Control and Enterprise Resource Planning
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- Keywords:** Management Control, MC, Enterprise Resource Planning system, ERP, Management Control System package, Interplay
- Thesis Purpose:** The purpose of this thesis is to explore the interrelationship between the Management Control of a particular organization and its Enterprise Resource Planning system from the Malmi and Brown (2008) package perspective, and further analyze whether the ERP acts as a driver of change in managerial practices or only supports the implementation of certain control techniques.
- Methodology:** The single case study of a qualitative nature was chosen as a method of this inquiry. This research takes an explorative approach with an experimental feature: the application of Malmi and Brown (2008) package as a framework for analysis.
- Theory:** Relevant research regarding the Management Control and the Enterprise Resource Planning laid the foundation for the literature review. Moreover, several prior research findings in the field of the interplay between ERP and MC are presented.
- Empirical Data:** The empirical material, necessary for this thesis, was collected via semi-structured interviews with the CFO and the controller of the case company, Alco Hellas S.A.. The findings of the interviews were further supported by archival documents provided by the CFO of the company.
- Conclusion:** The interplay between the ERP and MC actually exists and is evident in the company's operations. The ERP system may serve as a facilitator, supporter, but not as a driver of change, at least in this particular case.

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1. INTRODUCTION

This chapter serves as an introduction concentrating on the general discussion regarding the motivation of the authors and the background of the study. Subsequently, the purpose and the aim of the paper as well as the research question accompanied by the limitations of the study will be discussed.

1.1. Background

The interplay between Management Control (MC) and Enterprise Resource Planning (ERP) systems is a subject of great interest since managers' reliance on digitized information is escalating rapidly over time. Although several authors have throughout the years attempted to hypothesize the interrelation of ERP and MC, there is still a need for further research and exploration of this recently emerged topic. Yet, there is no general agreement among scholars regarding the role that the ERP system plays in the MCS of the organizations, whether it should be considered as a driver of change in managerial practices, accepted as a supporter of existing control mechanisms or observed as an independent variable.

Throughout the research conducted for this thesis, it became evident that the subject is not sufficiently explored neither theoretically nor empirically, since there is a limited amount of relevant data available at the moment. Authors such as Booth, Matolcsy and Wieber (2000) discovered that although ERP encourages flexibility in information access and increases functionality, it is not positively related to the adoption of advanced MC techniques. Furthermore, Granlund and Malmi (2002) agree with such claim, since their findings discover that companies use stand-alone IT systems rather than attempt to integrate MCs into ERP, due to the complexity of such software. In addition, Scapens and Jazayeri (2003) suggest that even though the ERP system can facilitate forecasting and budgeting, it cannot serve as a driver of change in managerial controlling practices. On the other hand, Spathis and Constantinides (2004) as well as Rom and Rohde (2007) discovered positive implications of ERP on MC techniques and their implementation.

The above-illustrated discrepancy between the previous findings (more information available in chapter 3) justifies the fact that there is a need for more research in this area, since the usage of MC techniques and ERPs can differ among companies. As was noted by Granlund (2011), the interplay of MC and ERP as a field of study is rather underdeveloped and requires not only further empirical research but also conceptual analysis, which will contribute to future investigations. It should be highlighted that prospective research should not consider MC as an independent tool/technique applied by a company but rather take into account the whole controlling system established by management as a "package".

In order to explore the interaction of the ERP and MC and enlarge the scope of the existing research regarding interdependence between those variables, a typology developed by Malmi and Brown (2008) was applied as a framework herein, since it serves as a holistic tool for the assessment and evaluation of the company's controlling processes and incorporates controls of different nature. At this point, it should be noted that cultural and administrative controls were excluded from the analysis due to their rather informal characteristics. As Prof. Malmi (2015) confirmed, ERP systems do not facilitate administrative and cultural controls thus, this thesis is not further concentrating on those controls since it is assumed that, currently, their intertwining with ERP is difficult to detect.

After the strategic direction of the research was formed, the next step was to identify a company in which the interactions between ERP and MCS would be present. The case company Alco Hellas S.A., a parent company in the Alco Group, was selected for further exploration. Alco Hellas S.A. adopted Atlantis II ERP system more than ten years ago, thus, its implications already became evident to company's management. It should be highlighted that one of the authors of this thesis was previously employed by the company and possesses internal knowledge about its structure. Consequently, this particular fact is expected to add more reliability to the later presented findings.

Furthermore, the choice of the topic for this paper was initiated with an aim of providing a profound analysis of the matter, while concurrently expanding personal knowledge. It was noted that previous experience of ERP systems is frequently mentioned as one of the key requirements for a controller position in various job advertisements, thus it was realized that controlling duties, at certain extent, encompass both knowledge areas (MC and ERP). Since both authors have interest in pursuing their future career as management controllers, the interrelationship of ERP and MC seems to be the subject of extensive applicability and considerable interest. Finally, the interest in the subject was strengthened by the content of the courses recently undertaken, that covered the characteristics of MC and ERP systems.

1.2. Research Purpose

The purpose of the thesis is to explore the interrelationship between the MC of a particular organization and its ERP system from the Malmi and Brown (2008) package perspective, and further analyze whether ERP acts as a driver of change in managerial practices or only supports the implementation of certain control techniques. Since the Malmi and Brown (2008) package was selected as a framework for exploration, it is also interesting to see whether it can be successfully applied as a basis for the analysis and discussion within this research area.

1.3. Research Question

The study aims to address one particular question:

- How does ERP interact with MC? Is it facilitating, supporting or acting as a driver of change in management accounting control techniques/practices?

1.4. Aim and Objectives

The aim of this paper is to minimize the existing theoretical gap by exploring the practical situation in the field of the ERP and MC interface. The current theory does not provide a universal conclusion on the subject and the majority of researchers have divergent views on the role of ERP in managerial practices. Therefore, in order to add to this debate, a real practical situation is taken under scrutiny. The objective of the thesis is to examine the theoretical issue in relation to the real practical situation within an actual company and to identify the existing interactions and intersections. Finally, while IT is claimed to be one of the contingent variables that shape the control environment of the organizations, there is a need to recognize how this claim applies to the case company.

1.5. Outline of the Thesis

The rest of this paper is structured as follows: In chapter 2 the reader can find the research approach that is pursued throughout the paper as well as the data collection and analysis techniques. Validity and reliability of the empirical findings are also discussed. In chapter 3 the theoretical framework of the paper is constructed, which serves as the backbone of this thesis. At the end of the chapter, the prior research regarding the discussed topic is presented. Moving on to chapter 4, the empirical results based on the interviews are revealed and all the information needed in the following chapter (analysis) is illustrated. Consequently, in the analysis chapter (5), theory and empirical data are interpreted in order to reach the conclusions of this thesis, which are presented in chapter 6. This final chapter concludes with a short summary of the major findings while practical implications and proposals for future research are also acknowledged.



Figure 1 - Structure of the thesis

2. METHODOLOGY

The purpose of this chapter is to make the reader acquainted with the methodology of this research. Firstly, the research approach as well as its design are introduced in detail. Secondly, data collection and analysis techniques are presented and elaborated on. Finally, the limitations of the research method as well as the validity and reliability of findings are critically reviewed.

2.1. Research Approach

Based on Bryman and Bell (2011), the research approach of this study can be characterized as qualitative, since the main focus of it encompasses textual descriptions of the given issue rather than numbers. Qualitative research seeks to acquire qualitative data that can be further interpreted and analyzed. The main advantage of this type of research approach is its ability to reflect the uniqueness of a particular case or situation (Flick, 2009), which by all means is aligned with the predeterminations of this thesis.

In formulating the methodological paradigm of this study with an aim to confirm the applicability of the approach chosen, the conceptual realms of epistemology and ontology were examined. The doctrine of epistemology concerns the assumption of what knowledge is, how it should be obtained and to what extent it can be classified as acceptable. Meanwhile, ontology aims to identify how the researcher views the reality, which is exceptionally important in social sciences since personal perceptions on social interactions may impact the tactic to determinate the truth of the investigated problem (Vasilachis de Gialdino, 2009).

An epistemological position of qualitative study is interpretivism, which means that it emphasizes the understanding of phenomena through the analysis of the interpretation provided by the actors involved in the process (Bryman & Bell, 2011). Since the empirical data is collected via interview of the company's employees, the analysis of this study is highly dependable on their interpretation of the key features of MC as well as those of the ERP system. Furthermore, in accordance with Carson, Gilmore, Perry and Grounhaug (2001), the interpretivist paradigm has a rather personal and flexible approach while seeking to rationalize the specific context of the subject under scrutiny. Therefore, since the personal factor will obviously be of high importance throughout the whole study, the interpretive nature of the epistemological position seems to be aligned with the latter.

Equally important is the ontological point of this qualitative research, which is defined according to Bryman and Bell's classification (2011) as constructionism, in that reality is presumed to be constructed by social processes and interactions between the

individuals involved. Such approach is the core principle of this study, since reality is assumed to be generated by social encounters of varied nature.

The aim of this study is to identify the interrelation of several variables in the social context, the MCS and ERP system in particular, further concentrating on qualitative details and interdependencies of the discovered evidence. As was noted above, the epistemological and ontological positions of this qualitative study are in compliance with the criterion predetermined for the study. Thus, all things considered, the qualitative research can be classified as most appropriate for future investigation.

Furthermore, the nature of this study is explorative, since it seeks to get a better understanding of the subject by exploring the matter, the relationship of MCS and ERP in particular. Therefore, the observations are attempted to be explained by the currently existing theories outlined in the theoretical part of this paper. However, the research is rather descriptive since the situational activities of the company are interpreted precisely with an aim to expand knowledge on the matter while seeking for missing details and inconsistencies. While Yin (2009) classifies the research design into explorative, exploratory and descriptive, this particular study has the features of both explorative and descriptive approaches. In addition, the Malmi and Brown package is applied as a framework for analysis and discussion, and further related to company's ERP system. Such tactic is relatively unique and is not widely used considering the context of the study, thus, the thesis bears an experimental twist as well.

Hence, this paper incorporates the qualitative aspects of research and has an explorative nature with an experimental feature.

2.2. Research Design

In order to get detailed insights into the operational link between Malmi and Brown 's MCS package and the company's ERP system, the case study type of research was chosen. Given that, this specific type of study supports investigation regarding the research question by assuring an in-depth evaluation of interdependencies between ERP and MC.

According to Yin (2009), in comparison to the other methods, a case study is relevant when: (a) the main aim of the study is to answer "how" and "why" questions, (b) events are not controlled by examiner, (c) the study focuses on contemporary phenomena. This particular thesis investigates a current situation, which the authors have almost no power to control or affect, since the company currently employs none of the two. In addition, none of the authors participated in the customization of the case company's ERP system. Furthermore, the purpose of the study rests upon the "how" question, more specifically, on how the ERP system interacts with MC. Thus, considering such

settings, the case study research design can be viewed as the most appropriate method for exploration.

In addition, two major types of case study design can be defined: single- and multiple-case studies (Eisenhardt & Graebner, 2007; Yin, 2009; Bryman & Bell, 2011). Single-case studies concentrate on a single event or experiment, while multiple-case studies may contain several units of analysis. The major advantage of a multiple-case research is that it provides more accurate data, which can serve as a basis for theory building (Eisenhardt & Graebner, 2007). However, the purpose of the paper is not to develop a new theory but rather to add on to the existing one by exploring the correlation between two independent variables, ERP and MC. By the same token, the main aim is to gain a deeper understanding of the specific phenomena and therefore single-case study offers an opportunity to perform an extensive analysis of the subject of interest (Yin, 2009). Although different variables within a single-case study may be present, the research in this paper concentrates on a single organization in a single location (Bryman & Bell, 2011, p.59).

Consequently, after considering potential variants, a multinational corporation, Alco Group, and more specifically the parent company, Alco Hellas S.A., was chosen for the in-depth analysis. The main reason for such a choice was the fact that the company previously employed one of the authors of this research, and thus it may be positively correlated with the overall accessibility of relevant data and the openness of management to provide internal information about the company.

The author worked for two years as a CFO assistant in Alco (a position that is currently vacant) and due to the nature of responsibilities (i.e. assuring information for controlling purposes and participation in the financial statements' preparation) became familiarized with the control structure of the company. In addition, the duties involved close interaction with the company's CFO on a daily basis while the company's ERP was intensively used as a supporting tool for the accomplishment of daily tasks. Therefore, it is argued that the awareness of the company's operations, prior experience with the ERP system and the established connections with the company's CFO add value to the thesis and increase the trustworthiness and credibility of the data acquired. In addition, the choice of the company for investigation was supported by supplementary factors such as: the size of the company, the usage of the relatively unknown ERP system and the management's unfamiliarity with MCs being a package, as illustrated by Malmi and Brown (2008).

In view of the fact that MC is a technique to guide, evaluate and direct the behavior of individuals towards congruent organizational objectives, the necessity of such practice becomes more prominent in mid-sized or big companies, since managers have no ability to monitor each employee while a department may contain hundreds of them. Therefore, it was acknowledged that the company under scrutiny should be preferably

big or middle-sized. Therefore, the parent company, Alco Hellas S.A., was considered to be appropriate for the in-depth analysis since it is a middle-sized company.

Furthermore, it is assumed that in well-developed countries like Sweden the link between governance techniques and IT systems is evident for the majority of organizational players. The IT systems become highly customized in order to meet the controlling requirements determined by managers. Therefore, it appeared of great interest to investigate a company in which management is unaware of the MC ability to operate as a package (Malmi & Brown, 2008). Such intention was induced by an aspiration to receive objective empirical evidence, since the interviewees are not impacted by prior knowledge of the subject and therefore, trustworthiness of collected data may be increased. Since one of the authors has insights into the company, it is certain that Alco's managers do not administer MC as a package.

In addition, the investigation of a poorly known ERP system adds a new perspective into the scope of the present research on the matter, in view of the fact that the majority of existing studies concentrates on well-known ERP brands such as SAP, Microsoft or Oracle. Alco Hellas S.A. is currently using an ERP system relatively unknown in the Northern Europe, named Atlantis II by Altec Software.

To summarize, the case study concentrating on the single company, "produces rich, holistic, and particularized explanations that are located in situational context through using multiple methods of data collection to uncover conflicting meaning and interpretations" (Bryman & Bell, 2011, p.61).

2.3. Data Collection Method

Within the case study research, collected data can be classified as primary and secondary. Primary data relates to the specific problem of the research concerned, usually supplementing the social knowledge of the subject with completely new evidence (Hox & Boeije, 2005). Although secondary data typically contains previously collected material of different nature, it plays an indispensable role in supporting the final theorization. Due to the distinction between the two sources of data, different collection methods are usually applied. Since this study incorporates primary as well as secondary data, the collection techniques used during the construction of the research will be outlined further.

2.3.1. Primary data

The initial data for this thesis was collected in form of the in-depth interview. Yin (2009) advocates this type of data collection method since it provides the examiner with an

opportunity to acquire comprehensive insights of the subject and is not restricted by number of questions nor time. Due to the fact that qualitative interviewing may be performed in an unstructured or semi-structured manner (Bryman & Bell, 2011), the latter option was deliberately chosen. The semi-structured interview is based on predefined questions, which are extensively related to the research topic, however, in the interview certain flexibility is given to deviate from established guidelines. The examiner may ask leading questions based on the answers received during such interview, whereas interviewees have the chance to freely comment on the topic concerned and raise issues of their own interest (Bryman & Bell, 2011).

The general idea behind the choice of the interviewees was based on the assumption that each interviewed person should have a good understanding of the kind of management controls that the company practices. Furthermore, the interviewees should be key users of the company's ERP system, and their knowledge must be attained through daily usage. Due to the fact that the focus of this research lies principally on the formal types of control, the employees of the Financial Department of Alco Hellas S.A. (in particular, CFO and Controller), were selected for dialogue since it is known by the previously employed author that they possess appropriate knowledge regarding the particular subject.

Furthermore, the interview questions can be classified into two categories: first, general questions regarding the structure of the company, as well as interviewees' duties and responsibilities and the Atlantis ERP system. Second, there are questions directly related to the research question regarding the interplay between MSC and ERP, which were formatted using the same categories as the Malmi and Brown's (2008) control package, with an emphasis on planning, cybernetic controls and rewards and compensation. The content of the predefined questions is illustrated in Appendix, however, it should be noted that the leading questions asked during the semi-structured interviews are not included.

Face-to-face interviews were undertaken first, nonetheless, the interaction with the company's CFO and Controller continued on several occasions via different information exchange channels. The outline of primary data collection is summarized in Table 1.

Interviewee	Form	Structure	Date	Duration
CFO	face-to-face	semi-structured	31 March 2015	Approximately 1 hour
Controller	face-to-face	semi-structured	31 March 2015	Approximately 1 hour
CFO	Skype	rather structured	15 April 2015	30 min
CFO	Skype	rather structured	28 April 2015	30 min

Table 1 - Primary Data Collection

During the face-to-face sessions, apart from giving responses to the basic questions, the participants were encouraged to communicate their own perception and illustrate the management controls as well as the efficiency of the employed ERP system. Furthermore, the Skype calls were conducted to gather clarifications on certain topics that were not elucidated during the personal meetings. Such discussions were held with Alco's CFO and were rather structured, since most relevant information was already collected during the interviews.

2.3.2. Secondary data

The secondary data accumulated within this thesis research can be categorized into two major types: theoretical and empirical documentation. Data for the theoretical framework, including mainly books about management control, were gathered from the Lund University library whereas the articles mentioned were accessed through the LUB online database. The literature for the theoretical part of this paper was chosen based on its significance and applicability to the pattern research question. Equally important, empirical secondary data was collected with an aim to supplement the results of the interviews. With regards to the research of the single company, the study incorporated complementary data such as the company's background and structure. Additional information was excerpted from the Annual Reports of Alco Hellas S.A., archival records provided by the company's CFO and publications on the company's website.

2.4. Data analysis

Although Yin (2009) proposes five analytical techniques for the analysis of collected data, pattern matching is perceived as most preferable for the case-study research method. Such a tactic contrasts the empirically discovered patterns with the foreseen ones, which are usually found in theoretical background of the problem. Notably, pattern

matching of gathered data supported the purpose of the research and permitted the authors to identify or confirm significant deviation of theory from practice. In addition, an explanation building technique (Yin, 2009) was implemented as supplementing the analytic strategy. Explanation building is a more sophisticated form of pattern matching seeking to explicate a phenomenon through drawing parallels and clarifying causal links within the case variables. Such method was applied with an aim to rationalize patterns and conceive final conclusions.

Empirical evidence on the MC techniques used by the case company were first analyzed and equated into Malmi and Brown's (2008) MCS framework. Subsequently, the findings were "pattern matched" with relevant literature and previous research conclusions, with an aim to find potential explanations to the research question. In order to investigate the research subject in depth and draw a parallel between theory and practice, causal links between the case variables were explored from various perspectives. The explanations and formulations were driven by a confrontation of the available facts with the existing theories on the subject, while judgment was also related to the personal rationality of the authors.

2.5. Validity and Reliability

The case study research is supposed to produce reliable and valid outcomes, therefore, the quality of the process, including data collection and analysis, should be ensured.

In order to promote the overall validity of the findings, which in accordance with Bryman and Bell (2011), stands for "integrity of conclusions that are generated from a piece of research", specific provisions were made.

2.5.1. External validity (research design)

In order to endorse external validity of this study, a single-case study was chosen as a basis for the investigation. The detailed construction of the case study research is widely reflected in existing methodology-oriented literature. With an aim to receive a profound understanding of the concept regarding the case-study method and evaluate its appropriateness to reflect the research question, several theoretical materials were examined. However, the external validity of such research approach is affected by the fact that the generalization of case-study findings is not applicable to a larger universe. Thus, in accordance to Yin (2009), the generalization of evidence gathered through case-study approach is analytical and therefore strives "to generalize particular set of results to some broader theory" (p.43). In other words, the theory behind the MCS and ERP interplay that led to the findings of this thesis in the first place, facilitates the identification of other cases to which the results of this particular study may become generalizable (Yin, 2009). With an aim to promote the external validity of the study, the

theoretical evidence introduced is further corroborated with the empirical findings in the analysis chapter (5) of the paper.

2.5.2. Construct validity (data collection)

Construction validity of research may increase when the researcher uses several sources of data in the data collection phase. Therefore, the theoretical framework applied in this study contains multiple evidences from different sources, such as: documentation, archival records and interviews (Yin, 2009). The documentation plays a rather explicit role in every case study; therefore, the sources that were used in this paper include administrative documents of Alco Hellas S.A., such as Annual Reports, and formal evaluations of the studies on similar cases (prior research reviews). The archival records, investigated for the research purpose, contain organizational files considering the structure of Alco Group and its subsidiaries as well as important data on acquisitions and mergers. The most essential part of data collection were the interviews with the target company's key employees, since they were the major source of empirical data. In order to prevent a possible bias in the data collection process, the interviews were carried out in a neutral, impersonal manner.

Naturally the research on Alco and its ERP system was subject of participant observation, since, as mentioned above, the company previously employed one of the authors of this paper. Therefore, the familiarity with the organizational settings could decay the role of authors as passive observers. However, it is assumed to be highly beneficial, since internal information considering the organizational figures and facts could be hard or impossible to obtain if there was no direct connection to the company.

Furthermore, Yin (2009), proposes two tests to assess the construct validity of research, and, considering the topic of this study, they will be to:

1. Determine the MC change in terms of specific, in this case IT and ERP, concepts, further relating them to the original objective of the research, and
2. Characterize the operational measures that match the notion (mentioned in previous studies)

Within this study, the changes of MC were discussed in several parts, whereas the measure of the concept was whether ERP facilitates the implementation and management of different control techniques.

Furthermore, the interview participants were selected based on the relevance of the knowledge they possess and ability to trustworthily reflect on the research question. The suitability of interviewees and their expertise within relevant field, were assessed in detail. Taken together, the results of the interviews suggested that the roles of Alco's

CFO and controller in the organizational hierarchy go beyond those of traditional accountants. It became evident that both actors conduct several performance management, measurement, and controlling tasks, while similarly acting as advisors and supervisors. Furthermore, the area of their expertise contains advanced knowledge on the company's ERP system. Thus, it became almost certain that, as primary users of the MC techniques, the interviewees would contribute their knowledge and experience to the empirical research of this thesis, adding value to the overall findings.

2.5.3. Internal validity (data analysis)

The combination of the two analytical techniques (pattern matching and explanation building) for the analysis of the empirical findings granted additional rationality to the final settlements, contributing to the internal validity of the study. Internal validity is a subject when the aim of the study is to confirm certain causal relations of the variables (Yin, 2009). Hence, with the causal implications of MC and ERP investigated in this study to a certain extent, the adoption of several data analysis techniques makes the outcomes of the investigation internally valid.

2.5.4. Reliability

The reliability concept advocates the fact that for a subsequent investigator, the experiment must be inherently repeatable, demonstrating similar findings and conclusions (Yin, 2009). In order to represent reliable data, the research process and its outcome should be accurately documented, and such approach was successfully applied in this thesis. Due to all the procedures undertaken to secure the validity of the research, it is likely that a research performed under equivalent circumstances will obtain similar results.

Lincoln and Guba (1985) stress that "since there can be no validity without reliability, a demonstration of the former [validity] is sufficient to establish the latter [reliability]" (p.316). Therefore, both concepts were of equal importance during the construction process of this study.

2.6. Limitations of Method Applied

Bryman and Bell (2011) noted that qualitative research is criticized for being too subjective and difficult to replicate while the problems of generalization and lack of transparency of findings are further declared. It was also discovered that throughout the book "*Case Study Research: Design and Methods*", Yin (2009) discusses the same drawbacks in relation to the case-study approach. Therefore, the reciprocal limitations of this study, as qualitative research and case-based, will be discussed further.

It is essential to remember that when the focus of the research lies on qualitative aspects, personal views and perceptions of authors may impact the outcome not only at a problem formulation stage, but also throughout data collection, analysis and final conclusion. On a similar note, an author's decision regarding the critical factors that should be apprehended in each phase of investigation, may cause bias in the collected data and further distract interpretations. Moreover, certain critical factors of the research problem may be given less attention or even excluded from the overall analysis. With regards to subjective judgment, Yin (2009) confirms that a case-study researcher usually faces difficulties and is unable "to develop a sufficiently operational set of measures" (p.41) in order to promote objectivity. Therefore, it should be acknowledged that the interpretation of the evidence provided in this paper might be, to a certain extent, affected by the personal apprehensions of the authors towards the investigated matter.

Furthermore, despite the benefits of the qualitative case-study approach mentioned in subchapter 2.3, such research seems to be rather hard to replicate. More specifically, Bryman and Bell (2011) explain that responses of interviewees might be affected, for example, by personality, age, or gender of the inquirer. Hence, there is a likelihood that some information will not be revealed to a researcher with a specific personal characteristics, making the exact reproduction of the same study problematical to conduct. Moreover, there is no specific research implementation standard for a researcher to rely on (Bryman & Bell, 2011) if similar investigation is to be repeated.

Since qualitative research in comparison to quantitative is "less codified" (Bryman & Bell, 2011, p.409) it might also be associated with lack of transparency. For example, unclear selection criteria for interview participants or an inappropriate data analysis method may lead to biased outcomes. The transparency of presented data may suffer in case of modification of the general research question during or after the data collection and analysis stage. This case study had clear selection criteria for the interview participants, which was based on the relevance of knowledge and experience possessed by the person involved. Moreover, the data analysis was in compliance with the methods discussed by Yin (2009). However, regarding the literature review, there might be a possibility that some relevant literature was left out because of the potential personal preoccupation in the theoretical material selection phase.

Despite the abovementioned factors, the main limitation considering qualitative case study, especially when based on a single company sample, is an incapability to develop a theory based on such research findings. However, it should be acknowledged that the results of this study can be applied to the existing theory or compared to prior research on the same matter, therefore, generating a noticeable addition to prevailing concepts (Yin, 2009).

3. LITERATURE REVIEW

The following chapter provides the reader with relevant theoretical information within the research field. Firstly, the concept of Management Control is briefly discussed, while the overall purpose of Management Control Systems is also enlightened. Thereafter, as one of the contingent variables, the Information Technology and its impact on Management Control practices are presented. The main features of the ERP systems as well as the previous research on the area of its interplay with Management Control are portrayed afterwards.

3.1. Concept of Management Control

The definition of Management Control as a concept is rather broad, since several scholars approach it differently. One of the earliest descriptions of management control belongs to Anthony (1965), who identifies it as “the process by which managers ensure that resources are obtained and used effectively and efficiently in the accomplishment of the organization’s objectives” (p.17). Anthony was also the first scholar who drew a line and separated management control from strategic and operational controls as an independent field of study (Langfield-Smith, 1997). Anthony's terminology, at least on the early stages, had a tendency to concentrate on the accounting-based measures and financial performance evaluation (Merchant & Otley, 2007). According to Nilsson, Olve and Parment (2011), management control is “about using the organization's resources economically” (p.16), thus, the essential role of financial accounting within controlling concept is evident. Consequently, accounting information provide managers with relevant data that reflect the actual situation of an organization, facilitating the assessment of its profitability (Nilsson & Stockenstrand, 2015).

Nilsson, Olve and Parment (2011) further specify that MC should also facilitate the spread of strategically important assets in the most appropriate way by shaping the behavior within the organization. Flamholdz (1996) define it as a “motivating performance toward organizational goals” (p. 596). Several researchers (Simons, 1995; Ouchi, 1979; Otley 1999) agree that the idea behind the MC goes beyond traditional accounting. The authors stress that MC should contain not only behavior controls but also strategic goal congruence conceptions. Otley (1994) explains the need for a broader approach in management controlling and the amendment of the traditional perspective proposed by Anthony, by the reform of contemporary business operations, which occurred in late 90s. Meanwhile, Johnson & Kaplan (1991) describe the change within business environment by a rapid development of information technology and increased competition. For this reason, the authors advocated the relevance of non-financial information, stressing the increased demand for advanced (later discussed as sophisticated) controlling techniques, which embrace different aspects of organizational change.

The work of Mintzberg (1979) proposed a new characteristic to MC: a mechanism to standardize the performance. The author suggests the standardization of work processes, outputs, skills and norms in order to achieve best practices (cited in Nilsson et al., 2011). Euske (1984) described management control as a "continuous, administrative, persuasive activity that has a relatively close time horizon and focuses on the entire organization" (p.22). The aspect that management control incorporates several actors is also covered in Anthony, Govindarajan, Hartmann, Kraus and Nilsson's (2014) later work, where MC is defined as a methodical process in which top managers influence the lower level managers to apply the organizational strategy in order to increase long-term performance (Anthony et al., 2014).

From the above-outlined, one may conclude that an effective MC is a continuous and adaptable process, which incorporates several organizational actors and seeks to standardize their behavior towards goal-oriented practices.

3.2. Management control systems

Flamholtz (1996) defines the Management Control System (MCS) as a set of instruments, which includes both processes and tools and has the main aim to increase the likelihood that people will act in the ways that lead to the achievement of organizational targets. Numerous researchers have investigated the use of several forms of controls, at the same time proposing various domains for MCS (Simons, 1987; Flamholtz, 1996; Abernethy & Chua, 1996, Langfield-Smith, 1997; Merchant & Otley, 2007; Merchant & Van der Stede, 2007; Nilsson et al., 2011; etc.).

The setting of organizational objectives and the link between the company's strategy and MCS is stressed by several scholars (e.g. Otley, 1980; Goold & Quinn, 1990; Langfield-Smith, 1997). The authors advocate that MCS plays a supportive role within the strategy development and implementation process. In contrast, some scholars (Mintzberg, 1987; Simons, 1995) highlight that it is unsafe for an organization if the main focus of its MCS is on the design and implementation of a particular strategy, since the "encouragement of learning, innovation, and adaptation" (p.785) should also be reflected within the company's controls (seen in Merchant & Otley, 2007). Merchant & Van der Stede (2007), completely separate MCS from strategy formulation process emphasizing the MCS potential to influence employee behavior. The authors stress the importance of MCS function to guide employees' performance of organizational tasks, maximizing their contribution and initiative. Meanwhile Flamholtz (1996) provides a deeper meaning to action controls and underlines that the primary concern of MCS is to administer inappropriate behavior of institutional actors by "creating a satisfactory degree of congruence between individual and organizational goals" (p.597). Given these points, Merchant and Otley (2007) draw a conclusion that MCS can embrace "almost everything managers do to acquire, deploy, and manage resources in pursuit of the organization's objectives" (p.785).

Nonetheless, all the scholars mentioned above agree that MCS contains a combination of various control techniques and tools, usually referred to as the organizational control mix (Abernthy & Chua, 1996; Nilsson et al., 2011). Several frameworks were proposed to classify multiple controls within the system in order to get a better understanding of the subject.

	Ouchi, 1979	Otley, 1999	Simons, 1995	Malmi and Brown, 2008
MC perceived as....	"...the mechanisms through which an organization can be managed so that it moves towards its objective" p.833	tool to "provide information that is intended to be useful to managers in performing their jobs and to assist organizations in developing and maintaining viable patterns of behavior" p.364	"...the formal, information based routines and procedures managers use to maintain or alter patterns in organizational activities."p.5	"all the devices and systems managers use to ensure that the behaviors and decisions of their employees are consistent with the organization's objectives and strategies, but exclude pure decision-support systems" p.290
Framework Purpose	opportunistic behavior management, performance monitoring and evaluation, goal congruence of organizational actors	to analyze control techniques that are used in an organization in search for a more comprehensive solution	the implementation and control of the company's business strategy	formally and informally direct employee behavior towards consistence with the organization's objectives and strategy
The structure	clan, bureaucratic and market mechanisms	five areas for assessment: objectives, strategies and plans, targets, rewards and feedback	four levers of control: interactive, diagnostic, belief and boundary systems	planning, cybernetics, rewards and compensation, administrative and cultural controls
MCS form	independent of each other, however if one mechanism fails, another should be applied	one tool analyzed from 5 perspectives	all four levers are connected to strategy, but not so much to each other	controls do not operate in isolation, act as a package

Table 2 - Different MCS frameworks

The MCS frameworks presented in Table 2 are the ones that are widely used in the MC literature and discussed by several authors and professors. As can be seen, the authors have a slightly different approach towards MC and its role within organizational settings. Simon's (1995) framework emphasizes the importance of the company's strategy and proposes that MC should direct its implementation, whereas Ouchi (1979) stresses the performance assessment and goal congruence mechanisms that can be Clan, Bureaucratic or Market oriented. On a similar note, Otley (1999) proposes a scheme to apply in order to evaluate and analyze particular MC techniques from five main perspectives in search for better practices. Moreover, Otley's (1999) framework can serve as a basis or analytical instrument for future research within the field of interest. Finally, Malmi and Brown (2008) originate a rather holistic, descriptive tool, which incorporates not only formal but also informal controls that are not isolated and thus operate as a package. Furthermore, the package is effectively visualized and thus, provides a framework for not only theoretical analysis and reasoning but also for potential practical implementation and examination.

Therefore, the Malmi and Brown (2008) package was chosen to examine the theoretical implications of control tools. Furthermore, Malmi and Brown (2008) MCS typology will be applied for analysis and discussion of empirical data.

3.2.1 Management Control System as a Package by Malmi and Brown

MC systems “operate as a 'package' when they are internally consistent -that is, they are designed to achieve similar ends” (Aberntehy & Chua, 1996, p.573). The control “package” presented by Malmi and Brown (2008) fits in this context and provides a conceptual framework for the assessment of different control tools and their ability to drive the performance of the company's employees towards similar outcomes. The typology was created in consistence with Malmi and Brown's (2008) definition of MC as “complete systems, rules, practices, values and other activities management put in place in order to direct employee behavior” (p.290). It should be highlighted that the goal of the MCS package by Malmi and Brown (2008) is to encompass all MC practices in order to mirror the whole control environment that exists in an organization (Grabner & Moers, 2013). Despite the fact that MCS as a package is not a new concept (CIMA, 2013), Malmi and Brown's typology relatively is. Therefore, as a rather new concept, this particular package was not used extensively in previous literature and prior research, which may limit the literature review. However, the Malmi and Brown (2008) package may be viewed as an appropriate tool to use as an analysis framework, since it provides a straightforward and clear understanding of how different controls in a company (e.g. cultural, cybernetic, administrative) should coordinate the employees' performance in order to achieve organizational purposes.

At this point it should be mentioned that an interview with Professor Malmi was conducted, which was a great advantage for this thesis since it provided the authors with a better understanding of the idea behind the MCS package and the

interconnection between ERP and MCS. The reason for this interview was a demand for an in-depth analysis and clarifications considering the research topic.

Coming back to MCS package, it is divided into five dimensions: planning, cybernetic, reward and compensation, administrative and cultural controls (see Figure 2). The structure of each package segment is outlined below:

Planning

In the Planning stage organization assigns strategic and operational goals towards which the behavior of employees will be directed. In addition, during the planning phase management sets the standards that should be met in relation to functional objectives, while the level of input expected from the members involved is also clarified. Notable is the difference between the simple future planning of organizational operations and the commitment building planning process which aims to promote goal congruence and workforce engagement to the organizational projects (Malmi & Brown, 2008). Malmi and Brown (2008) separate planning into two subsections depending on timeliness: action plans (short planning within 12 months) claimed to have a rather tactical nature, and long range planning (more than 12 months) which has a more strategic emphasis. In long range planning, the goals are decided to be accomplished within the medium or long run. Planning as control mechanism is considered important since it empowers congruence by disseminating goals throughout organization and increases the degree of personal commitment to organization's activities (Malmi & Brown, 2008).

Cybernetic controls

Cybernetic controls are defined as “a process in which a feedback loop is represented by using standards of performance, measuring system performance, comparing that performance to standards, feeding back information about unwanted variances in the systems, and modifying the system’s compartment” (Green & Welsh, 1988, p.289). Malmi and Brown (2008) propose several control systems that can be classified as cybernetics: budgets, financial performance measures, non-financial measures and hybrids.

Budget is a comprehensive technique and as one of the cybernetic controls has a close relation to planning stage, while serving as an instrument to control and evaluate the performance of organization in relation to settled goals (Malmi & Brown, 2008). As Prof. Malmi (2015) declared during the interview:

“Budgeting is a management control tool used for decision support as well as for control purposes”.

Despite the fact that new alternative techniques such as ‘only rolling forecast’ and ‘beyond budgeting’ have made their entrance in a small portion of large multinational

companies in countries like Sweden, budgets are still dominating (Arwidi & Jönsson, 2010). In addition, financial performance measures may be connected to the information enclosed in the organization's budgets and serve as a valuation tool for assigned financial targets. However, they have a rather simplified, narrow implication compared to budgeting and concentrate mainly on accountability assessment. Examples of financial performance measurement systems are ratios and economic value added (EVA). Moreover, non-financial measures such Total Quality Management (TQM) may assist modern companies in overcoming the limitations of financial measures by identifying the attributes that drive the organization's performance, taking into account, for example, quality of production. The final part of the cybernetic controls is the hybrid performance measures like Balanced Scorecard (BSC), which incorporate both financial and non-financial performance metrics (Malmi & Brown, 2008).

Rewards and compensation

Reward and compensation systems seek to influence the behavior of employees by increasing their motivation to devote themselves towards the achievement of organizational goals. The input of an individual or a group can be managed by incentives, for example, through offering monetary rewards when desired performance or particular results are accomplished (Malmi & Brown, 2008). Therefore, the reward and compensation part of the package is interrelated with "planning" and "cybernetic controls", while promoting goal congruence and encouraging personnel involvement in the organizational activities.

Administrative Controls

Administrative controls aim to direct the performance of individuals through organizational policies and governance established clarifying how certain tasks should be performed. The administrative controls are broken into three subcategories: organization structure, governance structure and policies and procedures (Malmi & Brown, 2008). The organization structure implies the modification of the current structure in order to encourage the relationship and coordination in the company, while authority and accountability is part of governance structure. Policies and procedures exemplify how employees should execute their responsibilities, and their behavior in relation to the organization.

Cultural controls

Cultural controls aim to impact the behavior of the organizational members through "values, beliefs and social norms" (Malmi & Brown, 2008, p.292). Thus, in the package built by Malmi and Brown (2008), cultural controls consist of values, symbols and clans. Behavioral control can be achieved in three ways: (a) the organization seeks and hires employees with similar values as the company's, (b) the organization hires employees which do not possess the desired values and tries to change them, (c) the organization explains to the employees how it wishes them to behave and what their values should

be. However, it should be highlighted that the organizational culture most of the times is beyond the manager's control (Malmi & Brown, 2008).

To conclude this section, such controls (i.e. administrative and cultural) are usually discussed as informal controls (Simons, 1987; Abernethy & Brownell, 1999; Malmi & Brown, 2008; Sandelin, 2008; Ferreira & Otley, 2009; etc.), since they influence the performance of individuals or groups informally and are less bureaucratic. As it is argued above, the interview conducted with Prof. Malmi made it definite that the ERP system does not facilitate controls like administrative and cultural, since they are overall concerned with the coordination of the employees' behavior. Yet, due to the nature of this research, further focus will be appointed to the investigation of rather formal controls while administrative and cultural MCs will be excluded from the empirical part of this paper.

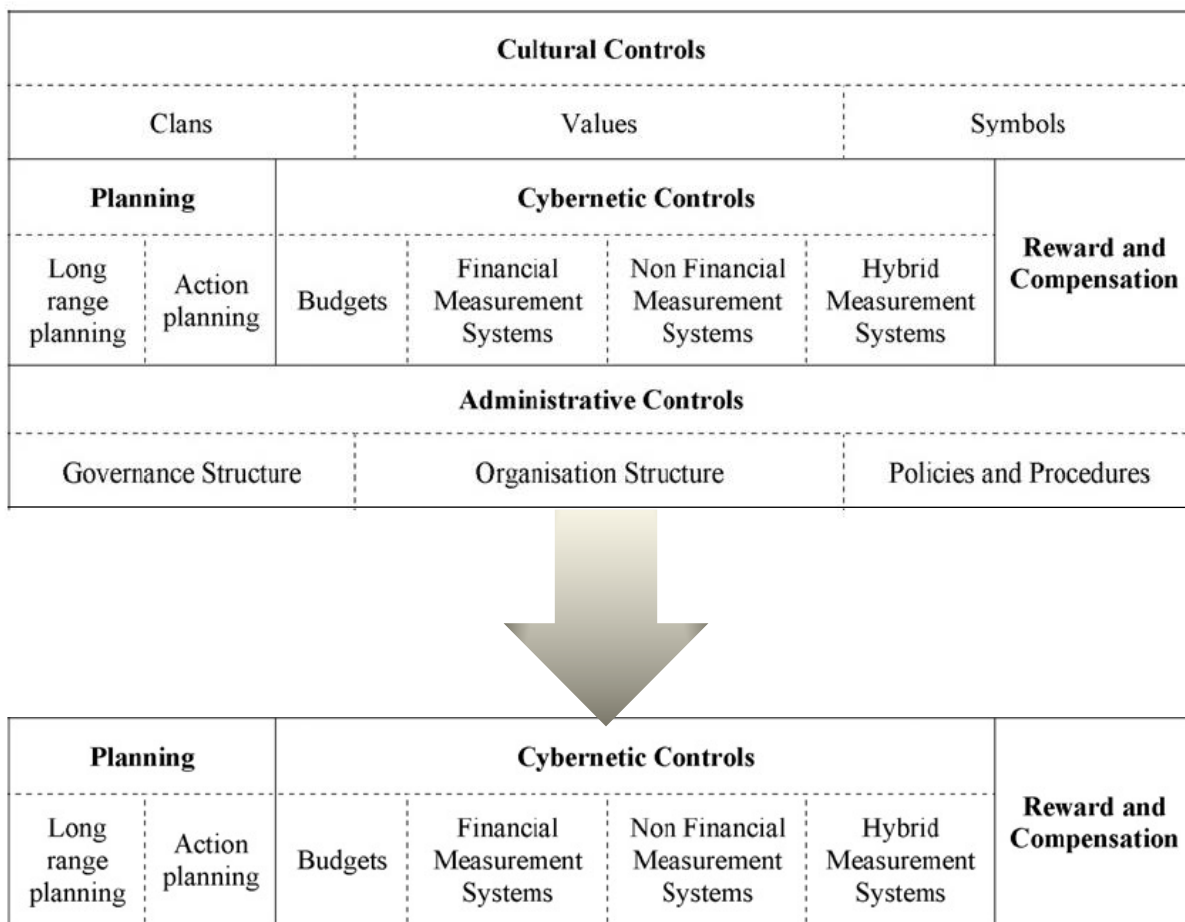


Figure 2 - Research framework

Based on the framework created by Malmi and Brown (2008, p.291)

3.3. Contingency theory

The choice of MC tools and techniques within MCS is influenced not only by the company's objectives and goals, but also by the means of situational contingencies of the operating environment (Euske, 1984). In a similar manner, Chennall (2003) stresses that "the identification of contextual variables potentially implicated in the design of effective MCS can be traced to the original structural contingency frameworks developed within organizational theory." Therefore, the author's statement highlights the interdependency between MCS and the variables that are presented in the contingency theory. The main idea underlying the contingency theory in relation to MCS is that the design and implementation of control mix is highly influenced by several external and internal factors of an organizational setting. However, it is important to remember that the appropriateness of different controls relies on the interactive effect of contingent variables in the organization structure and thus cannot be generalized (Fisher, 1998). Moreover, numerous authors (Waterhouse & Tessen, 1978; Otley, 1980; Fisher, 1995; Fisher, 1998) agree that there are several contingent factors affecting the selection of MC or the management accounting technique/tool/measure. Furthermore, it is suggested that particular features of MCS revolve around certain circumstances that can be situational-specific (Otley, 1980). Most dominant are: information technology, external environment, organizational structure, strategy and national culture (Chennall, 2003).

Hence, the contingency theory provides reasonable affirmation, confirming the existing interrelationship between IT and the concept of MC. Correspondingly, it becomes evident that the situational context of the company's IT environment, as a contingent variable, has a rather strong implication on management's decision-making considering the application of control technique/practices and their role within the company's activities. Therefore, an investigation of actual impacts of IT on MC, its constitution, implementation and controlling process itself in particular, evolves into a radically relevant subject to continue with. Further, the focus will lie on the investigation of the interdependence between MCS and management accounting with one relevant contingency variable - Information Technology.

3.4. Information Technology and Management Control

Since Information Technology is acknowledged as one of the contingent variables within management control implementation, it becomes worthy to investigate the current opinion of major scholars on this subject.

Chapman and Kihn (2009) believe that Information Systems (IS) can facilitate the analysis, collection, integration and reporting of data considering organizational results and employees' actual performance and by that enable effective management control. The authors also state that activities and actions of individuals within an organization

can be monitored, with data entered in one unit or department flow to the other throughout company's IS. It is also worth mentioning that the developments within the IT area expand the amplitude of managerial supervision and monitoring capability by facilitating the control of employees in different locations (Orlikowki, 1991). Thus, it becomes evident that IT enables efficient communication of the company's objectives (Chapman & Kihn, 2009) to its employees as well.

In a likewise manner, the findings of Schermann, Wiesche & Krcmar (2012) confirm that IS can serve as a sort of "catalyzer for establishing balanced management control systems that enable managers to simultaneously exploit and explore richer data on performance deviations and emergent chances and risks" (p.54). Further, scholars specify that MCS may serve two major aims: exploitative activities, which secure corporate performance through the standardization and refinement of routine tasks, and explorative activities, which encourage organizational integrity by the search for innovative solutions and risk-taking. Therefore, it is of primary importance for organizations to keep the right balance between exploit and explore control conditions thus, IT enables the MCS design that incorporates both functions (Schermann, Wiesche & Krcmar, 2012).

Correspondingly, Dechow and Mouritsen (2005) agree that due to the implementation of information technology inventions, "data become accurate, shareable, and available to different parties without creating the panoptic dream of visibility and action at a distance" (p.729), which can simultaneously contribute not only to effective resource management but also to the enactment of management control techniques. In addition, the enhanced reliability of data reduces the need for information checking activities of controllers, while simultaneously sustaining MC function (Maraghini, 2010). Moreover, Fisher (2007) stresses the importance of IT systems in the accounting-based terms of "financial consolidation, reporting, planning, budgeting, forecasting and analytics" (p.41), however, further stating that well-structured software also provides the capability to enhance internal governance as well as compliance with e.g. Sarbanes Oxley Act. Maraghini (2010) describes the related process endorsed by IT as "institutionalization of some of the rules, roles and routines [...] among which are the management control ones" (p.33).

Technology developments accelerate the "automation of the management, measurement, remediation, and reporting of controls and risks against objectives in accordance with rules, regulations, standards, policies, and business decisions" (p.3). Similarly, IT propagates the transparency in decision-making while enhancing business analytics (Caldwell, Scholtz & Hagerty, 2011). Finally, Granlund (2007) confirms that IT is an extremely important subject in accounting and further in management control, which may affect the use of Management Control Systems (MCS). He elaborates further that the issues regarding IT and its implementation, are currently major and popular projects in the business world. However, the research concerning the interface between IT and MC is not yet developed, neither theoretically nor empirically (Granlund &

Mouritsen, 2003). One reason for it is probably the fact that not all researchers are aware of the complex intertwining between the IT and MC (Dechow, Granlund & Mouritsen, 2007), however, Dechow and Mouritsen (2005) stated that control and technology should not be studied apart.

Based on the above-mentioned statements, Granlund (2011), recommended a broader analysis of technology and management controls based on the relation of IT and MCS packages (e.g. Malmi and Brown (2008) package).

3.4.1. Enterprise Resource Planning

Booth, Matolcsy and Wieber (2000) advocated the belief that Integrated Information Systems (IIS), and more specifically ERP systems, "are among the important topics arising at the interface of information systems and accounting" (p.5). IIS are real time systems, which integrate and share data, the main characteristics of which are usually associated with integration, flexibility, functionality and complexity. IIS contain "both transaction-oriented ERP systems and analysis-oriented SEM (Strategic Enterprise Management) systems" (Rom & Rohde, 2006, p.51), while their components support not only management accounting but also management control (Rom & Rohde, 2006). SEM systems were created to strategically support decision-making, but, since they fall out of the scope of this paper, they are not further investigated.

Indeed, the most popular form of IIS is the ERP systems (Booth, Matolcsy & Wieder, 2000), which were designed to overcome discrepancies created by the use of various systems through integration (Romney & Steinbart, 2012). They are complex software packages meant to integrate "all the information flowing through a company -financial and accounting information, human resource information, supply chain information, customer information" (Davenport, 1998, p.121) which impact the whole organization (Grabski, Leech & Sangster, 2009). ERP systems are used by a variety of big and middle-sized organizations in order to "coordinate and manage their data" (Romney & Steinbart, 2012, p.56) as well as to easily distribute up-to-date information throughout the organization (Romney & Steinbart, 2012).

Furthermore, the structure of ERP system contains several modules, which may differ in each organization in accordance to its needs. The most common modules presented in the book by Romney and Steinbart (2012) are the financial, human resources and payroll, order to cash, purchase to pay, manufacturing, project management, customer relationship management and system tools. Every organization can add the modules that are appropriate for their operations or delete those that are futile (Romney & Steinbart, 2012). Moreover, the ERP system integrates all the relevant data into one particular database, as a result, information of different nature gathered from customers or suppliers becomes accessible to the managers and employees of the company, as presented in Figure 3. Therefore, it becomes evident how ERP is designed to overcome

the major problems of certain enterprises, in which important data are kept in standalone systems. As was noted by Davenport (1998), the usage of various standalone systems seems to be rather expensive, while inefficient communication between independent software may result in situations where managers are forced to make decisions without relevant information-based support.

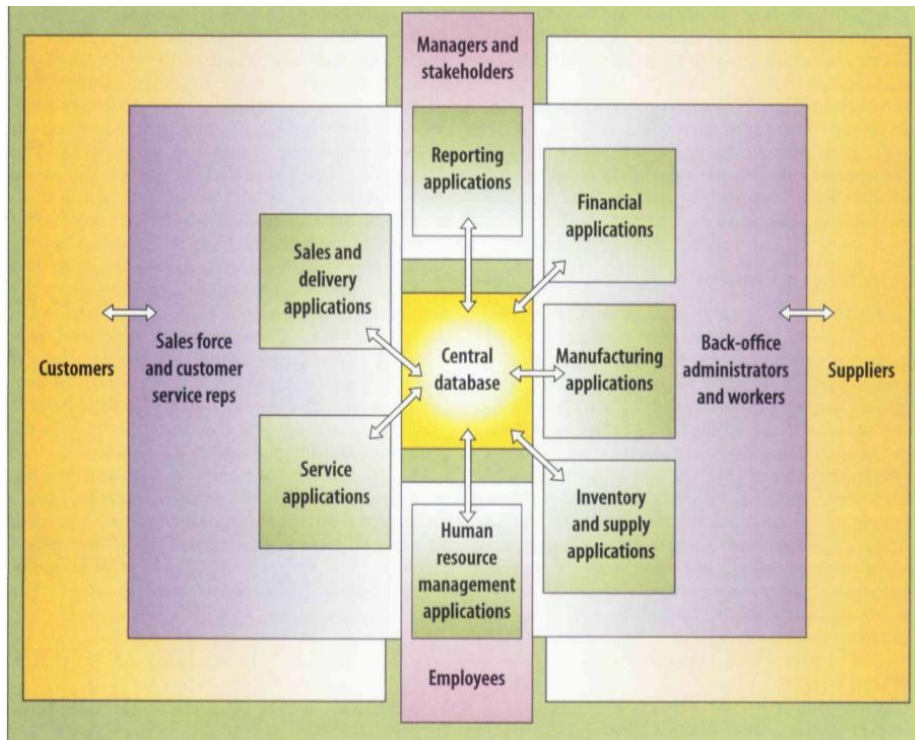


Figure 3 - Anatomy of ERP System

Seen in Davenport (1998, p.124)

It should be highlighted that ERPs may deliver major rewards to the organizations and at the same time bear equally important risks (Davenport, 1998). Major examples that can be identified are the improvement in access control and customer service as well as more standardized reports and procedures for the former and excess cost, time, resistance and complexity for the latter. The involvement of top management (e.g. in the customization process) is key ingredient for increasing the advantages gained by ERP usage and mitigating the risks. Internal controls as well as constant investigation regarding accuracy and validity of data (at the time that is inputted in the system) are of extreme importance, thus segregation of duties should be applied in every organization (Romney & Steinbart, 2012).

Since the 'ERP revolution' is a topic that has attracted the attention of many researchers throughout the years (Spathis & Ananiadis, 2005), studies, mainly empirical, have been conducted with regards to the impact of ERP on MC. Nevertheless, those studies (following below) are to be seen as introductory to the long discussion regarding ERP systems. Consequently, a need for a future conceptual analysis and empirical research underlies (Granlund, 2007, 2011). Driven by that need, in the following section the concentration will be mainly on the effects of ERPs on management accounting and control techniques (sophisticated and traditional). When discussing sophisticated accounting and control techniques, authors bring examples such as the ABC method, the BSC and TC, while for traditional, examples of ratios, planning and budgets are given (Booth, Matolcsy & Wieder, 2000; Granlund & Malmi, 2002; Scapens & Jazayeri, 2003; Spathis & Constantinides, 2004; Spraakman, 2005; Rom & Rohde, 2006; Granlund, 2007).

3.5. Prior Research on the Impact of Enterprise Resource Planning Systems on Management Accounting and Control Techniques/Practices

Many surveys have been conducted regarding the impact of ERP systems on the strategic or traditional aspect of management accounting and control as well as the impact on the role of management accountant/controller. However, at this point it should be mentioned that the focus will be only on the strategic aspect of management accounting and control and more specifically on whether - and how - ERP enables the use of more sophisticated and traditional control techniques/practices. In general, the findings appear to show a moderate impact on the strategic aspect of management accounting and control (Vakalfotis, Ballantine & Wall, 2011). At this point it should be highlighted that a specific distinction between sophisticated and traditional controls is not available. However, Prof. Malmi (2015) explained that sophisticated controls are the ones that operate by the causality principle, further providing an example regarding the use of causality principle in cost accounting:

“[...] in the sophisticated techniques you are using the causality principle as far as you can. That means allocate costs, which are caused by a cost object (cost object can be product, customer etc.). The company needs to define different types of cost objects and allocate their costs based on this causality principle”.

Prof. Malmi also clarified that in more general terms; sophisticated techniques could be the ones that address potential deficiencies of current practices targeting an improvement. Sophisticated techniques that were referred to include ABC, TC, BSC and beyond budgeting.

Booth, Matolcsy and Wieder (2000) studied the impact of ERP systems on the control practices adoption. By conducting a survey with the CFOs of 74 top Australian companies, the authors tried to identify the impacts that ERP has on management control practices. Their findings suggested that despite the fact that ERP systems provide "greater level of information integration, flexibility in information access and greater functionality" (Booth, Matolcsy & Wieder, 2000, p.12), adopting an integrated ERP system is not positively related to the adoption of new and innovative accounting and control techniques. Accounting and control practices that Booth, Matolcsy and Wieder (2000) mention include both sophisticated and traditional ones, such as long range planning, customer satisfaction surveys, shareholder value analysis, BSC, financial key performance indicators, non-financial key performance indicators, etc.

Further, Granlund and Malmi 's (2002) studied ten Finnish companies that had already adopted integrated ERP system. Same as previous, the authors tried to identify the effects that ERP systems have on management accounting and control. One of the authors' research questions was how the ERP affects the budgetary process and the performance measurement. A further research question that authors imposed in their paper was concerning the more innovative and sophisticated practices, and if those are automated through ERP software or are in a stand-alone system. The findings were in line with Booth, Matolcsy and Wieder (2000) and thus, the authors came to the conclusion that ERPs do not have a major impact on the management accounting and control. Specifically targeted to their case, the findings show that sophisticated techniques (such as ABC and BSC) as well as some traditional (such as budgeting) are not operated through the ERP but rather through separate systems that add on to the ERPs (examples can be either the SEM or another stand-alone software or spreadsheets). In the interviews, the companies stated that they had used sophisticated techniques (more specifically ABC) before the adoption of ERP. However, after the ERP adoption, companies kept ABC as a stand-alone system for complexity reasons. Only two of the companies admitted that they intended to build their ABC into their ERP system, despite the time and money that it requires. Thus, from the answers of the interviewees it became clear that the major reason for not including sophisticated techniques in the ERP system is the complexity and the cost of the process. Same applies to BSC according to Granlund and Malmi (2002). Moving on to more traditional practices and more specifically budgeting, the authors suggested again that minor changes took place after the adoption of ERP. It should be highlighted that an integrated ERP is different from a stand-alone system and, as it is mentioned above, highly complex. Thus, users need some time before they can derive all its hidden benefits (Booth, Matolcsy & Wieder, 2000).

In addition, in later years, Granlund (2007) reached to add value to Granlund and Malmi's (2002) argument by explaining the main reason behind ERPs not able to utilize sophisticated techniques. The reason appeared to be the complex nature of ERP systems, and his findings were based on a comprehensive literature review and on the interviews conducted with the specialists in the study field. Moreover, in an interview, a controller explained the immense difficulties and complexities that the industry faced

when they tried to implement in the ERP system, the ABC technique. Quattrone and Hopper's case study (2005) on two multinational companies is in line with the abovementioned studies of Granlund (2007) and Granlund & Malmi (2002), and suggests that integrated ERP is an extremely complex system in which controls are rather difficult to integrate.

In 2003, Scapens and Jazayeri based their study on a US manufacturer and found similar results. More specifically, their study revealed that the ERP system adoption is not a major influence for the company's techniques, since they stayed more or less the same mainly due to high resistance to change. However, the ERP system proved to be a tool that facilitates change when it comes to forecasting and budgeting by generating more "forward looking information" (Scapens & Jazayeri, 2003, p.228). Yet, the authors explain that it should not be taken as a fact that the ERP software (in their case SAP) is the change driver of the forward-looking orientation of forecasts and budgets. Furthermore, the authors report that SAP does not change or facilitate new innovative and sophisticated techniques in the particular company. Again, the final conclusion of Scapens and Jazayeri (2003) is in line with the previous authors' findings since they all suggest that ERP is not a driving change factor, which puts pressure on the company to adopt new, sophisticated techniques.

Nevertheless, in 2004, two different surveys resulted in the results opposite to those of Boott, Matolcsy and Wieder (2000), Granlund and Malmi (2002) and Scapens and Jazayeri (2003). First, Doran and Walsh (2004) examined 70 survey responses from Irish companies and argued that the adoption of ERP is positively related to the adoption of sophisticated and traditional techniques. Yet, another survey made by Spathis and Constantinides (2004) revealed similar results by using random sample of 26 companies located in Greece. The authors identified a notable change in the accounting and control practices and techniques (both in traditional and sophisticated) that the companies used before and after the implementation of ERP systems. Examples that the authors mention in the traditional practices are the introduction of financial ratio analysis and budgeting. Further, they identified a small amount of companies, which also adopted the use of new sophisticated techniques, like the ABC and Target Costing (TC) after the implementation of ERP system. However, Spathis and Constantinides (2004) endure major criticism by the authors Rom and Rohde (2007) due to the low response rate as well as their sample choice and the incompleteness of the list of modules that they are presenting.

Moreover, in 2005, Spraakman conducted a survey on 31 large companies located in Canada. The author focused on the identification of the ERP effect on capital budgeting and other traditional practices. In his findings, it is evident that ERP helps users to acquire more detailed and accurate data from the ERP software; however, the author argues that the ERP's impact on capital budgeting is preliminary. Furthermore, he suggests that traditional practices were used before the adoption of ERP and they are still used after the ERP implementation. Despite this fact, the post-implementation

practices/controls are more "efficient and effective" (Spraakman, 2005, p.25). In general, the author argues that the ERP system may not drive the adoption of new traditional practices but rather improves the existing ones. It is noticeable that the author does not mention sophisticated techniques, thus, it is assumed that it is either out of the scope of his paper or there are no changes applicable after the ERP implementation. Finally, the author expresses his concerns regarding his survey sample since the respondents were only controllers and senior managers, and change in techniques may exist on the lower levels.

In 2006, Rom and Rohde sent 3000 questionnaires to Danish companies, out of which 401 answered. Their major findings were: first, the ERP systems in organizational context are used mainly for data collection; thus, they do not have a major effect on the MC techniques/practices. Second, that SEM systems are supporting the use of non-financial measures (the authors are bringing as an example of non-financial measure, the BSC) at larger extent than ERP systems. One year later, Rom and Rohde's (2007) literature review proved once more that "ERP systems are not the driver of change" (p.50) regarding strategic based changes (such as sophisticated techniques). Nevertheless, ERP systems may facilitate those changes (Rom & Rohde, 2007).

Based on the previous research that is presented above, the conclusion is mainly that ERP is not a driver that brings change to sophisticated and traditional management techniques (or more generally: to controls). On the other hand, the two studies conducted in 2004, proved the opposite and argued that ERP actually encourage implementation of sophisticated and traditional techniques/practices that an organization applies. In general, some authors argue that ERP can be seen as a facilitator of the existing practices rather than a driver of changes in management accounting controls. Meanwhile, several studies claim that ERPs are neither a facilitator nor a driver of practical changes. One may conclude that many contradictions exist in prior literature, and for that reason generalizations are not safe to be made (Granlund, 2007, 2011).

4. EMPIRICAL DATA

This chapter focuses on introducing the case company by providing a concise history of its operations and major accomplishments. The Organizational Chart is illustrated with a further focus on the financial department where the main relevant controls are applied. In addition, the ERP system that is currently used by the company is presented alongside with the control techniques that it integrates or supports, which are examined via the framework of Malmi and Brown (2008).

4.1. Presentation of the Company - Alco Hellas SA

In 1989, Mr. Theodoros Tzorzi established a sole proprietorship which in 1990 was converted to 'ALCO HELLAS ALUMINIUM INDUSTRIAL & TRADING CO. S.A.' with the trade name 'ALCO HELLAS S.A.' (further presented as 'Alco'). The headquarter of the company is situated at the Aspropyrgos, municipality located in Attica, Greece. Alco's acquisition of subsidiaries throughout the years has made the company a large Group, which operates in Greece, Germany and Romania (the detailed structure of the parent company will be discussed further below). Alco Group makes "state-of-the-art aluminum systems of high quality and aesthetic appeal covering the whole range of building applications. The Group's structure includes large aluminum profile manufacturing industries and commercial companies both in Greece and abroad" (Alco, 2015a) while the main sources of finance are: shareholder investments and bank loans (CFO, 2015).

The purpose of the company is "to process and trade aluminum, iron and related metals" (Annual Report, 2012, p.38). Furthermore, in the company's purpose the examination of Greek and international markets is also important in order to better promote its products. In addition, the company aims to "exercise commercial and industrial activity in the sector of electric energy in Greece and abroad [...] and also to distribute, transport and sell electricity from renewable source of energy (RES)" (Annual Report, 2012, p.38).

Further, the vision of Alco is to "design, produce and offer branded, innovative, integrated aluminum profile systems for all areas of modern construction and implementation" (Alco, 2015b). The mission of Alco is "the continuous expansion of the global market and marketing extruded aluminum products, its contribution to the development of the national economies of the countries in which we have production plants and the protection of the environment by making appropriate investments" (Alco, 2015c).

4.1.1. History

From 1990 until 1993, the company's policy was dictating that sales should be mainly in the foreign markets. However, in 1993, the company decided to shift its attention to the Greek market and more specifically to Attica. In 1994, due to the creation of a new production unit, the company managed to expand its sales around Greece. In 1995, the company established a new company 'THRACE ALUMINIUM S.A.' (presented as 'Thrace'). At that time Alco possessed 30% of Thrace. The company was created in order to produce aluminum profiles and export them mainly to foreign markets so that it would not operate as a competitor for Alco. In 1997, the company became listed at the Athens Stock Exchange. After that, in 1998, Alco bought the 51% of the shares of 'GROUPAL GROUP ALUMINIUM HELLAS S.A.' ('Groupal'). Furthermore, in 2001, 'ALCO ROM Ltd' (presented as 'Alco Rom') was established in Romania in order for the company to become known to the Romanian market also. One year later, Alco created strategic alliances with other Greek Groups and later that year purchased 51% of the German aluminum profile producer company HERMANN GUTMANN WERKE GMBH ('Gutmann'). Gutmann purchased another German Company, 'GARTNER EXTRUSION GMBH' ('Gartner') at the end of 2003 thus Gartner became an indirect subsidiary to Alco. In 2004, the company's offices built in the Municipality of Aspropyrgos where Alco and Groupal's employees were working. Additionally, in the same year the International Financial Reporting Standards (IFRS) issued by International Accounting Standards Committee (IASC) and its successor International Accounting Standards Board (IASB) were adopted by Alco at the first time. In 2005, Gutmann also purchased 'GUTMANN ALUMINIUM DRAHT GMBH' and 'GUTMANN IMMOBILIEN GBR' which again became indirect subsidiaries to Alco. In 2007, the Gutmann and Thrace subsidiaries established a new company located in Hamburg, called 'NordAlu GmbH' ('Nordalu'). Gutmann possessed the 55% of Nordalu's shares and Thrace 45%. Once again Alco gained another indirect subsidiary. At the end of 2007, Gutmann established the subsidiary 'Gutmann USA inc' ('Gutmann USA') for trading in United States. In 2008, when the crisis burst out, the company started to face major difficulties and consequently in 2010, Groupal stopped its operations due to the years of major losses to the Alco Group. Some time before the stop of operations, Groupal established 'GROUPAL ENERGY Ltd' ('Groupal Energy') in which the 85% of the shares were possessed by Groupal and likewise, Thrace established the 'ALTHRA ENERGY Ltd' ('Althra Energy') in which again 85% of the total shares possessed by Thrace. Those two companies (Groupal Energy and Althra Energy) were established in order to produce photovoltaic systems for Alco. Further, in 2011, Gutmann withdrew the Gutmann USA subsidiary and thus Gutmann USA was not part of the Alco Group since April 2011. Moreover, in 2012, Alco established 'ALCO DEUTSCHLAND AG.' ('Alco D.') as an indirect subsidiary, located in Grunwald, Germany. In 2013, Alco sold the 55% of the total shares of Alco D. to the 'GSI German Service International GmbH'. In addition, in 2013, Alco purchased 99% of the total shares of 'ALKITAS ENERGIAKI-E.ZUBULIDU L.P.' located in Attica (Alco, 2015d). Finally, the CFO of Alco informed that due to the crisis and the high losses, in 2014, Groupal, Groupal Energy, Thrace and Althra Energy were sold.

4.1.2. Structure of the Company

CFO explained that the company is currently struggling due to the global financial crisis. Despite that, the company still possesses a number of direct and indirect subsidiaries, which are shown in the following tables. The first table presents the direct subsidiaries of Alco while the second presents the indirect ones.

Direct subsidiaries:

Company Name	Country	Percentage of Total Shares (%)
ALCO ROM TRADE S.R.L.	Romania	90.00%
ALKITAS ENERGIAKI-E.ZUBULIDU L.P.	Greece	99.00%
ALCO DEUTSCHLAND AG	Germany	32.14%

Indirect subsidiaries:

Company Name	Country	Percentage of Total Shares (%)
GUTMANNAG	Germany	51.00%
GARTNER EXTRUSION GMBH	Germany	100.00%
GUTMANN ALUMINIUM DRAHT GMBH	Germany	49.00%
GUTMANNIMMOBILIENGBR	Germany	94.00%
NORDALUGMBH	Germany	55.00%

Table 3 - Direct and Indirect Subsidiaries of Alco Hellas S.A.

Based on the information available in Alco's Annual Report (2014)

4.1.3. Products

Alco has a variety of products. Despite the fact that in the company's Annual Report (2012) it is stated that the products are not categorized into specific groups, the CFO confirmed that the products are grouped into two general categories: aluminum products and photovoltaic systems. The 'aluminum products' category is comprised by sliding systems, opening systems, thermal insulating systems, glass facade systems, rolling shutter, blinds, office partitions, insect screen systems, folding systems and aluminum composite panels (Alco, 2015e). When it comes to the 'photovoltaic systems' category, the CFO clarified that Alco constructs the aluminum base that the photovoltaic panels are placed on. In addition, the company uses some of those panels as a source of energy to generate and sell electricity.

The products of the company are subject to ISO accreditations and more specifically ISO 9001:2008 and ISO 14001:2004. Particularly regarding ISO 9001, the standard "sets out the requirements of a quality management system" (ISO, 2008). Additionally, ISO 9001 indicates a strong customer focus since the standard aims to ensure the high quality of company's products. Whereas, ISO 14001 exemplifies the environment management system requirements to which the company should be introduced to (ISO, 2004). Information regarding each product falls out of the paper's reach and thus no further details are provided.

4.1.4. Internal Company Structure

Through the discussion with the company's CFO, the general structure of the company was revealed. As the CFO (2015) explained:

"the Board of Directors is the one that takes all the decisions in our company, below them we have a legal service that assist us when necessary, our internal auditor and the department that is dealing with the Stock Exchange -providing announcement to the shareholders and to the Stock Exchange itself. Finally, we have our general manager who is responsible for the sales, financial, administrative, R&D and factory department. In each of those departments a manager is in charge".

Further on, the focus will be on the financial department, which consists of the CFO, the controller and the assistants. The figure that follows summarizes Alco's internal structure.

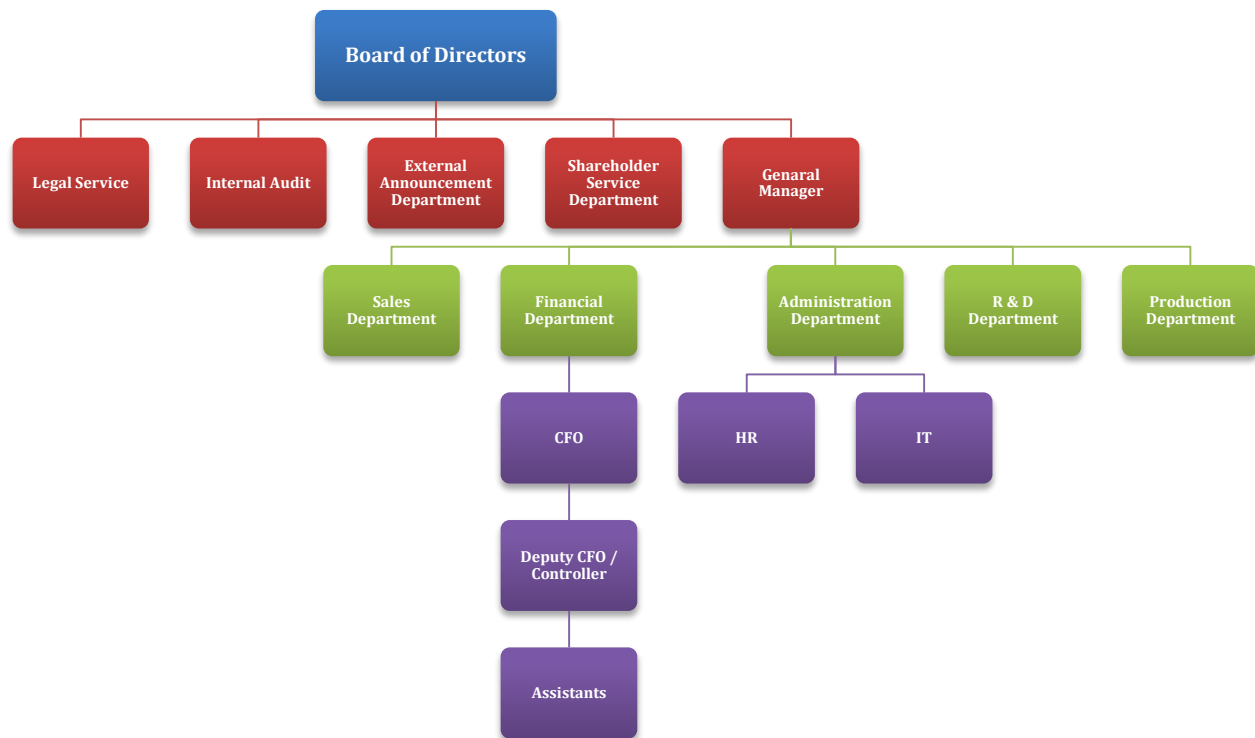


Figure 4 - Organizational Chart

Based on the information gathered by interviews

4.1.5. Financial Department - Segregation of duties

The financial department, as illustrated in the abovementioned organizational chart, consists of the CFO who is placed on top of the department, below him one can identify the controller and further below the financial assistants. The employees of the department cooperate closely with each other, while the CFO and the controller also interact on a daily basis.

The assistants are the foundation of the department and their primary duties are limited to the management of accounting data (input and reconciliation to ERP system) such as accounts receivable/payable, cash collections/payments and tax payments.

The duties of the controller mainly comprise accounting tasks of varied nature. However, the controller specified that one of her responsibilities also involves the supervision and training of the financial department's assistants, as well as the correction of possible errors in the accounting data. In case the assistants' errors are immense, the controller draws attention of the employees by repeating the appropriate procedure (Controller, 2015).

“[...] if they (assistants) still perform the same errors it would probably mean that they are not qualified for this job” (Controller, 2015)

Furthermore, the controller's field of expertise encompasses support and advisory (to other departments) on the main issues regarding the daily usage of the ERP system and the improvement of the employees' understanding regarding the organization's financial processes.

The CFO believes that his role is even more influential when it comes to different parts of the organization, since he provides advice to the other departments, such as the sales and the HR departments. The responsibilities of CFO include interaction with every division since he should be aware of the departments' current position while the other managers should be informed of the company's financial situation. Additionally, the CFO duties include consultation to the Board of Directors (i.e. interests, risks), cooperation with banks and Stock Exchange, participation in the preparation of consolidated financial statements as well as budgeting and planning process. Therefore, CFO's responsibility is not only related to managing financial metrics but also involves strategic decision-making and advisory concerning the whole organization.

Finally, the center of attention is shifted to the main feature of both the controller's and the CFO's duties:

“[...] customization, support and development of the ERP when it is necessary” (Controller, 2015).

Currently, Alco uses an integrated ERP system called Atlantis II, by Altec Software Consulting Services ('Altec Software S.A.').

4.2. ERP System

Atlantis II ERP is reliable, integrated software, acknowledged among Southeastern Europe, consisting of sufficient amount modules, which can be fully customized according to the special needs of each company. Companies may choose the modules that are relevant for their operations and delete the ones that are not (Altec Software, n.d.).

Alco has been using the Atlantis II software for more than ten years. The CFO expressed that up until today, they have been satisfied by the software and its potentials. The controller agreed with the CFO, however, pointed out that the ERPs

should be improved constantly otherwise they become outdated. Alco's CFO together with the controller customized their ERP in order to fit the company's, as well as their own, needs. Currently the modules of Alco's ERP are:

"Inventory, sales and distribution, purchases, accounting, finance, production, payroll and HRM, tools. The company uses all of them in the best possible way, however, there is always room for improvement" (Controller, 2015).

Alco's modules are presented in the figure below. The Atlantis system is demonstrated as a puzzle since the authors of this thesis view ERP as a package that integrates and connects the 'puzzle pieces'-modules of the company into one leading database.



Figure 5 - Alco's customized Atlantis ERP system

Based on the information gathered by interviews

Atlantis is used by the financial, production, administrative, sales and R&D departments (each of the departments has the relevant engagement), with the controller and the CFO being addressed as the 'experts' or 'supervisors' of the ERP, since they have managed to excel on it over the years. It should be highlighted that the assistants do not have access to the 'tool' module since it is used for customization of ERP and its processes, by the CFO and controller only.

In addition, the controller of Alco, as one of the ERP supervisors, explained that the software is highly customized. The customization process has become easier since Atlantis is user-friendly software that enables the company's users to handle a wide range of different capabilities such as selectors, forms and menus (Altec Software, n.d.). Both CFO and controller are constantly trying to generate ideas regarding the better use

of their ERP in order to support more efficiently and effectively their daily activities. One of the most important customizations made by the controller, the CFO and an IT expert, immediately after the adoption of the ERP, was the engagement of the ABC and TC method into the system.

“When we began to customize our ERP one of my top priorities was cost accounting”
(Controller, 2015).

However, ABC and TC are not the only controls used by the company, hence the other MC identified in the company's processes will be deliberated in the following section.

4.3. Controls

As it is stated in chapter 2, the second part of the interview was meant to discuss MC and in particular the controls identified in the Malmi and Brown (2008) package in connection to the company's ERP. At this point it is important to mention the different point of views that the CFO and the controller retain with regards to the concept of MC. The CFO expressed his notion of MC as an overwhelming process, which contains strategy creation and implementation, whereas the goal congruence of organizational actors is also given a high priority. While the controller perceived MC as a tool to realize the organizational strategy, further stressing the importance of the accounting-based measures and performance evaluation techniques as crucial parts of the mechanism.

Afterwards, the interview questions were directed towards the planning, cybernetic and reward controls that the company uses as well as whether and how the ERP system is involved in the process. It should be noted that the interviewees were further asked if the ERP implementation led to the adoption of different MC techniques/practices. Both reported that the currently used controls were operated on prior to and after the adoption of the Atlantis system except for the BSC, which will be explained further below.

4.3.1. Planning

The CFO (2015) clarified that the company uses both long-range and action (i.e. short range) planning. The strategic objectives that company is seeking to accomplish in the long run (at the time of the interview) were:

“The improvement and expansion of machineries and buildings, the creation of new innovative products and new market opportunities like acquiring subsidiaries, creating strategic alliances and new retail stores if it is possible”.

Action planning mainly regards the increase of sales and the decrease of unit and manufacturing costs.

To be more specific, CFO stressed that the 'improvement of machineries and expansion of buildings' objective is characterized as a long-range plan. Regarding machineries, for example, the company first identifies the working capacity of the machinery. If it is working in full, then new machinery should be acquired, if not, capacity should be increased.

“ERP is providing us with essential and detailed data regarding acquisition cost, product capacity as well as depreciation of machinery. That makes it really important for our planning process” (CFO, 2015).

Moving on to the next long range plan ('creation of new innovative products and improvement of the existing ones'), the CFO explained that their ERP systems provide them with information regarding the current list of products as well as their leverages and problems. Furthermore, ERP gathers all customer satisfaction reports regarding problematic products, which is a crucial procedure for potential product changes. Simultaneously, the examination of customers' current demands as well as market competition is carried out by the sales department. All those actions made in order to plan the new product selection and the improvements of the existing products.

“As soon as this process takes place, the Board of Directors has all the necessary information to choose the products that will be launched” (CFO, 2015).

Regarding the 'new market opportunities' objective, the company constantly evaluates the geographical sales distribution via the analysis of data extracted from ERP system. The results of the analysis reveal the markets where the company has the potential to expand or export its products and therefore, increase sales. Moreover, the visualized data regarding the new market expansion are taken to the Board of Directors where strategic decisions are made (CFO, 2015).

Further the 'sales increase' short range plan will be discussed, where the company is continuously searching new ways to increase its sales either by targeting its current customers or finding the new ones. Once again, ERP system is used as a tool for the identification of the existing customers and current sales to them (i.e. the products that customers currently use and what other products they could potentially use). Likewise, the 'decrease of unit and manufacturing cost' objective belongs to short term planning and regards the reduction of direct labor cost, material cost and manufacturing overhead. The CFO confirmed that:

“[...] the ERP is used to input data, process them, control and improve the result either in the short or long term”

4.3.2. Cybernetic

Budgets

Moving on to cybernetic controls and more specifically to budgeting, the CFO confirmed that, on a yearly basis, each department designs budgets which are forwarded through the ERP personally to him. Regarding the budgeting process, CFO replied that ERP is used as a basis; however, Excel is considered a tool that provides support to the process.

“Yes, we use budgets in every department. ERP is the basis to create those budgets since it provides us with previous sales and other relevant information. Then all budgets are forwarded to me (CFO) in order to create budgeted income statement. I also forecast the cost of materials and the manufacturing cost. Before the ERP adoption, budgets were made in spreadsheets. But excel is still used as a tool that helps us to create our budgets” (CFO, 2015)

Financial Measures

The controller verified that the ERP system automatically provides some ratios (like Return on Investment and Price over Earnings), which are required by the Stock Exchange and their auditors. Furthermore, technical product requirements are calculated (e.g. thermal performance) which are not included in the duties neither of the CFO nor to the controller's, due to the rather industrial nature of such measures. Finally, ABC and TC control techniques are used and are, as mentioned above, automated in the ERP system, thus their usage does not require any supplementary assistance from other software or tools such as Excel.

Non-Financial Measures

Regarding non-financial measures, the CFO clarified that the company uses Total Quality Management in order to obtain recognized quality products, which can be marketed in more than one country. As mentioned above, the company is subject to the ISO 9001 and ISO 14001 accreditations (imposed by IFRS standards) and therefore the quality of the products is one of the company's priorities. A special subdivision in the factory department is responsible for the inspection of batches in order to ensure that the products are compliant and ready for distribution. Moreover, special service firms check the company once a year in order to confirm that the quality of the products is the one required. ERP provides the service firms with the information needed in order to successfully perform their task. Moreover, the information that the ERP system provides is important not only for the service firms but also for the managers who are now able to modify and improve the products (CFO, 2015).

In addition to the TQM, the company uses customer satisfaction reports, which as mentioned above, also assist in the planning process. The customers fill an online form on the Alco's webpage where they state their problems and complaints regarding the products. Afterwards the online forms are automatically transferred to the ERP system where the exact problem, the number of the product and batch, the customer number as well as the distribution date become available to sales department. Subsequently, an employee communicates with the customer regarding the problematic product and arranges for its substitution. Later on, the sales department notifies the manufacturing department so that the whole batch is inspected for further evaluation of problematic products. However, the CFO made it clear that there are maximum ten suchlike reports produced within a year. Such a process, where customer satisfaction is an input to further corrective actions, increases the management awareness of the products that need to be improved or even substituted (CFO, 2015).

Hybrid Measures

The company uses a modified form of BSC, which incorporates two perspectives: the customers' and the internal process perspective. Measures and targets are developed on a higher level by general manager (CFO, 2015). The BSC is a newly adopted practice for Alco. CFO stressed that the adoption of BSC had nothing to do with the ERP implementation and that the BSC is processed in a different, stand-alone system. Yet, he did not communicate any additional details.

4.3.3. Rewards and Compensation

According to the Controller, Alco uses Key Performance Indicators (KPIs) in the production, sales and financial departments, which are assigned by the manager of the particular department. ERP is crucial for monitoring, evaluating and calculating the bonuses that each department earns.

In the financial department, the controller, rather than the CFO, is in charge of performance evaluation and rewarding system of the employees. Since the main duty of the controller's assistants is to produce accurate accounting data in a timely manner, meeting deadlines is essential and therefore reflected in the department's KPIs. Rewards that the assistants receive are mainly distributed in a form of a small yearly bonus if the requirement of the KPI is achieved and daily activities are managed in an efficient, effective manner (Controller, 2015).

In the production department rewards are also connected to KPIs. Considering that in this department the measurement of production is an easier process than in the financial, the employees may receive a bonus on special occasions. The main KPI can be illustrated briefly by explaining the volume of aluminum production required daily by

a group of employees (consisting of 6 members). The employees are obliged to produce a minimum of 5 tons of aluminum daily (i.e. in eight hours), however if they manage to produce 8 tons or more a small bonus is marked in the system. Something similar is also true for the aluminum painting (3 tons are the daily minimum). However, the controller stressed that quality is extremely important and cannot be sacrificed.

“[...] quality over quantity” (Controller, 2015)

On a yearly basis, a calculation of the total bonus to be received by each employee is generated via the ERP system (Controller, 2015).

Moving on, the most relevant KPIs in the sales department are related to acquisition of new customers and meeting the budgets. Individual bonus distribution depends on the number of new customers the salesperson has managed to attract, while the meeting of the yearly budget seems to be the whole department's goal. Information on whether performance targets achieved is gathered through the ERP system.

It is interesting to mention that all the above-identifiable controls can be discovered under several modules in the Atlantis system. Thus, below the modules are presented, where the discussed controls can be identified. It should be noted that the Planning and Budgeting controls are only supported by the ERP system and thus cannot be identified in one module. The information taken in order to complete the planning and budgeting processes can be found in several modules and thus, they are not illustrated in the following figure.

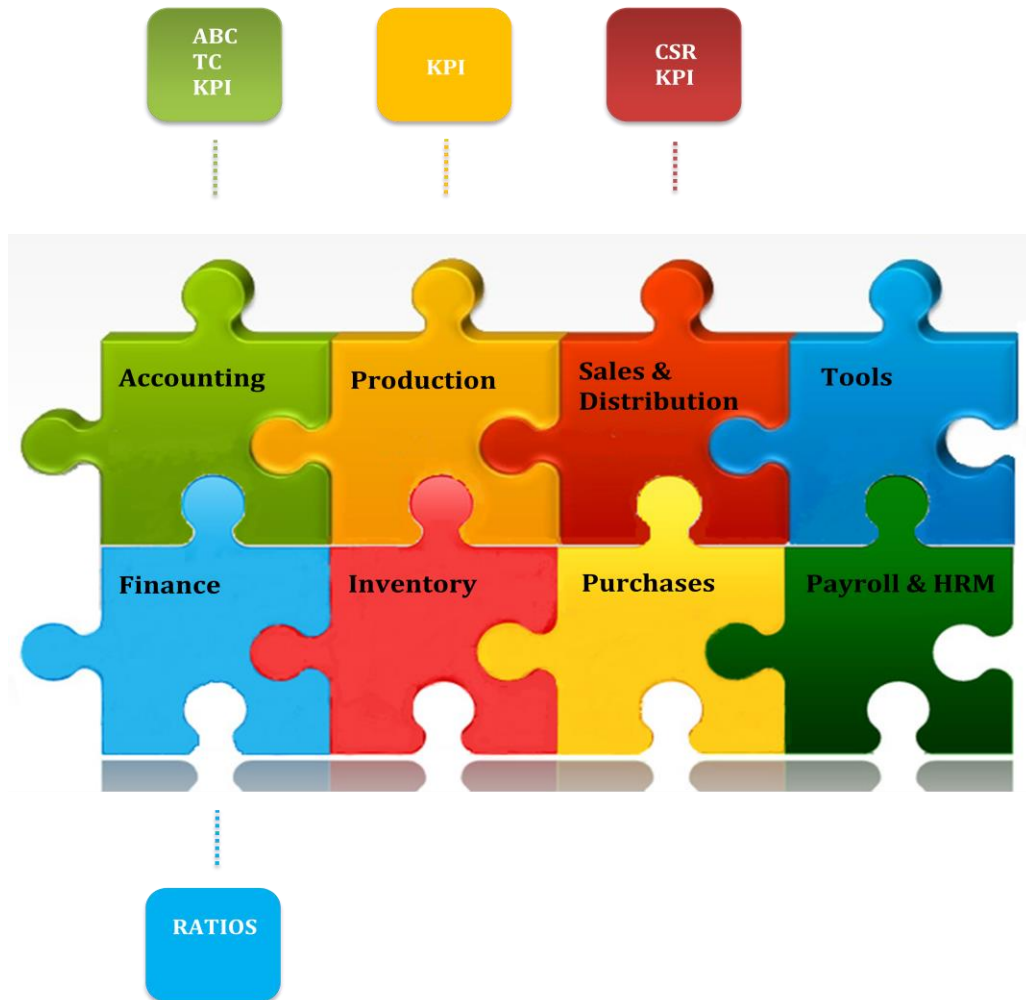


Figure 6 - Identification of the controls in the ERP system

Based on the information gathered by interviews

To summarize, both the CFO and the controller of Alco agree that controlling is an essential process for the company's overall success. Therefore, as illustrated in Figure 6, the company implements several control techniques/practices while Atlantis system provides a great assistance not only in setting the company's objectives but also in the performance evaluation and the employee's behavioral control on a daily basis. As the controller (2015) noted:

"[...] yes, our ERP is a crucial information provider. We need it."

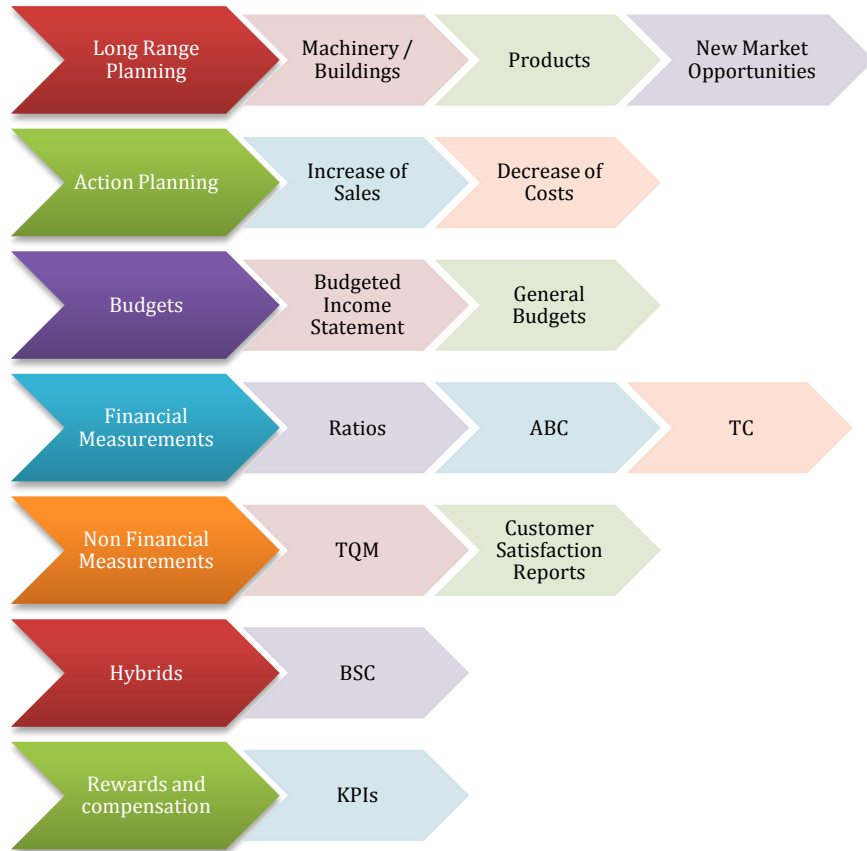


Figure 7 - Alco's Management Control System

Based on the information gathered by interviews and Malmi and Brown's package (2008)

5. ANALYSIS

In this chapter the literature review is tested against the live-case company. Further, a discussion regarding the interrelation between MC and ERP systems follows. The interaction between the two packages as well as their divergences will be deliberated on the applied research framework.

5.1. Framework for Analysis - Management Control and Enterprise Resource Planning

Initial observations suggest that a link between MC and the ERP system of organization may exist; therefore, it is considered interesting to investigate how the ERP system's characteristics may fit within the overall concept of MC. One of the most well known definition of MC belongs to Anthony (1965) who claims that MC is a process by which the management assures that resources are utilized efficiently to achieve company's objectives. The term "resources" may have a rather twofold meaning and refer to either land, machinery, capital used by company, or employees as well. On a similar note, Nilsson, Olve and Parment (2011) confirm that MC relates to the economical resource usage. As an integrated transaction-oriented IT system, ERP may lead to an efficient and effective resource usage by controlling the company's material and financial resources, however, MC is not only about managing and controlling numbers but also about directing the employees' behavior towards the desired strategic objectives as well as promoting goal congruence (Ouchi, 1979; Simons, 1995; Flamholdz 1996; Otley 1999). Therefore, the ability of ERP to act as a motivator for individuals and groups working for the company is questionable, since commitment to corporate goals comes from personal communication and cooperation (Malmi, 2015).

Furthermore, Mintzberg (1979) suggested that MC seeks to standardize the operation processes since it may have a positive impact on the organization's overall performance. The standardization of daily tasks is strengthened by ERP, since it may facilitate the control of the input data and assist in monitoring deviations in employees' actions (Schermann, Wiesche & Krcmar, 2012) through a system preventing potential manipulations. Flamholdz (1996) stresses the important element of MC in administering inappropriate behavior, thus, at a certain point, ERPs may serve as a tool to prevent such acts. Moreover, ERP can reduce the need for information checking activities (Maraghini, 2010), which are usually performed by the company's controllers for the MC purposes; thus, the system may decrease the workload of the managers involved.

Although a contingent relationship of ERP and MC may be obvious, the findings cannot be extrapolated to all organizations. Despite the fact that the contingency theory suggests that MCS is influenced by several contingent variables (one being Information Technology), there is still a possibility that a contradiction with this hypothesis may

appear due to the situational factor of the particular company. However, in order to investigate the MC and ERP interplay empirically, the interdependencies between Alco's MCS and ERP system, Atlantis, will be analyzed and discussed further via the framework proposed by Malmi & Brown (2008).

5.1.1. Planning

The "planning" process is perceived to be the backbone of the Malmi and Brown (2008) MCS package since all further control techniques (Administrative, Cultural and Cybernetics) as well as the company's rewarding and compensation systems, are implemented to ensure that the objectives settled at this stage will be accomplished. Future organizational plans assigned by higher management serve as a guideline and a driver for potential changes in the current processes and tactics. While financial success is an essential element for every institution, development and future growth may be of equal importance and thus should be reflected in strategic goals. Respectively, scholars (Anthony, 1965; Ouchi, 1979; Simons, 1995; Flamholdz, 1996; Langfield & Smith, 1997; Otley, 1999; Merchant & Van der Stede, 2007; Malmi & Brown, 2008) that have investigated MC in theory and practice agree that one of the most important aspects of MC is to guide and direct organizational performance and the employees' behavior towards the desired outcomes. While the controlling systems and tools may differ from company to company, it is undisputable that in order to stay profitable in the fast-changing business world, organizations have to assume a forward-looking attitude and set objectives for the functional areas.

In consistence with Malmi and Brown (2008), Alco's management administer both types of organizational plans: long-range and action (short-range) planning. While the short-term objectives of the company are rather financial oriented, e.g. decrease in manufacturing and unit costs and increase of revenues, the long-range plans are more strategically oriented, targeting organizational growth. In addition to the continuous search for new market opportunities, Alco's long-range functional objectives include the development of innovative products and the optimization of machinery/building's overall utilization. As was noted by the company's CFO, Alco's Board of Directors require a huge amount of various information in order to set the future directions for performance improvements. Therefore, Alco's ERP system, Atlantis, serves as a great support, since it provides an opportunity to gather the relevant data and structure compatible reports for further analysis. Thus, the main advantage of Atlantis ERP from the planning perspective is its ability to store and process immense amounts of different data.

Furthermore, since the future objectives of the company seem to concern the whole organization, the information needed for efficient planning comes from different sources, and thus ERP's capability to transfer and integrate data contributes to the process. For example, in order to decide on the new market for exporting Alco's products, the Board of Directors should be familiar with the current production capacity, prices, sales distribution, etc. Although such information is gathered in different departments, it can

be easily accessed through the ERP within a short period of time. ERP enables the user to extract data across the whole organization, which may contribute to an effective implementation of important reporting tasks. As was noted by Champan and Kihn (2009), one of the main attributes that make IS systems useful, is that the input data can be transferred to any department.

It should be also noted that Malmi and Brown (2008) explain that the planning process can be twofold: first, focusing on the organization's future activities and second, on the encouragement of employee commitments to future plans. Alco's objectives seem to have a rather operational nature, constraining on the strategic targets of the whole company rather than promoting personal commitment of employees. As an information provider, Atlantis supports the planning of future activities by ensuring that relevant organizational facts and figures are up-to-date and easy to access. However, it is likely that its ability to direct employee commitment may be rather impossible to assess since Alco's planning process does not incorporate such planning objectives. Although Chapman and Kihn (2009) proposed that IT systems enable efficient communication of the company's objectives and Schermann, Wiesche and Krcmar (2012) notice that they may enable managers to gain data on deviations in the employees' performance and therefore facilitate monitoring. The capacity of ERPs to encourage personal commitment to the organization's goals is doubtful. Though employees may perform better when being monitored, since ERP provide a visibility throughout organization (Malmi, 2015), being only software, ERP cannot motivate employees to commit to organizational goals because such motivation may be achieved throughout social interactions.

Hence, Atlantis provides a great support to Alco's Board of Directors, and it becomes evident that the planning process is highly dependent on the information gathered from ERP, however, the system itself cannot serve as a planning tool. Setting the organization's functional objective requires personal communication and interaction between the individuals who possess the relevant knowledge in different areas. As with the Alco case, the development of plans considering new innovative product lines requires strategic decisions, which are made by collective participation of several organizational actors, such as production, sales and financial managers. Thus, the data extracted from the ERP system should be analyzed, interpreted and applied in an appropriate way. Therefore, ERP cannot be observed as a contingent variable, which affects the planning stage of Alco at a large extent. The role of the company's ERP at the strategic objective setting phase is restricted to the analysis, collection, integration and reporting of data (Chapman & Kihn, 2009). On a similar note, Prof. Malmi (2015) confirmed that setting out organizational plans requires managers to obtain a forward-looking attitude while trying to predict the future. Although ERP provides historical data on organizational performance, its capability to reflect future is questionable. Despite the fact that certain information extracted from ERP can be used as a proxy for future forecasts, it depends on the professionalism of manager to interpret the data correctly and conform it to potential future occurrences.

Furthermore, in line with Booth, Matolcsy and Wieder (2000), even though Atlantis supports Alco's decision-making and objective setting by offering flexibility in information access and promotes greater functionality, the implementation of ERP did not change company's planning practices, as it was noted by CFO (2015). Therefore, ERP system cannot be observed as a driver of change when it comes to planning phase.

5.1.2. Cybernetic controls

Budgets

Budget as one of the cybernetic controls within the Malmi and Brown (2008) MCS package serves as a tool to assist management in organizational goal achievement by providing support not only in decision-making but also in the management control of employee behavior (Malmi, 2015). As a control mechanism, budget may contribute to the company's planning of financial targets, evaluation and measurement of current performance as well as efficient resource allocation. The CFO of Alco confirmed that budgets are used in all the departments of the company and are made on a yearly basis. While the managers are responsible for the budgeting process of the department under their supervision, the CFO of the company is the one who further consolidates sub-budgets and generates the final budget version in form of an income statement (budgeted income statement).

From the conversation with Alco's CFO it became evident that the budgeting form that the company applies seems to be rather traditional, in view of the fact that the preparation process is supported by historical data such as previous year sales, revenues, costs etc. The reported findings appear to support Prof. Malmi's (2015) distinction between traditional and sophisticated forms of budgeting. According to Prof. Malmi, the main sign of sophistication is the ability of control to incorporate visibility towards future (e.g. rolling forecasts). The budgets generated by Alco's CFO are rather traditional since the data on the company's past performance serve as a basis for planning and controlling future performance. Even though Scapens & Jazayeri (2003) proposed that when it comes to budgeting and forecasting, ERP may act as a generator of forward looking information, Alco's budgeting policies contradict such a claim.

Furthermore, the support provided by Atlantis in the accomplishment of the budgeting is minimal, since the process is carried out in Excel and ERP only serves as a provider of relevant numerical data. The capability of IT systems to assist in the accounting-based tasks such as budgeting and forecasting was stressed by Fisher (2007), however in the Alco's case, Atlantis has a rather limited supporting role. Summarized data of company's accounts are taken from Atlantis, while records are consolidated and final budgets are generated in Excel spreadsheets. The assumption that some traditional control techniques, such as budgeting, are operated through separate systems which serve as an add-on to the ERPs, was previously discussed by Granlund and Malmi (2002). Therefore, the authors' findings seem to be applicable in the Alco's case as well,

since budgeting is not facilitated by the company's ERP, and application of Excel is needed. A possible explanation for this might be the persistence of the company's tradition, and the CFO confirmed that before the ERP was adopted, the budgeting process had been performed explicitly in Excel.

In their study, Granlund and Malmi (2002) also noted that minor organizational changes were experienced after the adoption of ERP. Correspondingly, the endorsement of Atlantis ERP did not change Alco's budgeting procedure; it is still performed in Excel. From this perspective, Atlantis serves only as a database to store and collect the relevant data, while the budgeting process itself cannot be supported or facilitated by the ERP. A question may arise whether the management of Alco is resistant to the possible changes in the practices or whether the company's ERP has no technical proficiency to facilitate the budgeting process. One possible implication of this is that changes and customization under the current ERP require investments, which due to the crisis and lack of financial resources, the company is not willing to make. However, since the CFO did not mention any problems in the existing process of budget preparation, the company does not seem to be interested in potential rearrangements.

As noted, Atlantis supports budgeting only by providing relevant data, however, the process is not integrated in the Alco's ERP and requires the implementation of another analytical tool (in this case: Excel). Furthermore, the post-implementation of ERP did not facilitate any major changes in the budgeting procedures and practices; therefore the contribution of Atlantis to this form of cybernetic control is minimal. It can be argued whether the budgeting process can completely be integrated into the ERP system, since it requires some sort of ability to predict the future events and take into account several external factors (i.e. environmental, economic), for example, competition or inflation/deflation. Taking this idea one step further, it may be that human involvement is of extreme importance for controlling processes such as budgeting and planning, and the capability of any ERP system is limited. Not to mention that, acceptable budgeting levels differ between companies and thus, a universal version of a 'budget module' may not exist. Once more, customization and human involvement appear to be necessary, since it is possible that the complexity of such processes may leave no room for integration into the ERP systems.

Financial measures

Moving on to the financial measures executed in Alco, ratios, ABC and TC techniques can be identified. At this point it is interesting to acknowledge the difference between the sophisticated and traditional MC techniques/practices. Prof. Malmi (2015) stressed during the interview that MCs might be called sophisticated when they aim to improve deficiencies of previous practices. Hence, ratios could be classified as a traditional tool while for example EVA (which is not applicable in this paper) as a one-step-further (more sophisticated) technique. As Spathis & Constantinides (2004) confirmed in their paper, ratios may be seen as a traditional measure. On the other hand, ABC and TC are considered sophisticated techniques by several authors (Granlund & Malmi, 2002;

Spathis & Constantinides, 2004; Malmi, 2015). In contrast to the traditional costing methods, ABC and TC provide management with a broader picture of the company's expenses and thus serve as a better tool for cost allocation. Since advanced costing techniques seem to incorporate different aspects and take into account several variables, they can serve as a basis for not only cost minimization but also for strategic planning and resource management.

Coming back to the discussion topic, it seems possible that the implementation of the two costing methods, ABC and TC, as well as the usage of ratios, such as Return on Investments, by Alco are related to the company's planning process described throughout the paper. More specifically, the two costing techniques are directly related to short range planning process and expectedly to the 'decrease of unit and manufacturing costs' objective. Therefore, ABC and TC seem to operate as tools to achieve short-term objectives, e.g. via ABC Alco may detect areas where cost minimization could be possible to accomplish, while by implementing TC at the production design stage the company can appoint a target margin which can further result in increased sales. Furthermore, the CFO explained that ratios are used in order to monitor the company's operations as well as the returns to the shareholders, which seems to be rather important for the Board of Directors. Shareholders are one of the financial supporters of the company (apart from the banks as the CFO stressed) and thus, Alco needs to attain their contentment. It is almost certain that since one of Alco's objectives is to continuously expand its operations, the company wishes to keep its current shareholders and possibly gain new ones, which will automatically result in further financial support. Thus, ratios may be seen as an informational tool for Alco which may support the achievement of company's goals.

It has come to knowledge that all the financial measures of Alco are facilitated by ERP and their calculation is automatically done in the system. The CFO explained that before the ERP adoption, the costing system had entailed a rather complex and time consuming process, while after the system was implemented and customized, the amount of work was reduced. This statement might possibly generate two main conclusions. First, the ERP system is not a driver of change when it comes to the implementation of such financial measures as ABC, TC and ratios since they had already been in use before the ERP adoption. This particular conclusion is in line with the studies conducted by Booth, Matolcsy and Wieder (2000), Granlund and Malmi (2002), Scapens and Jazayeri (2003) which explained that companies use the same management accounting and control techniques before and after ERP adoption. The evidences are also in line with Spraakman's (2005) who proved that ERP does not promote changes in traditional practices (e.g. ratios) as well as with Rom and Rohde's (2007) finding regarding the potential changes in sophisticated techniques. The second conclusion may be of equal importance. ERPs may not be the reason for adopting new sophisticated and accounting techniques, however, they can be seen as a tool for improving the existing techniques/practices as well as a time saver for the managers of the company who need to accomplish a vast amount of daily tasks. Spraakman's (2005) survey produces the same results as he argues that after the implementation of ERP

the existing traditional practices were improved. Although Doran and Walsh (2004) as well as Spathis and Constantinides (2004) suggest that ERP implementation may have positive consequences and encourage further adoption of traditional and sophisticated techniques/practices, the case of the financial measures of Alco does not support this claim.

Non - Financial measures

Another cybernetic control identified in the MCS package by Malmi and Brown (2008) is non-financial measures. Throughout the interviews it became evident that Alco, alongside with the financial measures, uses two non-numerical metrics which concern the company's customers and its products. The company uses TQM, which promotes the importance of product quality. The ISO standards (9001, 14001) that the company is obliged to comply with, mentioned in chapter 4, ensure that the products launched to the Greek or foreign markets are in accordance with the regulations. Consequently, it is almost certain that TQM is closely associated with the Alco's objective regarding the improvement of the existing products. The company's plan seeks to create innovative and flawless products and to have the ones already launched improved, which is in line with the TQM philosophy. Once again, it is clear that the company is trying to connect its planning process with the cybernetic controls in order to achieve the desired results. At this point, the role of the ERP should be considered. The CFO confirmed that TQM is not supported by the company's ERP system hence, two questions arise: (a) Is TQM an extremely complex sophisticated process, which cannot be incorporated into the 'weak' ERP system? (b) Is the cost of this particular process immense? The reply of the CFO was straightforward: cost. This statement agrees with the findings of Granlund and Malmi (2002) where cost is one of the main reasons for not integrating sophisticated techniques/practices into the ERP system.

Moreover, the company uses customer satisfaction reports (CSR) in order to identify problematic products or batches and improve or substitute them. This particular non-financial measure also indicates the close connection between the cybernetic controls and the planning process. Clearly, the use of CSR by the company displays the importance of customers and products, which is directly associated with the previously mentioned objective regarding the improvement of existing products. Alco is willing to replace the flawed products, and this action characterizes it as a company with a clear desire to achieve its goals. Apart from that, the company conceivably understands that in order to achieve an increase of sales as well as a long-term expansion of operations, it should develop a strong brand name and customer loyalty, which may be achieved by offering flawless products and services. Thus, for an immediate response to the customers' problems, the company incorporated the CSR measure into the Atlantis system. The CFO explained that through ERP the requests are registered faster than before and thus agrees with Spraaakman (2005) who stated in his findings that ERP provides more efficient and effective controlling processes.

In sum, the findings regarding the non-financial measurements of Alco, indicate that TQM is not integrated in the ERP system. Apart from the cost factor that the CFO mentioned, authors such as Granlund & Malmi (2002) and Granlund (2007) suggest that another possible implication for the non-utilization of techniques in the ERP system could be the high complexity of the process. On the other hand, CSR is a controlling practice facilitated by the ERP system, and this fact raises questions regarding this discrepancy in the integration of non-financial controls. One might assume that this distinction may exist due to the completely different processes of the two non-financial measures. Indeed, the CFO underlined that TQM might be viewed as a more complex procedure in relation to CSR, since external service firms are regularly involved in the process. On the contrary, CSR do not require any involvement of external parties and are constructed only when product problems arise, which, as was mentioned in chapter 4, is not a frequent phenomenon.

Hybrid measures

Regarding hybrid measures, Alco uses a modified BSC, which includes two perspectives: customers and internal processes. One possible implication for this modified version of BSC might be the extreme importance of customers and production process to the management of Alco. The financial aspect is also crucial for the company, however, one could assume that it is not exploited in Alco's BSC because the company is already using ABC, TC and ratio metrics as financial measures. This approach can also be explained by the fact that financial targets, such as cost minimization and increase of sales, are already covered by the company's short-range (action) plan, therefore, there is a chance of redundancy. It should be highlighted that, according to the CFO, the BSC is not facilitated by the company's ERP system. However, since the customer perspective is taken into consideration, one may assume that CSR is one of the measures that the company uses. Consequently, although the whole BSC is not integrated into the Atlantis system, one part of it (the CSR) is. Notwithstanding this, BSC in general is processed in a standalone system, as the CFO confirmed, and thus, the conclusion that one may draw at this point is that the company, for its own reasons (presented below), has neglected the idea of synthesizing the whole BSC into ERP, as well as abandoned the idea of integrating TQM in the system.

When the reasons for not incorporating the whole BSC in the ERP system were requested (while other sophisticated tools such as ABC and TC are fully integrated), the CFO explained that BSC is a recently implemented tool and that the company does not currently have resources to allocate. The idea of cost being a reason for the companies to use a standalone system rather than ERP for facilitating sophisticated management control techniques/practices is also confirmed in the article of Granlund and Malmi (2002). However, the CFO did not state that the company is thinking of incorporating the BSC technique into the Atlantis, thus, there is a possibility that the management is currently satisfied with the BSC operated in a standalone system and is not willing to change it. Management's resistance to potential change regarding management accounting and control techniques is also stressed in an article by Scapens and Jazayeri (2003). The authors claim that ERP cannot be perceived as a driver for

potential changes in control practices, such as BSC, which also became evident in the Alco's case, since even though the company has relatively recently adopted BSC (ERP implementation did not play any role in the adoption of BSC), the particular technique is not supported by Atlantis. In addition, Rom and Rohde (2006) advocated that stand-alone systems are superior to ERP systems when it comes to non-financial measurements (the authors included BSC in the non-financials). Thus, it is suggested that this applies also to Alco, since, as is already mentioned, managers explained that they are currently satisfied with the way that these two practices are operated on.

Therefore, when it comes to hybrid controls, the implementation of BCS and the adoption of ERP are not directly interrelated with each other and should be observed as independent events. Thus, Atlantis did not encourage the management to employ new techniques such as hybrid measures, and is currently not supporting or facilitating this type of cybernetic control (not completely at least).

5.1.3. Rewards and Compensation

As was noted by Malmi and Brown (2008), reward and compensation practices aim to improve the performance of employees and direct their behavior towards organizational objectives by increasing the motivation and devotion of individuals and groups. Incentives are usually associated with the organization's strategic objectives and their achievement, therefore, a connection between the rewards used by a company and its planning process may be discovered. In addition, one may assume a further relationship between the rewards and the company's cybernetic controls since the former serve as a tool to assess the fulfillment of predefined targets.

Specifically targeted to Alco's case, rewards are used by the company in form of KPIs applied in key departments (i.e. financial, production and sales department). Starting with the financial department, it became evident that the KPI used in order to measure the assistants' performance is connected to the efficient and effective management of activities and time. The use of the KPI in this department seems to prioritize the accuracy of the accounting data inputted in the ERP since, rewards are given to the employees who avoided human error in the input process while met the deadlines. The importance of the ERP and the data that it provides to the management was repeatedly underlined by the CFO and the controller in chapter 4 and thus, it is possible that the management voted for the use of KPIs in order to minimize the input errors. Furthermore, in the production department, KPIs regarding the daily aluminum production and painting are used. One may conclude that these KPIs might be connected to the TQM and ISO standards, which dictate that the products may possess some special characteristics in order to fulfill the requirements. Thus, the use of KPIs may be viewed as a mechanism of accomplishing certain criteria, as previously mentioned.

In addition, the sales department also applies KPIs regarding the acquirement of new customers and the overall achievement of budgets, as discussed in chapter 4. It is probable that these KPIs are connected to the achievement of the short-term organizational objective targeted to increase sales (since more customers boost the company's sales) as well as to fulfill the company's budgets. Remarkably interesting is the fact that the KPIs in the financial and production departments do not concern meeting of budgets. This inconsistency may be due to the fact that the company chose the most relevant KPIs for each department, the KPIs perceived as the most critical. As Prof. Malmi (2015) confirmed, ERPs are able to provide an extensive amount of KPIs, however, choosing them all may result in confusion among the employees, since people in general are not programmed to comprehend a plethora of different objectives at the same time.

It is highlighted by the company's controller that the above-discussed KPIs are integrated in the ERP system, while monetary incentives (i.e. bonuses) are provided when certain indicators criteria are satisfied. Consequently, in this particular case, ERP completely facilitates the rewards and compensation control system while minimizing the human error factor in the rewarding process. Furthermore, since user authentication is usually installed in the ERP platform, the data collection on employee individual performance becomes easy to complete. Such data are also stored in ERP database throughout the year; thus, the summation of overall bonuses is also facilitated by the system. Otherwise, performance assessment and evaluation of each employee would be rather challenging to accomplish, since monitoring of their daily duties fulfillment would require involvement of several managers and would be a rather time-consuming procedure. Therefore, Atlantis can be perceived as one of the primary instruments supporting MC concerning Alco's reward and compensation system.

As discussed above, the management controls applied by the company may be facilitated, supported or operated in a standalone system. More specifically, planning and budgeting are only supported by the ERP, however management participation is always needed in order to complete those processes. On the other hand, several financial measures such as ratios, ABC and TC, are completely integrated into the ERP system, as well as KPIs concerning rewards and compensation. When it comes to non-financial measures, the findings are diversified since CSR as a controlling practice is facilitated by the ERP system whereas TQM is not. Same applies to the hybrid measure which is currently operating in a standalone system despite the fact that a small portion of it may be integrated into the system (more specifically CSR). Below, one can identify the customized Figure 7, where Alco's controls are demonstrated in relation to their Atlantis connection. Arrows symbolize a rather supporting role while the collision of the puzzles with controls signifies integration. The pieces/colors of the 'ERP puzzles' are chosen in relation to the modules that are presented in Figure 6. It should be noted that the information for budgeting and planning is gathered from various ERP modules. Furthermore, TQM and the BSC are excluded since they are processed in the other systems, despite the fact that part of BSC is assumed to be supported by the CSR integrated in Atlantis.

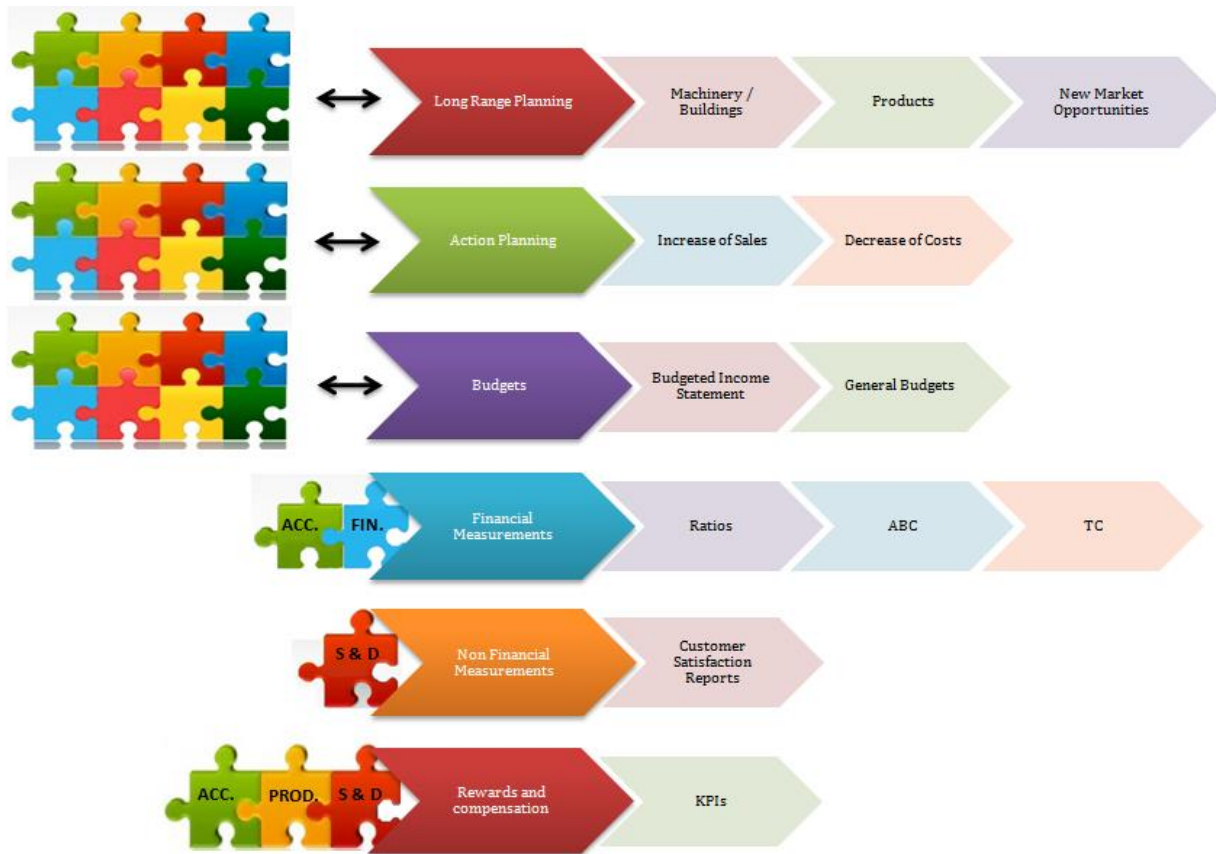


Figure 8 - Interplay of Atlantis and MC (I)
 (Based on Malmi and Brown, 2008)

5.2. Management control vs. Enterprise Resource System

The discovery of the connection between Alco's control instruments processed through the package of Malmi and Brown (2008) and the Atlantis ERP software used by the company brings a twofold association between them. On the one hand, a certain similarity in conceptions can be detected, while on the other hand, MC and ERP serve rather different purposes in the organizational context.

The main idea behind the Malmi and Brown (2008) MCS typology is that controls do not operate in isolation, thus parts of the framework are interconnected with each other. During the planning process the company's management sets out organizational objectives and strategic goals, while cybernetic (as well as cultural and administrative, excluded from the overall research) controls serve as a tool to guide and facilitate the implementation of such plans. Meanwhile, rewards and compensation systems aim to

direct the performance of employees toward strategic targets by motivating them with different incentives to achieve the desired outcome. The interrelationship between the discussed MCs can be detected in the MC techniques applied by Alco's management. The long-range and action plans are supported by the company's cybernetic controls, while the company's KPIs and the bonuses signed to them seem to operate as an incentive to increase the employees' efforts and direct their performance toward the achievement of goals. Therefore, it became evident that the MC tools exploited by Alco's management are in compliance with the conception of the Malmi and Brown package (2008) and actually operate as a package supporting each other. As was noted by Abernethy and Chua (1996), operating as package comes with internal consistency of instruments that aim at the same outcome. Therefore, ERP system, as presented by several authors (Davenport, 1998; Rom & Rohde, 2006; Romney & Steinbart, 2012), serves as an IT system "package", consisting of modules created to integrate and coordinate the company's data as well as control transactions. Furthermore, the modules of ERP systems do not operate in isolation, but are rather closely interconnected with each other.

Thus, ERP and the Malmi and Brown (2008) MC typology incorporate a similar ideology, and both can be viewed as a package, the elements of which are dependent on each other. Therefore, one may assume that the ERP system may serve as a central attribute of MC. This statement however may lead to erroneous conclusions since the ERP system is not able to completely facilitate all the controls used by a company. This became evident in this case since the Atlantis system supports only some controlling processes (planning and budgeting) while the management for their own reasons (which were discussed above), have completely neglected digitalization of some others (TQM and BSC).

The interplay of ERP and MCS of the case company is illustrated in the following figure. First, one may see a broader picture of the two packages connected and subsequently a more itemized version of the elements of these packages. Although these entities operate rather separately, at some point they intervene with each other. In the intervening area, the management accounting and control techniques/practices are integrated into the Atlantis system. It is important to highlight that the planning and budgeting processes, since they are only supported by ERP, are closer to the MC 'cycle package'. One additional remark is that the BCS, although it operates in a different system, is closer to the 'ERP cycle' than the TQM, since CRS (which is assumed as one of the measures used in the customer perspective), are completely integrated into the ERP.

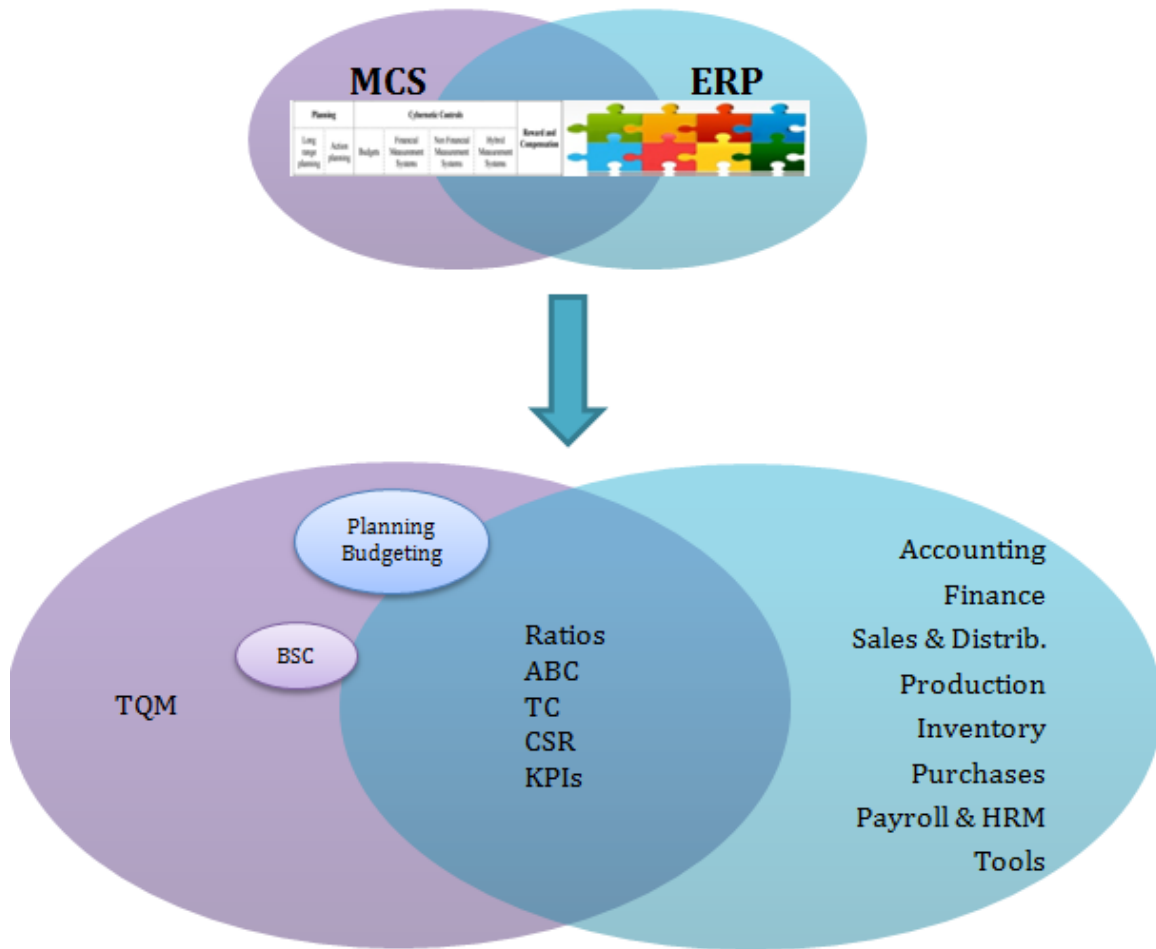


Figure 9 - Interplay of Atlantis and MC (II)

Despite the similar philosophy identified between the Malmi and Brown's (2008) MCS package and the ERP, they serve two completely different purposes. Their differences were also detected by Prof. Malmi (2015) since he stressed that ERP, as a transaction system, is created not to manage an organization but rather to automate transactions. Furthermore, ERP may be viewed as an information provider system critical for the company's controlling processes, and therefore as an essential system for companies. Indeed, the CFO of Alco underlined that ERP is profoundly necessary for the company since it provides all the information needed to the management, even in the monitoring of employee's performance. Hence, it may be reasonable to conclude that although ERP is not a control tool, it is a tool that supports the controlling process. This appears to support Prof. Malmi's (2015) belief that ERPs may be viewed as a 'big brother', a tool that provides the management with visibility throughout the organization and actually affects the behavior of employees. On a similar note, the Atlantis system serves the purpose of a transaction system and a supporter or in some cases even a facilitator of several control techniques, such as planning, cybernetic and rewarding, however, human involvement is still extremely necessary. Furthermore, the Atlantis may have

integrated some KPIs and other controls to manage the behavior of employees, however, the control does not come from the system itself but rather from the managers who view the employee's results and if they are not the desired ones, demand explanations for their behavior. Consequently, ERP is responsible for only one part of the story.

A further interesting point has to do with the complexity of the integrated techniques/practices, which differ from company to company for several reasons. Prof. Malmi (2015) expressed an idea that certain techniques, such as ABC, may be easier to implement in some companies because of the field they are operating in, since the cost of materials may be transparent. Indeed, there is no much complexity in the production process of aluminum in relation to other companies and therefore, this could be one reason for the diversity between the companies. Thus, a potential conclusion may be that Alco managed to integrate some of the adopted techniques, such as ABC and TC in the Atlantis system because the processes followed might be of low complexity. A good ERP support might be provided due to the simplicity of the nature of the business.

6. CONCLUSION AND DISCUSSION

The following chapter summarizes the findings of this thesis, which serve as a subject for discussion. Furthermore, contributions and proposals for future research are presented.

6.1. Conclusion

After considering all the variables illustrated in the chapters above and analyzing the results, several findings, which will be discussed in more details further below, were revealed. Yet, the main conclusions that one may draw from this thesis are: (a) the interplay between ERP and MC actually exists, which became evident in the company's operations, (b) ERP systems may serve as a facilitator, supporter but not as a driver of change, at least in this particular case.

6.2. Contribution and Discussion

All things considered, it was discovered that: firstly, the targeted company actually uses several controls/techniques/controlling practices, which could be identified in the Malmi and Brown (2008) package. Secondly, the interrelation between ERP and MC became obvious since the company is currently using its ERP in the controlling process by integrating controls and techniques into several ERP modules. The final finding concerning the role of ERP in the controlling process indicates that more than half of the MC techniques applied by the company are interrelated with the ERP system. Some authors (Doran & Walsh, 2004; Spathis & Constantinides, 2004) suggest that ERP may be viewed as a driver of change when it comes to the usage of controls prior to and post the ERP implementation, however, in this case, the particular statement was not confirmed. On the other hand, Booth, Matolcsy & Wieder (2000) were one of the first who advocated that ERP adoption is not a driver of controls' change, and the data reported here appear to support the assumption. This is further corroborated by several authors (Granlund & Malmi, 2002; Scapens & Jazayeri, 2003; Spraakman, 2005; Rom & Rohde, 2007; Granlund, 2007) who reached similar conclusions. Consequently, this consistency of findings (in prior research and in this thesis) might be attributed to the management's interpretation of ERP ideology. Managers may view the ERP system as an essential information provider and not as a strategic tool, which can support the reform of practices.

Interesting is the fact that there is a clash between the findings when it comes to the integration of sophisticated controls in this thesis and in other studies, like the one made by Granlund and Malmi (2002). The authors stressed that complexity of operations is one of the reasons for not integrating sophisticated controls into ERP (further supported

by Quattrone and Hopper (2005), Granlund (2007) and Prof. Malmi (2015)). The empirical evidence of this paper confirmed that the integration and further usage of more advanced techniques is possible via the ERP system. However, one should bear in mind that the exploration of different industries with different processes will most probably lead to contrasting results and that the complexity of the companies' operations plays an important role in the integration of MC techniques/practices into the ERP systems.

One final remark regarding the findings revealed from this study is the importance of human interference in the controlling process. Despite the fact that some of the controls were integrated in the system, one should not forget that ERP is a computerized software that cannot on its own automate any future decision making nor guide the performance of employees, a statement which is supported by Prof. Malmi (2015) as well. Therefore, it becomes evident that despite the continuous development of ERPs, the human factor is always present and crucial in controlling practices. However, the findings of this paper, in contrast with several prior studies (Granlund & Malmi, 2002; Scapens & Jazayeri, 2003; Quattrone & Hopper, 2005; Rom & Rohde, 2006; Granlund, 2007), reveal that more than half of the controls are supported by ERP. Consequently, it can be assumed that, in the future, the nature of controls will become even more computerized. Such tendency has already become visible since the recent empirical evidence enlightened in this thesis differs from previous results that have been published during the last decade. Nevertheless, this statement should not be taken for granted since prosper studies may be affected by miscellaneous factors.

Turning now to the goal of this thesis, which was the minimization of the sizeable loophole currently existing in the research field of the ERP and MC interplay, it may be presumed as achieved. One of the contributions of this thesis, regarding the existing theoretical gap, is the knowledge gathered from the interview conducted with Prof. Malmi. His responses may act as supplementary information not only to the Malmi and Brown's (2008) article but also to the current debate regarding the interface between the MC and ERP systems. Furthermore, the examined company was analyzed in depth, through a case study, and the empirical evidence was added on to other important findings such as those by Booth, Matolcsy & Wieder (2000), Granlund and Malmi (2002), Scapens and Jazayeri (2003), Granlund (2007, 2011). Certainly, one should bear in mind that the presented results cannot be extrapolated to all cases and must be interpreted with caution since this thesis refers to a single case company, however, the findings may complement prior research. Since there is a limited amount of relevant data available on the interface between ERP and MC, the significance of this thesis is evident due to the enduring practicability of the findings.

Having discussed the theoretical contributions of this paper, it is now necessary to demonstrate the more practical ones. Throughout this thesis it became apparent that some of the controlling techniques are not integrated in or supported by the ERP but are rather processed in a separate system. Consequently, this finding could be an alert to

the case company's managers, who, despite their satisfaction regarding ERP, should realize that there might be a room for further improvements. It should be noted that additional reinforcement offered by external systems might signal the need for potential ERP enhancements. Furthermore, an investigation of the poorly known ERP, Atlantis, which is presented in this thesis, may generate value for controllers/managers since they will be able to assess the ability of the system to facilitate or support company's controlling practices and techniques. However, potential users should bear in mind that Atlantis is subject to considerable customization and that the current modification of the system that was investigated in this paper was a result of the management's preferences. Consequently, a different modification will generate diverse applicability of the system in relation to MC.

Moreover, it should be acknowledged that the MCS package of Malmi and Brown (2008), which is applied in this thesis, is a rather modern framework. Therefore, its applicability to the research in relation to the IT technology (more specifically ERP) field may be questionable since it is not fully exploited in prior research. This thesis justifies that Malmi and Brown's (2008) package can be successfully applied as a framework for the analysis of findings in relation to the ERP system, therefore, scholars may adopt a similar research approach in the future. However, not all subsections of the package were explored, thus, the choice to exclude administrative and cultural controls may have affected the general conclusion, driven from the empirical findings. So far it looks like ERP plays at least a supportive role in the implementation of the majority of MC applied by the case company, however if the interplay of informal controls had also been investigated, the final results may have not been as optimistic.

Furthermore, the analysis presented in the paper exemplifies how managers can apply the Malmi and Brown (2008) MCS package as an assessment tool of the company's MC. More specifically, one may evaluate whether cybernetic controls applied by the company are promoting organizational strategic objectives and future plans as well as investigate if the company's controls are supporting each other. Such approach may benefit companies since they would be able to identify the rather dispensable control techniques/practices, which, if removed, will possibly increase overall efficiency.

6.3. Future Research

Numerous scholars (Granlund & Mouritsen, 2003; Spathis & Constantinides, 2004; Rom& Rohde, 2006, 2007; Granlund, 2007, 2011; Dechow, Granlund & Mouritsen, 2007; Malmi, 2015) advocate that the interface between the two variables (ERP and MC) as an area of study is rather under researched. The authors of this paper share this point of view since, throughout the study; it became evident that the discussed prior research is rather limited. This fact narrowed the interpretation of the empirical findings and the existing theory. Therefore, since it is a relatively new field of research, there is still much progress to be made. Another reason for further investigation is the increased

relevance of the ERP and MC interplay in the field, attributed to the extended reliance of managers on digitalized information and its providers. It is essential to acknowledge that empirical research on this subject is continuously affected by reforms in managerial practices, as well as rapid innovation developments in technology and computerization of daily tasks. Therefore, future researchers should be aware that the main objective is not to establish universal generalizations but to reflect rather practical changes within the business world, while trying to understand the interdependencies between the variables. Thus, since the interaction between ERP and MC demands deeper studies and insights into the companies' processes, case studies are considered to be the most appropriate method for acquiring the relevant empirical data and alluring the results since they empower thorough examination and exploration of the subject.

As was noted by Granlund (2011), IT is emerging, replacing the old systems with new, more advanced ones, and as it is mentioned above, a trend of control integration is discovered in this paper. Therefore, there is a possibility that future ERP systems will offer further digitalization of controlling, and probably, completely incorporate diverse MC tools. While Prof. Malmi (2015) notified that the ERP systems are not designed to support informal controls (i.e. administrative and cultural), Granlund (2011) advocated that future research should examine interactions of informal controls and ERP systems as well. Thus, it is assumed that the author may have alluded to the possibility of support or even facilitation of such controls in ERP. In order to determine the 'winner' in this debate, further research is recommended, since eventually the ERP systems might manage to support informal controls and the incorporation of the whole Malmi and Brown (2008) MCS package may become feasible.

In his article, Granlund (2011) further highlighted that the customization of the ERP systems involves considerable human intervention, while this thesis expressed the doctrine of human factor in the MC and ERP interface as well. Thus, a rather alluring study would regard the human involvement in the controlling processes and the extent that affects the implementation of MC in relation to the ERP systems. The examination of causal interactions may indicate the extent to which human factor is needed in the management controlling procedures and supplement the future research regarding the support of informal controls by the ERP system.

Since this thesis incorporates the Atlantis system, another possible area of future research would be the investigation of it in a different industry. It can be assumed, that the findings, especially in a company with more complex operational processes than Alco, will be remarkably contrasting. Furthermore, Malmi and Brown's (2008) MCS package is observed as the backbone of this research, since it served as a framework for evaluation and analysis of the acquired data. Therefore, its applicability to support future research can be further tested in form of single or multiple case studies. Such approach may add new perspectives to the widely used research designs, since it offers a possibility to assess the efficiency of MCs used by the company while further

facilitate the characterization of the ERP system's role within a company's established management controlling process.

One thing should be taken as noteworthy. Further future research in the field of the interrelation between ERP and MC will bring to surface more fascinating variations, which will have a common denominator: when it comes to technology, change is the only variable which remains stable.

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8. APPENDIX

Interview Questions

General questions regarding company and interviewees

- What are the goals of Alco?
- Which are the most important sources of financing?
- What was the reason that the company sold its subsidiaries?
- What is the general organizational structure of the company?
- What is currently the structure of the Financial Department?
- Could you describe us your roles and duties?
- Where you working in the same position prior the ERP adoption?
- Did your role and duties change after the implication of ERP?
- Do u have any advanced IT skills? Do you think that they are important in ERP implementation?

General questions regarding the Atlantis

- Which ERP modules are you currently use?
- Do you use other systems despite the Atlantis ERP?
- Is the ERP system important for your daily operations? Why?
- Do you think that your ERP system collects effectively data and organizes efficiently management accounting tasks?
- Do you believe that your ERP needs improvement?
- How much did you participate in the ERP implementation?
- What was your priorities when customize the ERP?

Questions regarding MC and controls

- What kind of long range planning do you use in Alco?
 - What is the role of the ERP in long range planning?
- What kind of short range/action planning do you use in Alco?
 - What is the role of the ERP in short range planning?
- Do you perform budgeting processes?
 - How does the ERP helps you in the creation of budgets?
 - Did you use budgets prior the ERP adoption?
- What kind of financial measurements do you use? (ratios, cost accounting)

- o Do you connect them to the ERP system? Are they integrated?
 - o Did you use the same measures before ERP adoption?
- What kind of non-financial measurements do you use?
 - o Do you connect them to the ERP system? Are they integrated?
 - o Did you use same measures before ERP adoption?
- Do you use any hybrid measurements consisting of both financial and non-financial measurements?
 - o Do you connect them to the ERP system? Are they integrated?
 - o Did you use same measures before ERP adoption?
- What about rewards and compensations? Are they somehow connected to your ERP (for example KPIs, time measuring, contacts)?
- How do you operating cost and profitability accounting through ERP? Or in a standalone software (such as excel)? What methods do you use currently?
- How do you perceive the concept of management control?