ISCTE Business School

Essays on the Role of Management Control Systems in Innovation

Rúben Alexandre da Silva Barros

Thesis specially presented for the fulfillment of the degree of

Doctor in Management,

Specialization in Accounting

Supervisor:

Doctor Ana Maria Simões da Costa Ferreira, Assistant Professor, Accounting Department, ISCTE-IUL

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“Live as if you were to die tomorrow.

Learn as if you were to live forever.”

Mahatma Gandhi

RESUMO

O objetivo desta tese de doutoramento é explorar, de forma holística, o papel dos sistemas de controlo de gestão (SCG) na inovação. Na sequência do crescente interesse da literatura nestas matérias, é realizado um caso de estudo na Amorim Cork Composites, uma empresa portuguesa reconhecidamente inovadora.

Apesar de se ter estabelecido ligações entre as quatro alavancas de controlo de Simons e vários tipos de inovação, tem sido negligenciado que estas foram concebidas para trabalhar em conjunto e, que desse uso conjunto resultam importantes tensões dinâmicas. Neste sentido, usando o *framework* de Simons é analisado como é que os SCG podem ser mobilizados em relação à inovação e como é que surgem essas tensões dinâmicas. De facto, percebe-se que os sistemas de controlo interativo e de crenças podem criar as condições necessárias para a inovação, enquanto que os sistemas de controlo diagnóstico e de fronteiras permitem à empresa extrair os benefícios dessas condições.

Dos dados recolhidos, são também percebidas duas dimensões que ajudam a entender como e porquê é que os SCG afetam o comportamento dos indivíduos em relação à inovação. Com base na teoria institucional, é argumentado que os SCG enquanto um conjunto de rotinas institucionalizadas pode orientar os indivíduos para a inovação pelas dimensões de comunicação e, de orientação e foco. Estes sistemas aumentam o comportamento proactivo dos indivíduos afetando a sua cognição e *sensemaking*.

Com isto, esta tese apresenta três ensaios relacionados entre si (um de revisão de literatura e dois empíricos) que contribuem para o avanço do conhecimento e aumento do debate.

Palavras chave: Sistemas de controlo de gestão; Inovação; Alavancas de controlo de Simons; Teoria institucional; Estudo de caso

JEL Classification System:

M41 – Contabilidade

M49 – Outro

ABSTRACT

The aim of this dissertation is to holistically explore the role of management control systems (MCS) in innovation. Following an increasing interest of the academic literature in this matter, we conducted an intensive and in-depth single case study in Amorim Cork Composites, a Portuguese company that is widely known as innovative.

Until now the literature has established links between the four levers of control and the various types of innovation. However, it has been neglected that these systems were envisioned to work together and that their use generates important dynamic tensions. Therefore, informed by Simons' framework we explore how the case company mobilizes the packages of MCS regarding innovation and the dynamic tensions that arises from these uses. Indeed, it is perceived that interactive and beliefs systems can create the necessary conditions and that diagnostic and boundary systems allow for the appropriation of the benefits of these conditions.

After achieving these results, we then link institutional theory to the dimensions of communication and guidance/focus that come from data analysis to develop a model on how and why MCS affect the individuals' behaviours. Based on institutional theory we argue that as a set of institutionalized routines MCS can orient individuals for innovation through the dimensions mentioned. Through cognition and sensemaking MCS increase the proactive behaviour of individuals to engage innovation.

With this, we are able to present three inter-related essays (one literature review and two empirical essays) that contribute to advancing the existing knowledge and furthering the current debate on this subject.

Keywords: Management Control Systems; Innovation; Levers of control framework; Institutional theory; Case-study

JEL Classification System:

M41 – Accounting

M49 - Other

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LIST OF ABBREVIATIONS

ACC – Amorim Cork Composites

ABC – Activity-Based Costing

AROW – Asia and Rest of the World

BSC – Balanced Scorecard

BU – Business Unit

CA – Corticeira Amorim

CEO – Chief Executive Officer

EMEA – Europe, Middle East and Africa

ERP – Enterprise Resource Planning

LOC – Levers of Control Framework

MCS – Management Control Systems

NAM – North America

NIS – New Institutional Sociology

OECD – Organization for Economic Co-operation and Development

OIE – Old Institutional Economics

PMS – Performance Measurement System

R&D – Research and Development

SCG – Sistemas de Controlo de Gestão

I. INTRODUCTION

1. Context and Motivation

This dissertation is composed of three essays that explore the role of MCS in innovation, each resorting to different concepts and theoretical approaches. The first essay comprehends a literature review that then is used as a frame for the last two empirical essays, which are based on data collected through a case study at Amorim Cork Composites (ACC). In general, based on the definition of Simons (1995a) and Chenhall and Moers (2015), it is adopted an understanding of MCS as the formal information routines and procedures used by managers to maintain or modify patterns to achieve organizational goals.

Innovation is, today, considered a critical source of competitive advantage (Kaplan and Norton, 2004; Crossan and Apaydin, 2010), and the importance of organizations to be innovative has become a preponderant aspect of their survival (Chenhall and Moers, 2015). Innovation is seen as a driver of growth and sustainability (Pfister, 2014), and managing it has become a central topic in academic literature (Lövstâl and Jontoft, 2017).

Although innovation is a concept with many definitions, the body of research that explores this study sees innovation as a process through which the implementation of new ideas occurs (e.g.: Davila, 2000; Davila *et al.*, 2009a; Adler and Chen, 2011; Bisbe and Malagueño, 2015; Chenhall and Moers, 2015). With this idea behind, the relevance of MCS arises, treating innovation as an organizational process able to be managed and not as a random event (Davila, 2005; Davila *et al.*, 2009a; Bisbe and Malagueño, 2015). This conceptualization of innovation is used in the first essay, and then, refined in the empirical essays where a definition of innovation is adopted that is closer to the interpretation of what innovation means through the lenses of the organization where the study is conducted[1].

Indeed, the need for organizations to engage with innovation has brought additional challenges to management control systems (MCS) in their role of helping managers to

[1] As a matter of fact, they adopt an interpretation of innovation more related to product innovation in which innovation is seen as a new application of cork, a new cork product, new developments of existing products, a new application for an existing product, or even the transfer of a product from one segment to another.

achieve the organizational goals (Chenhall and Moers, 2015). As a consequence, the relevance and the role of MCS in innovation has changed significantly over the last years (Fried, 2017). Within a traditional paradigm in this stream of research, arguments have been written and evidence has been presented on how MCS can stifle innovations (e.g.: Ouchi, 1979; Rockness and Shields, 1984; Abernethy and Brownell, 1997; Amabile, 1998; Cardinal, 2001; see also an analysis in Davila *et al*., 2009a). In the early days, management accounting and control were systems with a focus on execution (Davila *et al.*, 2009a, b) and a way to deliver the pre-established objectives as efficiently as possible (Davila *et al*., 2009a). At that time, these systems required uniformity and predictability (Davila, 2005), which did not comply with the uncertainty associated with innovation. Voices argued for loose forms of control in the context of innovation (Abernethy and Brownell, 1997), and Ouchi (1979) clearly reports that no rational form of control could be applied in innovative contexts.

These days, authors argue for a completely different understanding. Arguments have highlighted that MCS can contribute to innovation (e.g.: Bedford, 2015; Bisbe and Malagueño, 2015; Curtis and Sweeney, 2017) providing support and direction for it (Curtis and Sweeney, 2017). Management accounting and control is therefore reconceptualised as compatible with innovation (Moll, 2015). As a matter of fact, over the last 40 years, MCS have registered a tremendous evolution that makes them break with the notions of cybernetic controls and advance to more open and complex forms of control (Chenhall and Moers, 2015). Now, MCS contribute essentially to flexibility and autonomy (Wickramasinghe and Alawattage, 2007) with an emphasis on strategic aspects (Langfield-Smith, 2008). New systems and techniques have arrived to organizational practices (Ittner and Larcker, 2001; Chenhall and Moers, 2015), and besides the focus on financial measures, nonfinancial measures also play a role in these practices (Pfister, 2014).

In parallel, the works of Simons also recognized the ability of MCS in managing uncertainty and directing the organizational participants to emerging opportunities and threats (Moll, 2015). With this background, management control practices started to accept the variation and uncertainty needed for innovation (Davila *et al*., 2009a), and managers started to organize the structures at their disposal to achieve it (Chenhall and Moers, 2015). Encouraged by this, academic researchers fuelled the debate, and started to examine the applicability and relationship of MCS in innovation (Moll, 2015). As a

result, the studies that compose this growing field have highlighted and determined that MCS can have a positive role in innovation (Moll, 2015; Curtis and Sweeney, 2017).

Drawing on the seminal works of Robert Simons (1987; 1990; 1991; 1994; 1995a) and on the framework that he developed, these studies have started to examine the challenges of using MCS regarding innovation (e.g.: Bisbe and Otley, 2004; Henri, 2006; Adler and Chen, 2011; Bedford, 2015; Lopez-Valeiras *et al.*, 2016). In this realm, a variety of reflections have been made so far. Mostly with a quantitative nature, and a practical or functional approach, these studies have perceived the role of MCS, used according to the levers of control, in different types of innovation. In this, interactive control has collected strong evidence on its positioning as promoters of innovation (e.g.: Henri, 2006; Bisbe and Malagueño, 2009; Bisbe and Malagueño, 2015; Bedford, 2015). They are said to provide guidance, stimulus, and legitimacy (Bisbe and Otley, 2004), forums for challenging the current plans (Bedford, 2015), and facilitate the external and internal flows of information that are necessary for innovation (Lopez-Valeiras *et al.*, 2016). Diagnostic use of MCS, in turn, have collected contradictory evidence. On the one hand, some authors argued and present evidence on their constraining role (Henri, 2006) but other authors have presented opposite evidence (McCarthy and Gordon, 2011; Bedford, 2015). The latter authors report that diagnostic controls provide space for experimentation when companies want to exploit only their existing markets (Bedford, 2015). Boundary and beliefs systems have collected little empirical evidence and their role in innovation is not well explored.

Some studies have also presented other arguments on the role of management control systems in innovation. Some authors assert that MCS can facilitate the appropriateness of the results of sustainable innovation (Lopez-Valeiras *et al.*, 2015). Other authors argue for flexibility in managing innovation projects (Maier and Branzei, 2014).

However, this array of studies only allows us to take some prescriptions on how to use these systems from generic terms or to identify some positive or negative consequences on using MCS in innovation. Indeed, the studies in this body of research reported links between MCS and innovation (Moll, 2015), and seek to know if the MCS have a relationship to innovation or not. In this way, the discussion in the literature so far has been unsuccessful in capturing interesting dynamics on the role of MCS in innovation. Resorting mainly to quantitative methodologies with a practical and functional nature,

the only thing that the literature has reached is a superficial interpretation of what is happening in the organizational field. As Lövstâl and Jontoft (2017) mention, although the importance of MCS in innovation is stressed, it continues to be a difficult and challenging task. Furthermore, some authors have urged researchers to consider matters that will not be achieved without the qualitative support, and richness that these approaches are able to bring, (e.g.: Moll, 2015; Chenhall and Moers, 2015; Fried, 2017; Lövstâl and Jontoft, 2017). As Moll *et al*. (2006b) claim, qualitative approaches can make substantial contributions on how the MCS interact, providing richer evidence and understanding of processes. Following this, Henri (2006) long ago argued the need for more qualitative studies in this field.

In fact, questions regarding how these systems are used in innovative contexts or how and why MCS are able to affect individuals' behaviours regarding innovation stills is barely explored. Against this background, case studies embedded in deep, rich, and holistic evidence appears as the approach with the most potential (Ryan *et al*., 2002; Adams *et al*., 2006).

This dissertation aims to provide a holistic view on the role of MCS in innovation, improving the existing knowledge and furthering the currently growing debate in the literature. It analyses in detail the control practices and systems used to manage innovation in Amorim Cork Composites, a very innovative company that is part of the listed group of Corticeira Amorim (CA). As it results from the brief discussion above, until now, to our best knowledge, there are still few case studies in the literature to explore the role of MCS in innovation, and more are needed to fully investigate in these matters. By this, the base methodology followed represents a support for the increase of the theorization of this field, and allows us to contribute to a richer understanding of the realities here enunciated.

2. Research questions

To achieve the purpose articulated above, this dissertation comprises three inter-related essays, each corresponding to one section. This strategy of dividing this dissertation into

essays allows us to explore different issues on the role of MCS in innovation[2]. Although, they are intended to be independent, a complementary relationship between them exists in the sense that they contribute to the same body of literature and reinforce each other. As such, we acknowledge a certain repetition that may exist between the studies with base ideas, concepts or even arguments that could be present in one or more essays. Such repetition would also be evident in the last two essays given that they explore different aspects of the same control practices in the case study.

The first essay is a literature review and an analysis of the evolution of research in the field, representing the beginning point for the empirical essays that follow. In this essay, it is recognized that the evolution of the research and the perception of the role of MCS could not be dissociated from the common management control techniques and practices that were in use in the field. Furthermore, MCS were determined by a set of contextual factors (for example, globalization, competitive environment, and characteristics of the production structure) that are also acknowledged in this study and serve as a base for the descriptive analysis of literature and the unveiling of some possibilities of further research. The inherent research questions to this study are the following:

i) How have the research and the perception of the role of MCS in innovation evolved according with the progress registered in the management control practices?
ii) What possible paths can the research take to further explore this field of research?

After identifying a set of gaps in the literature, the second study addresses one of these possible paths. The literature in this body of research has resorted to the "practical-oriented" Simons framework on the levers of control. Its use has provided light on the effects of each of the levers on different types of innovation, but the central aspect of dynamic tension between these levers and the balance that it is achieved in the context of innovation have been quite absent in the literature. When Simons (1995a) developed the framework, he asserted that for organizations to achieve an effective control of their business strategy they should have the four levers working simultaneously. Their use would then probably generate dynamic tensions between them, as some levers represent

[2] Also, this strategy has permitted us to obtain feedback from the presentation of preliminary results in conferences, seminars or doctoral colloquia.

positive forces and others negative forces (Simons, 1995a; 2000; Tessier and Otley, 2012). These arguments have been lately reinforced in the literature on the levers of control (LOC) framework and the importance of the combined use of these levers is established in the academic world (e.g.: Widener, 2007; Mundy, 2010; Speklé *et al*., 2014; Kruis *et al*., 2016). Regarding the dynamic tensions between these levers and what that means to innovation, Chenhall and Moers (2015) reinforce that to be effective in managing innovation and efficiency, the four levers of control must be working in combination. Empirically, Henri (2006) analyses the tension between diagnostic and interactive use of performance measurement systems (PMS) and specifies that this tension contributes positively to the deployment of innovation capability. Also, Bedford (2015) provides evidence of the beneficial role of the tension between diagnostic and interactive use of MCS, but is not able to present evidence of beliefs and boundary use tensions.

Therefore, the second essay builds on this gap. Being informed by the LOC framework, we analyse the management control practices of ACC, conceiving MCS as a package of controls as results from the definition of Malmi and Brown (2008). With this it is possible to explore the balance of controls that is being employed by ACC's managers and the dynamic that arises from these uses and from the systems that are used to manage innovation. In this way, the questions that orient this essay are:

i) How do managers of the case company take advantage of MCS, and balance their use according to the LOC framework to deal with innovation?
ii) How do the dynamic tensions that these uses create contribute to the innovation effort?

By answering these questions, the essay starts to develop the current understanding on the role of packages of MCS in managing innovation. Besides analysing the enunciated gap in the dynamic tension created between the different types of use of MCS, it provides evidence on all of the levers of control. Boundary and beliefs are less explored when compared to interactive or diagnostic use of systems (Martyn *et al.*, 2016). Furthermore, in analysing the dynamic tensions that are generated it can reinforce the academic arguments that the levers mutually reinforce each other (Heinicke *et al*., 2016; Curtis and Sweeney, 2017). Last, in analysing the systems as a package it is possible to provide more evidence on how a range of controls complement and work with each other.

The third essay, presents a different perspective when compared to the second. Instead of focusing on the type of use that managers employ of the MCS at their disposal, the essay focuses on the sociological aspects of how and why these systems as institutionalized practices affect individual behaviour. Resorting to the same case study and analysing the ACC's management control practices, this essay introduces into equation institutional theory to inform the reader on a model for how and why MCS could affect the innovative behaviour of the employees. Institutional theory is quite popular in the management accounting and control literature (Wickramasinghe and Alawattage, 2007), and is seen as a theoretical background to help researchers understand how and why individuals respond in a particular manner to accounting practices (Scapens, 1994; Burns and Scapens, 2000; Wickramasinghe and Alawattage, 2007). In fact, under every branch of institutional theory the organizational behaviours or individuals' thoughts and actions are perceived as influenced by institutions. The evolution that this theory has undergone allows us to perceive that institutions not only limit the actions of the individuals (Burns and Scapens, 2000; Cardinale, 2018), but allow these individuals to change them (e.g.: Battilana *et al.*, 2009). Very recent literature has theorized that institutions are also able to orient the behaviour of individuals (Cardinale, 2018). Therefore, this study relies on the understanding of the influence of institutions on individuals' behaviours. Nonetheless, the study takes a different perspective from the uses that accounting researchers have taken of institutional theory, not trying to explain or justify a process of change, or putting an emphasis on isomorphism (e.g.: Lounsbury, 2008), or even practice variation (Cruz *et al.*, 2009).

Once again, MCS are interpreted as a package of controls that go from the formulation or reformulation of the strategy until their operationalization in the field. With this background, the third essay addresses the following questions:

i) How and why do MCS of the case company affect individuals' behaviours regarding innovation?
ii) How do the understandings of action under institutional theory's teachings help explain the role of MCS in innovation at the case company?

This essay contributes to the main body of literature by setting aside the type of use that managers employ of the MCS, and refining of the understanding of the influence. The result of that refinement is the construction of a model that links the dimensions of

communication, and guidance/focus with institutional theory. With this, it is possible to assert that through these two inter-related dimensions the MCS affects the behaviour of individuals. Also, in the light of institutional theory and though these dimensions, how does the MCS, as a set of institutionalized routines, orient the behaviour of the actors. They affect individuals' cognition and increase their awareness, proactivity, and propensity to engage in innovative behaviours. This orientation that is provided by the MCS is consistent with the recent theorization of Cardinale (2018), which finds evidence in essay three.

3. Methodology adopted

3.1. Research methods and methodology

As outlined in the previous subsections, the empirical essays of this dissertation adopt a qualitative research design. Qualitative research is able to take the researchers from a narrow and functionalist view of accounting phenomena (Vaivio, 2007). It is considered appropriate when the intention of the researcher is to understand accounting phenomena in the context in which it is produced, experienced, and interpreted by the individuals (Moll *et al*., 2006b). Furthermore, the multifaceted nature of the management accounting and control practices can only be analysed when qualitative research methods are employed (Moll *et al*., 2006b), since they are not a set of systems to support rational choices or control (Vaivio, 2008). Therefore, as the purpose of this study was to holistically understand the role of MCS in innovation, with a rich and integrated vision of these practices, a qualitative research design appears to be the best research option.

Furthermore, this research work also falls under an interpretative perspective (e.g.: Hopper and Powell, 1985; Ryan *et al*., 2002). In this perspective, the researcher essentially emphasizes the subjective nature of the social world and tries to understand it through the frame of reference of the individuals targeted by the study (Hopper and Powell, 1985; Ryan *et al*., 2002; Moll *et al*., 2006b). In this way, qualitative methods are more appropriate in an interactive process involving mostly case studies or participant observations (Hopper and Powell, 1985).

More specifically, in this dissertation we conducted an intense and in-depth single case study on ACC. Several authors have argued for the use of case studies in management control research (e.g.: Ahrens and Dent, 1998; Ryan *et al*., 2002; Scapens, 2006; Berry and Otley, 2008; Scapens, 2008) as this is a commonly used method. Indeed, case studies are regarded as one of the best choices to gain deeper and holistic insights on the organizational processes (Ryan *et al*., 2002; Adams *et al*., 2006; Eisenhardt and Graebner, 2007), allowing the researcher to understand the techniques, systems that are used, and how they are used in their organizational context (Scapens, 1990; Berry and Otley, 2008). As Keating (1995) mention case studies represent a way for researchers to acquire an intimate and contextual knowledge about management practices. Also, the case study is the best option when considering that the base body of literature of this dissertation still has limited insights on the role of MCS in innovation. Therefore, at the bottom line, the case study permitted us to obtain richer descriptions and a strong contextualization of the phenomenon under study (Ahrens and Dent, 1998; Eisenhardt and Graebner, 2007). Furthermore, as Yin (2009) highlights, the case study represents an appropriate method when the questions that the researchers posit start with "how" or "why", which is the case of this dissertation.

The case study of the two essays are mainly explanatory and exploratory (Scapens, 1990; Ryan *et al.*, 2002; Scapens, 2008). The study is explanatory in the sense that it seeks to provide knowledge about the reasons on how control practices are used to manage innovation and determine the behaviour toward it. But also, it is possible to categorize the case study as exploratory considering that the existing theoretical background is limited, and the case could prompt theory development.

3.2. Case Selection and the field site

When choosing a case study, researchers must have in consideration the needs of theory development, and in exploratory case studies select a relevant case (Ryan *et al*., 2002; Scapens, 2008). For that reason, it should be a case in which there is an unusual opportunity of access (Eisenhardt and Graebner, 2007; Yin, 2009). This is what happens with the selection of ACC.

After a few contacts with managers at ACC, a preliminary meeting was scheduled and the managers showed their availability to host the research. Furthermore, the company brought together two important aspects that were defined at the start by the researcher to considerer a case revelatory. The company has in use well defined management control practices that are enacted year after year to achieve the defined strategies. Nine years ago, the case company have hosted another PhD research project that provided a complete account of these practices at that moment and that gave us a certain guarantee of what to expect in the field about this matter (see Ferreira, 2010). Also, the company has a strong orientation toward innovation, with a strong culture and strategy built upon it[3].

ACC is the most innovative business unit (BU) of the larger listed group Corticeira Amorim. Corticeira Amorim is an industrial group that started with the production of cork stoppers but today has BUs that go from the managing of raw-materials to insulation cork, and composite cork products. This last, is the company in which the study was developed and is considered the most technological and innovative business unit of the group.

ACC is an industrial unit with roots in the 1960s, that produces cork granulates and agglomerates and cork with rubber agglomerates. These valuable agglomerates are then used for a wide variety of products that are commercialized around the world. ACC has clients in very demanding industries and for that reason have always felt the need to invest in research and development. ACC uses the acoustics, sealant, thermic and even aesthetic potentialities of its agglomerates to produce solutions that are incorporated in products for the transport, construction, furnishing, and even aerospace industries (among others). This has made ACC a very innovative company, the most innovative business unit in the group, and even internationally recognized by this, as the company acknowledges on its official website:

> *[ACC is] Internationally renowned in the world of research, development and the production of new cork composite solutions, it embraces cutting-edge projects which not only benefit from the technical advantages of cork but increase their added value.*

Its mission is also related to innovation as seen in the following passage:

[3] The two remaining essays will clearly explore the ACC's innovation positioning in detail. For that reason, here we address this matter only briefly.

> *Innovation is central to the Composite Cork BU given that its mission focuses on developing new products and applications to add value to cork.* (2017 annual report)

For these reasons, ACC was the best option for the development of this study.

3.3. Designing the case study and preparation

After the selection of the case study is treated Ryan *et al.* (2002), Scapens (2008) and Yin (2009) proposed an interactive and non-linear process in conducting a case study. The first step for the authors is the designing of the case study and a stage of preparation for the collection of data. They mention that the first thing to do is to clarify and specify as clearly as possible the research questions to be addressed.

In this regard, the first essay started to be developed at the beginning of this dissertation, to clearly identify the main literature and to explore the questions that could be addressed. Prior to the field work, a preliminary draft of the essay was written. This essay was updated several times in the course of the field work, and during the analysis of the data. New literature was added to reflect the evolution of the research and to accompany the evolution of the growing body of literature to which this study contributes.

Apart from that review, we identified the relevant theories that could support and inform the work, since the choice of theory determines how the case study will be developed (Ryan *et al.*, 2002; Scapens, 2008; Yin, 2009). Still in this preparation stage, another important aspect was the search for literature on qualitative research and, especially case studies. We analysed how evidence could be collected, how it could be assured rigour in the study, and how the data could better be treated and analysed. For this, specific literature was assessed, including Mason (2002), Patton (2002), Ryan *et al*. (2002), Ahrens and Chapman (2006), Pratt (2008; 2009), Gioia *et al*. (2013), Silverman (2013), and Miles *et al*., (2014).

3.4. Collecting evidence and assuring its quality

The succeeding steps enunciated by Ryan *et al*. (2002), Scapens (2008), and Yin (2009) are the data collection process and the assessing of evidence. Data were collected between November of 2015 and September of 2016. Evidence in a case study can come from a variety of sources (Moll *et al*., 2006b; Berry and Otley, 2008; Yin, 2009). In the case of this study, evidence has come from interviews, direct observation, and documentation of the case company.

The case study/collection of evidence progressed in two stages. The first stage comprised a pilot case study to access the availability of the company and its suitability to the purposes of this study. At this stage, we also searched for insights about the company and a broad understanding of the company. The history of company, the management control practices, the innovation processes, and the company market and innovation positioning were analysed in detail (see Appendix A for a guide in this interviews). To this end, a total of six interviews (Appendix C), three visits to the company (Appendix D), and a collection of internal and external documentation were carried out.

After this stage, lines of inquiry were defined and the full range of employees to interview was defined. Twenty-six more interviews were conducted with key employees of the company (Appendix C). All the heads of the departments except one were interviewed and, in the case of the departments with more than five employees, two more employees in the second line of management were interviewed. In the specific case of the production department, which concentrates most of the employees of the company, all of the second-line managers were interviewed. These interviews were prepared in advance but they quickly evolved into a more informal conversation[4]. This allowed us to pursue new issues and ideas as they were emerging and to adapt the interview to the expertise and job of the interviewee (Ryan *et al*., 2002; Scapens, 2008).

At the end, the interviews represented the main source of evidence. A total of thirty-two interviews were conducted and two visits were made to the facilities of ACC (Appendix C and D). Also, we attended a meeting held for all the employees involved in the PMS. The interviews have an average duration of one hour each and were all tape recorded except for the first, in which only practical aspect of the research were addressed. These

[4] The questions prepared are presented in the Appendix A and B.

interviews were transcribed verbatim afterwards. Since in the visits recording was not feasible, detailed reports were written as soon as possible.

In addition, a wide variety of documentation was collected. Besides the publicly available information and documents available, internal documents were gathered, as their existence emerged during the interviews. In accordance, documentation regarding the MCS and ACC's innovation processes were gathered. Furthermore, internal reports, PowerPoint presentations of the strategic plans, information about the goals and evaluation measures and examples of monthly reports of results from employees and the company were also gathered.

Following this research design, it was possible to incorporate some of the strategies recommended by Yin (2009) to ensure the validity and reliability of the evidence. First, we used a multitude of data sources (Berry and Otley, 2008; Yin, 2009). This guaranteed a triangulation of information, and since the interviews were conducted to various hierarchical levels it was possible to obtain multiple perspectives and increase the depth of the analysis. Thereafter, a database to organize and document all the data collected was created (Yin, 2009). Also, the use of a qualitative data analysis software helped in this task of managing this evidence and analysing it. Finally, in writing the essays that compose this study, we sought to keep a chain of evidence.

3.5. Data Analysis and writing the empirical essays

Analysing the evidence is considered one of the hardest steps in the development of a case study (Mason, 2002; Yin, 2009). As Scapens (2008) reports, in a case study a great deal of data can be accumulated. Going though these data was a challenging task and different protocols of analysis were followed in the two essays[5]. To analyse the findings, we used a software for qualitative data analysis (MAXQDA) that facilitated the codification of the data, its tracking, and comparing the results.

In the second essay, we chose a deductive protocol of analysis of the findings (Patton, 2002; Miles *et al*., 2014). In this essay, since Simons' LOC framework (Simons, 1995a;

[5] Here only a brief report on how the data were analysed is provided. For more detailed accounts, please see the two essays.

2000) was used, the goal was to identify how the managers at ACC were mobilizing their MCS according to the four levers of control. An analysis of the literature was conducted to perceive how these levers were operationalized and then data were coded according to it. With this a consistent process of analysing the data was secured (Miles *et al*., 2014). During this process, how the dynamic tensions between these levers manifested started to be perceived as well as what that means to innovation. Once the dynamic tension started to become clear (after a few interviews were analysed) the interviews were analysed again.

In the third essay the protocol followed was slightly different. The research questions posited for this essay give the case study a more exploratory role, and for that reason an inductive protocol was followed to analyse the data. The data analysis started with the creation of first-order codes or open coding (Gioia *et al.*, 2013; Miles *et al*., 2014) oriented by the research questions. This was a complex process, and as various authors recognize, involved various cycles of analysis, repeatedly searching the informants' words for clues (e.g.: Scapens, 2008). Notes were taken during the analysis and diagrams and charts to help the analysis were also done (e.g.: Mason, 2002; Ryan *et al*, 2002; Scapens, 2008). Ahrens and Dent (1998) acknowledge that perceiving patterns in the data is the most uncodified part of the data analysis process. However, with time, and in line with the impressions during the interviews, patterns started to appear. Considering these patterns, the data were reassessed and the analysis written.

Lastly, the two essays were written and are presented in this dissertation. In writing these essays we sought as much as possible to walk the reader through the analysis providing accurate and reliable answers to research questions. The patterns are explained with supporting evidence.

4. Organization of the dissertation

This dissertation is organized in five sections. Additionally, to this first section (the introduction), the three essays are presented, and at the end it is presented the concluding remarks.

The first essay is presented in the second section. This section is an extended literature review, walking the reader throughout the evolution of the research and identifying some possible paths for research using qualitative methodologies. This essay/section is entitled "Bridging Management Control Systems and Innovation: the evolution of the research and possible research directions".

Having established the importance of adopting case-based research to explore the field and dig into very interesting dynamics, we present the empirical essays. The first essay, called "Management control systems and innovation: a levers of control analysis in an innovative company", is presented in the third section of the dissertation. Informed by the LOC framework and the principle of dynamic tensions, it studies how the managers in ACC use the MCS at their disposal to manage innovation and how dynamic tension arises.

The fourth section corresponds to the last essay, with the title of "Management control systems and innovation: a case study enlightened by institutional theory". It links institutional theory to the dimension to which MCS affects the behaviour of individuals to inform a model on how and why MCS affects innovative behaviours. It also assesses how institutional theory can help to explain the role of MCS in innovation.

Lastly, the fifth section is the conclusion, where a summary of the study is done, followed by the contributions, limitations of the studies, and the development of some possible research directions.

II. BRIDGING MANAGEMENT CONTROL SYSTEMS AND INNOVATION: THE EVOLUTION OF THE RESEARCH AND POSSIBLE RESEARCH DIRECTIONS [6]

1. Introduction

Innovation is seen has a central driver of economic growth and sustainable development (Pfister, 2014), representing a critical source of competitive advantage for organizations (Crossan and Apaydin, 2010). Managers are constantly looking for solutions or tools that not only are able to trigger an innovative response in organizations (Chenhall and Moers, 2015), but to manage the processes associated with it as well. As a matter of fact, innovation is more a result of processes able to be managed by the organizations, than random events that some of them happen to experience at some point of their life (Davila, 2005; Bisbe and Malagueño, 2015).

Naturally, this innovative push has created additional challenges for management control systems. These challenges with time have revealed the central role that MCS can play in innovation (Bedford, 2015) to be very different from the paradigm that was in place some years ago. Traditionally, control has been seen as a restraint to the freedom, creativity, experimentation, and flexibility of the developers and, therefore, detrimental to innovation (Davila *et al*., 2009a; Christner and Strömsen, 2015). MCS were seen as a way to have unenthusiastic and compliant employees (Ouchi, 1979), which was opposite to the exploitation needed for innovation (Davila *et al.*, 2009a, b). Now the literature has established links between innovation and MCS (e.g.: Henri, 2006; Bedford, 2015) and recognized that MCS could help decision making through the innovation process (Pfister, 2014). Some authors point out that MCS encourage creativity (Merchant and Van der Stede, 2012), facilitate flows of information (Lopez-Valeiras *et al*., 2016), or orient managers to opportunity seeking behaviours (Simons, 1995). With these circumstances, the debate has been fuelled and the interest of researchers has led to an increase in the number of works published in a wide array of research fields (Lövstål and Jontoft, 2017). Indeed, this is a field with much to explore despite the advances that have been achieved

[6] This essay was submitted for publication in Qualitative Research in Accounting and Management and is already under the second round of revision.

so far. In this regard, it is still necessary to further our knowledge on how management control practices can support and relate to innovation. This entails knowing what has been achieved in the literature so far.

Prior reviews of the literature have been conducted (Chenhall and Moers, 2015; Moll, 2015; Fried, 2017; Lövstål and Jontoft, 2017), but they do not consider the context and the practices that were generally used and at the disposal of organizations. Furthermore, they have very concrete sub-points that do not cover all the research that has been conducted. Fried (2017) concentrates her review on the terminological distinctions of control, while Lövstål and Jontoft (2017) mainly review tension-related terms and their interpretation. Chenhall and Moers (2015) examine the role of innovation as an element of context and as a key variable in the evolution of MCS from simple closed systems to complex calculative practices. Moll (2015) writes an editorial for a special issue in Management Accounting Research, but only briefly discusses some studies that focus mainly on new product developments.

Against this background, this essay builds on these reviews with the general purpose of following the history of the research and perceptions about the role of MCS in innovation bringing together recent literature and making some suggestions for further research. Consequently, the base point here is that it is not possible to dissociate the conclusions and the analysis that this body of research provides without considering the historical evolution of management control practices and the overall environmental context that determined these practices. For example, in the transition of the understanding reported earlier much has changed. Since Johnson and Kaplan (1987) argued that management accounting has lost its relevance, the practices and techniques of management control have undeniably evolved much in consequence of the conditions of organizations' environmental aspects. The latest forms of control are more open to uncertainty (Simons, 1995a) and strategic aspects (Wickramasinghe and Alawattage, 2007; Langfield-Smith, 2008) that are paramount for accommodating innovation. Altogether, these new techniques and conditions have led to the development of different perceptions and frameworks that permit looking at control and innovation with different eyes.

Therefore, the contribution of this essay resides in providing a structured review of the main literature linking innovation and MCS and proposing avenues for future research. The analysis is divided into two historical phases that represent the different perceptions

about the role of MCS that have been enunciated earlier. The first period comprehends the traditional view of the role of control in innovation and the second, a more recent period that groups the research developed after the 1980s. The latter period is hereinafter called contemporary. This paper merges two bodies of research. First, it builds the context with some base and seminal works on management accounting and control. Second, the literature on MCS and innovation is analysed with a descriptive emphasis. To this end, we collected empirical and theoretical references from articles, books, and book chapters that explored any aspect of the role of MCS in innovation or provided important arguments.

At the end, having identified the state of the art, it is argued that the field lacks more detailed and rich analyses between the dynamics of the two realities explored. For this, researchers should take a radical step forward. The field needs researchers to embrace qualitative methodologies with theoretical perspectives based on social and institutional aspects rather than follow the main approach with contingency, functionalist and practical nature flavours. With this support and bases, it is possible to unveil some points to explore. For example, regarding institutional theory, further research could analyse the way MCS changes innovation processes or concepts or how new products developed affect the management control practices. Another avenue is to analyse how systems are used during the development processes and how internal tensions related to innovation appear, disappear and are managed by the MCS.

The remainder of this paper is structured as follows. The next section explains the key terminology used herein. The third section portrays the evolution of the role of MCS in innovation, starting with the traditional view and its contextualization. Then, the alterations that led to the more contemporary phase are explained and, after, the findings achieved so far are described. In the fourth section some gaps are identified and directions for future research are proposed, before concluding in the final section.

2. Conceptual underpinnings

Before reviewing the literature, it is necessary to clarify the underlying theoretical concepts. This section presents those concepts, starting with that of innovation and then moving on to the definition that will be applied to MCS.

2.1. Innovation

Innovation is considered a source of competitive advantage (Crossan and Apaydin, 2010). It is a broad concept with multiple definitions depending on the author and the research tradition and, therefore, difficult to define in few words. Baregheh *et al.* (2009) found 60 different definitions of innovation were found in the literature in a search through journals from various disciplines. The first definition of innovation is attributed to Schumpeter in 1934 (Crossan and Apaydin, 2010). Known as the prophet of innovation, Schumpeter (1934) argues that economic development is driven by innovation, and it can come in the form of a new product, a new production method, a new organizational structure, a new source of supply, or the exploitation of new markets (Schumpeter, 1934; Fagerberg, 2005; Crossan and Apaydin, 2010). After Schumpeter's theories, several other authors and institutions defined innovation (e.g.: Damanpour, 1991; OECD, 2005; Crossan and Apaydin, 2010). For example, the Oslo Manual (2005) tells us that innovation is "*the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organisation or external relations."* (OECD, 2005: 46).

From the body of research examined in this essay various authors choose to adopt definitions closer to the interpretation that innovation is a process by which the implementation of new ideas happens (e.g.: Davila, 2000; Davila *et al*., 2009a; Adler and Chen, 2011; Bisbe and Malagueño, 2015; Chenhall and Moers, 2015). This approach highlights the relevance of MCS, in which innovation is treated not as a random event but as a result of organizational processes able to be managed (Davila, 2005; Davila *et al.*, 2009a; Bisbe and Malagueño, 2015). Following this thought, Davila (2000) mentions that as new product development processes gained more importance in company strategies, so too did the role of MCS in coordinating and controlling them. In the same line, Davila (2005) stated that the MCS control systems can be flexible enough to deal with the unpredictability of innovation and, at the same time, stable enough to frame action, reinforcing the idea that innovation is an organizational process able to be managed. The author further adds that the organizational processes that could be related to innovation, at both the strategic and organizational level, include the internal powers that make it possible to "*identify, nurture, and translate the seed of an idea into value*" (Davila, 2005: 42). Consequently, this interpretation leads to the distinction between the concept of creativity and innovation, although the two concepts are closely linked to each other

(Chenhall and Moers, 2015). Chenhall and Moers (2015), for example, see creativity as the production of a novel idea that can, therefore, be considered the starting point for innovation. Adler and Chen (2011), also studying creativity, define it as the generation of novel ideas. However, innovation is then seen by Chenhall and Moers (2015) as the creation and successful implementation of these creative ideas that could be related to new processes, new products, or new services that improve outcomes for companies.

2.2. Management control systems definition

MCS are today systems of complex nature with controls connected by various complementarity relationships between them (Chenhall and Moers, 2015). For this reason, focusing on a single MCS definition is not an easy task, since the literature lacks agreement. One of the possible reasons behind this is the growth of its scope. The first conceptualisation of the notion of management control goes back to the seminal work of Robert Anthony, in which he defines management control as "*the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplish of the organisation's objectives*" (Anthony, 1965: 2). Focused on planning, monitoring, and measuring this conceptualization is very representative of the way these systems were initially perceived. Since that time, the scope of the definition of management control has increased and entered the field of strategy, with emphasis being placed on value creation, employee empowerment, and formulating competitive benchmarks (Langfield-Smith, 1997; Ittner and Larcker, 2001)[7]. The recognition of the need for value creation called for the identification, measurement, and management of value drivers that guarantee customer satisfaction, investor return, and organizational innovation (Ittner and Larcker, 2001). As Langfield-Smith (1997) highlights, management control should involve the use of non-financial measures to determine the performance of short-term indicators linked to the attainment of long-term strategic goals. In practice, organizations do this by adopting new strategic accounting techniques such as the Balanced Scorecard[8] (BSC) (Ittner and Larcker, 2001). These types of techniques

[7] The studies of Langfield-Smith (1997) and Ittner and Larcker (2001) provide a more detailed analysis on the evolution of the scope of Management Control.

[8] Introduced by Kaplan and Norton in a 1992 Harvard Business Review article, the BSC retains financial metrics as a key factor for business success but with the aim of creating value for shareholders in the long run. It uses three other perspectives: customer, internal processes, and learning and growth (Kaplan and Norton, 1992, 1996; Kaplan, 2009).

are normally designated as Performance Measurement Systems, which in simple terms, are a set of metrics that operationalize the strategy and attain strategic goals through a set of financial and non-financial measures (Henri, 2006; Hall, 2008; Franco-Santos *et al.*, 2012). These systems are involved in more complex MCS, having relationships of complementarity with other controls, such as budgets or incentive systems (Chenhall and Moers, 2015).

This brief background creates a challenge in choosing a definition that reflects the points enunciated. To overcome this, it was decided to adopt a comprehensive definition in their scope that could, like the approach followed by Franco-Santos *et al.* (2012), focus on the necessary and sufficient conditions that comprise MCS. Accordingly, based on the definitions provided by Simons (1995a) and Chenhall and Moers (2015), it is considered as MCS the formal information routines and procedures used by managers to maintain or modify patterns to achieve organizational goals. This definition, therefore, puts an important emphasis on the connection between these systems and strategy, ensuring an operationalization and attainment of the organizational strategic goals. Furthermore, it will allow us to develop the analysis following the various time periods and the evolution on the perception of the role of MCS in innovation.

This definition assumes that MCS represent processes of information, that could be more or less complex, with more or fewer controls involved. This opens the door to the inclusion of the ideas of a combination of systems that work as a package (Malmi and Brown, 2008; Sandelin, 2008; Ferreira and Otley, 2009; Grabner and Moers, 2013), the levers of control framework (Simons, 1995a), performance measurement systems like Balanced Scorecard (Kaplan and Norton, 1992, 1996), budgets, and other systems that can fulfill the principles of operationalization of the strategic goals from the definition enunciated.

3. The evolution of thought on the role of MCS in innovation

The published works that explore the role of MCS in innovation are organized here at two moments. From the literature reviewed we perceive a movement from a point at which some authors provided arguments and evidence to show how detrimental MCS were for innovation and, a second moment where there is a change to a different perspective. These

phases elapsed like "historical" phases that, for the purposes of this essay, are named traditional and contemporary phases. The reporting of these moments and the research that is encapsulated in them start with a contextualization about the exogenous circumstances that justify the design of MCS in those periods, and then a descriptive analysis of the findings is conducted.

3.1. Traditional thinking about MCS and Innovation

Wickramasinghe and Alawattage (2007) make a fairly good report on the historical context in which what the authors call a mechanistic approach to management accounting and control was developed. Two important facts are pointed out by the authors to justify the practices developed and used in this period (Wickramasinghe and Alawattage, 2007). First was the movement from craft production to mass production. With the industrial revolution and the economies of scale that could be gain as a consequence, large amounts of money were invested in the production processes (Johnson and Kaplan, 1987). Managerial movements, like Taylorism and Fordism, led to job and process fragmentation, standardization, and rationalization of production systems that de-skilled the workforce and resulted in more productivity (Wickramasinghe and Alawattage, 2007). Furthermore, externally industrialized countries were able to sell their products easily with low competition either in price or quality (Ashton *et al*., 1995), which allowed companies to focus on the efficiency of production processes (Loft, 1995).

Second, the shift that occurred in the production process also led to the emergence of bureaucratic forms of organization (Wickramasinghe and Alawattage, 2007). Johnson and Kaplan (1987) also mention that following the industrial revolution there appeared a hierarchical form of organization that created a new demand for accounting information in order to maximize the efficiency of the capital invested. These hierarchical organizations continued to grow with the advances in transportation, communication, and economies of scale creating more opportunities to gain from this form of organization (Johnson and Kaplan, 1987).

In this way, the traditional formulations of control were established to act in accordance with the principles of standardization, in bureaucratic environments, and with rigid rules (Davila, 2005; Wickramasinghe and Alawattage, 2007). In other words, this meant that

management accounting was centred on principles such as the mechanization of production and production-orientation in management. Management accounting and control provisioned the managers with tools to monitor behaviour and minimized the need for direct supervision (Wickramasinghe and Alawattage, 2007). Indeed, the focus of this traditional MCS was to make sure that processes delivered the value they were projected to generate, promoting the execution of the same routines in companies with little or no change (Davila, 2005; Davila *et al.*, 2009b; Ylinen and Gulkvist, 2014). Efficiency of the internal processes was the motive for having controls at this period (Johnson and Kaplan, 1987). However, these systems were mainly reactive, identifying courses of action only after deviations from the plans were detected (Ashton *et al*., 1995). It predominated the use of cost accounting, variance analysis to production activities, budgeting control, and financially oriented decision analysis as modes of delegation and control (Ittner and Larcker, 2001; Wickramasinghe and Alawattage, 2007). MCS were intended to reduce uncertainty and emphasized problem solving (Langfield-Smith, 1997), specifying concrete objectives for managers who should ensure its accomplishment (Wickramasinghe and Alawattage, 2007). Simons (1995b) noted that managers in this era exercised control by telling employees how to do their jobs and monitoring them with constant surveillance to guard against any surprise.

Regarding innovation, these systems emphasized execution and not exploration (Davila *et al.*, 2009a, b), leading to employee dissatisfaction and stifled creativity (Cardinal, 2001). As Davila *et al*. (2009a) points out, control tools were a way of delivering pre-determined objectives and therefore eliminated the possibility of innovation because this was seen as inefficient due to the high risk of failure. The processes associated with innovation were identified as uncertain: they lacked routine and their outputs were usually hard to evaluate (Abernethy and Brownell, 1997; Davila *et al*., 2009b). Additionally, their features were not within the pillars of uniformity and predictability required by traditional systems (Davila, 2005). In sum, MCS were understood to hold back the development of innovation (Davila, 2000; Ditillo, 2004; Davila, 2005; Mouritsen *et al*., 2009; Davila *et al*., 2009a; Haustein *et al*., 2014; Christner and Strömsen, 2015; Lopez-Valeiras, 2015; Chenhall and Moers, 2015).

To support this argument there are a number of empirical studies and authors. Overall, early studies find organic forms of control more suitable for organizations that try to pursue innovation (Chenhall and Moers, 2015). Quinn (1978) states that formal planning

practices in organizations institutionalize innovation as an incrementalism. Ouchi (1979) resorts to some examples to show that control systems that depend on monitoring, evaluation, and correcting in an explicit manner lead to unenthusiastic and compliant employees. Ouchi (1979) goes further and states that, in innovation settings, no "rational" forms of control can be applied. Based on Ouchi's framework (1979), Rockness and Shields (1984) seek to understand which control systems are appropriate for research and development reaching results that do not allow them to verify many of the planned associations and, hence, it can be concluded that control ends up constraining innovation. Reaching a similar conclusion, Abernethy and Brownell (1997) report that in research and development organizations, where uncertainty is high, reliance on more personal forms of control are preferable to accounting or behavioural control systems. The authors dissociated formal MCS from entrepreneurship and innovation (Davila *et al*., 2009b).

The same idea is shared by the innovation literature. Damanpour's (1991) meta-analysis of the relationship between innovation and its potential determinants sees control as detrimental to innovation efforts, and reports the negative effect of formalization. The above arguments are all examples of the traditional view that control should be avoided when searching for innovation.

However, a new approach to control is now in place. At the end of the 1980s, Johnson and Kaplan (1987) argued that the approaches to management accounting and control had lost their relevance. Since then, various techniques have been developed to provide an answer to an environment with new challenges. As a result, the perspectives on the role of MCS in innovation also have evolved, and more recent empirical studies have portrayed a new way of thinking about control in innovation contexts.

3.2. From a traditional thinking to a new paradigm

During the 1980s, Johnson and Kaplan (1987) posited that MCS of most companies were of little help to them, and that a loss of relevance had occurred regarding management accounting. The social-political and economic context changed, ushering in an historical transformation (Wickramasinghe and Alawattage, 2007). The global competition of the 1980s associated with a revolution triggered by the new practices introduced by the

Japanese manufacturers and the development of technology put companies under pressure (Johnson and Kaplan, 1987; Wickramasinghe and Alawattage, 2007).

More specifically, the context in which companies were inserted evolved from local to global (Wickramasinghe and Alawattage, 2007), with a decline of protected markets and a fair increase of global competition (Ashton *et al*., 1995). In parallel, a set of technological and political changes had occurred such as the development of the technologies of information, telecommunications, and transport, along with an appreciation of knowledge-intensive activities (Johnson and Kaplan, 1987; Wickramasinghe and Alawattage, 2007). Also, Japan was becoming one of the world leaders (Ashton *et al*., 1995), motivated by the models developed in the 1970s that had made the Japanese companies a competitive threat that could not be taken lightly (Wickramasinghe and Alawattage, 2007). With this, markets had become volatile and managers started to put their attention on the market positioning of the company and on customer satisfaction (Wickramasinghe and Alawattage, 2007). New entrants and substitutes now represented a potential threat, which made managers think more strategically and less financially (Wickramasinghe and Alawattage, 2007). Following this line, the ideals about manufacturing also changed, and at this moment, instead of mass production, the organizations tended to adopt more flexible regimes of production (Wickramasinghe and Alawattage, 2007). Products are now rapidly obsolete, and flexibility to adapt to customer preferences is needed (Johnson and Kaplan, 1987). Also, companies are required to adopt structures and management styles more flexible and responsive (Ashton *et al*., 1995). Against this background, Wickramasinghe and Alawattage (2007) argue that from the mid-1980s a mechanistic form of organization gave way to a post-mechanistic approach. This transformation also has implications to management accounting and control practices, which now have a completely different role (Wickramasinghe and Alawattage, 2007).

Before, standardization and control of production activities were the main roles of management accounting. Now these systems contribute mainly to flexibility and autonomy (Wickramasinghe and Alawattage, 2007). This is in line with Johnson and Kaplan (1987), who posit that the challenge is to develop flexible approaches to performance measurement systems and management control. Furthermore, the new emphasis put on the strategic focus has brought to the management accounting discipline a wide array of possibilities (Langfield-Smith, 2008). New tools and techniques have been

developed that allow integrating management accounting and control to the operations management level and to the strategic level (Wickramasinghe and Alawattage, 2007). Examples of such techniques are the Activity-Based Costing (ABC), enterprise resource planning (ERP), and Balanced Scorecard (Ittner and Larker, 2001; Wickramasinghe and Alawattage, 2007; Chenhall and Moers, 2015). In general, besides regularly measuring a variety of financial indicators, these systems also focus on nonfinancial indicators based on the company strategy.

MCS have developed in such a way that they are now able to back innovation, providing rationales around which innovation can be debated (Chenhall and Moers, 2015).

3.3. Contemporary research on MCS and Innovation

Against this new way of looking at MCS, an emerging stream of literature has questioned traditional thinking and stressed that MCS can boost innovation (e.g.: Mouritsen *et al*., 2009; Adler and Chen, 2011; Chenhall *et al*., 2011; Ylinen and Gulkvist, 2014; Bedford, 2015; Bisbe and Malagueño, 2015). The current understanding is that MCS support organizational efforts to respond and adapt to the environment (Davila, 2005); allowing organizations to create unique capabilities (Mundy, 2010) and promoting dialogue and idea creation (Davila *et al*., 2009b). Based on the case of IBM and the standard Chartered Studios in San Francisco Pfister (2014), reports that control can be directing, enabling, and supportive and with these characteristics open the door to innovation and creativity. In general terms, as Davila (2005) points out, MCS can be flexible and dynamic enough to deal with innovation processes, not treating them as random exogenous events, but rather as manageable organizational processes.

The literature has gradually recognized this new role for MCS. Amabile (1998) reports that creativity can be enhanced only when people are granted freedom to achieve the goals. The author adds that these goals need to be clear and stable for a long period of time. Nixon (1998) conducted a case study that highlights the important role played by accounting and the financial controller in planning and controlling new product development processes. Davila (2000) shows that PMS are relevant in product development processes, and a necessary tool to reduce uncertainty. Cardinal (2001) defends the importance of control for both incremental and radical innovation. In her

view, input, behaviour, and output forms[9] of control are good for innovation as they enable scientists to conduct their work. While the results point to the importance behavioural, output and input control for radical innovation, input, and output control are shown to be important for incremental innovation.

Chenhall *et al*. (2011) contribute to the debate in the literature by examining how MCS are involved in the relationship between strategies of product differentiation and innovation based on a survey of Russian companies. They find evidence that formal controls have some influence in helping companies to develop innovations. Merchant and Van der Stede (2012) state that controls lead to significant opportunities for improvement or innovation by fostering creativity in some cases. Mouritsen *et al*. (2009) use a multi-case study of three firms to conclude that management accounting calculations link innovation to the firm-wide concerns. The authors believe that this link is created by short and long translations; short translations are activities that mediate innovation activities and the cost and revenues of the firm, while long translations frame considerations about the value of the innovation to the firm throughout a tension created by multiple calculations.

Although not studying innovation directly, Adler and Chen (2011) examine creativity and motivation. The authors develop an integrative model in which they sum 15 propositions, and conclude that the proper MCS and enabling forms of bureaucracy can be united to support creativity.

Two empirical studies address innovation capability as opposed to innovation, based on surveys in small and medium-sized Finnish companies. Saunila and Ukko (2013) showed that there is a positive relationship between innovation capability and performance measurement. Saunila *et al*. (2014) conclude in their quantitative-based study that performance measurement can be used as a tool to increase the performance of small and medium size enterprises through innovation capability. The authors state that innovation capability is greater in companies that measure its determinants, especially if external knowledge is actively exploited as a determinant (Saunila *et al*., 2014). What the authors

[9] Following the explanations of Cardinal, input control may be perceived as a form of resource allocation, behaviour control as monitoring of ongoing employee activities and behaviours, and output control is related to evaluation of results an outcomes. As Davila *et al*. (2009b) explains, input control is more informal and the other two are more formal controls.

demonstrate is that performance measurement has a moderating effect on the relationship between the determinants of innovation capability and organizational performance (Saunila *et al*., 2014). However, this study uses the same data sample as Saunila and Ukko (2013), so the results can be expected to be similar.

For its part, the theoretical work of Haustein et *al*. (2014), based on Merchant and Van der Stede's (2012) object of control framework, states that the control of results (e.g. performance measures) is not appropriate for companies with a high innovative capacity as employees tend to adopt a risk-averse behaviour. The authors even hypothesize that the control of results is negatively associated with innovation capacity in innovative companies. Haustein *et al*. (2014) also hypothesize that cultural control should be positively associated with innovation capability. According to the authors, cultural control (e.g. codes of conduct, team rewards) stems from a strong culture and will serve as a repository of knowledge and should stimulate collective action and tolerance for divergent ideas.

Lopez-Valeiras *et al*. (2015) study how MCS facilitate the appropriation of the benefits of sustainable innovations and conclude that MCS can enhance the impact of innovations on organizational performance when used in accordance with the more recent notions of control. They give the example of the Balanced Scorecard, which is oriented to the external environment and is able to offer a comprehensive approach to control the internal processes within the strategy. The study is based on a survey using a sample of companies in the Portuguese and Spanish agrifood industry.

Indeed, these are just a few conclusions in a wider field of research. The Simons Levers of control framework is the main reference used in this new approach on MCS and innovation, and was the subject of many reflections in the literature. Chenhall and Moers (2015) state that the most significant and remarkable advances linking innovation and MCS came from studying the use of control mechanisms according to the LOC framework. The next subsection will address in more detail the literature that has used this referential and report the main conclusion they achieve.

3.3.1. Innovation and the LOC Framework

Davila *et al*. (2009a) consider Simons' levers of control framework to be a paradigm shift in the traditional way of thinking, as it clearly identifies interactive systems as tools that ensure that organizations explore strategic uncertainties. Highlighting the importance of this framework, Moll (2015) reports that Simons' seminal work seems to have served as an inspiration for researchers to rethink accounting's compatibility with the development of new products. In fact, the framework describes an efficient way in which managers can balance innovation and control while implementing the intended strategy (Simons, 2000). More specifically, Simons (1995a) reports that while diagnostic control systems prevent innovation from ensuring the attainment of pre-established goals, the interactive use of controls and belief systems creates tension that allows organizations to develop a positive environment for sharing information and learning. This is a strong argument for the relevance of control of innovation (Davila *et al*., 2009a). It is on these grounds that much research is conducted.

For example, Marginson (2002) uses Simons' framework to study the relationship between MCS and the strategic process in a telecommunication company, Telco, and finds that top management's use of PMS creates tension and the possibility of trade-off during the development of new ideas and initiatives; in other words, during the execution of innovation. Moreover, Marginson (2002) suggests that beliefs and boundary systems trigger organizational change.

Going further, Bisbe and Otley (2004) achieve some results that contradict Simons' hypothesis about the effect of interactive control on innovation. Gathering data through a survey with medium-sized Spanish manufacturing firms and focusing on product innovation, the authors conclude that the interactive use of MCS can foster innovation only in the case of low innovating companies. The authors explain that the interactive use of MCS favours innovation in these companies by providing guidance for searching, legitimacy for autonomous initiatives, and stimulus for initiatives. In contrast, the impact in highly innovative companies is found to be the exact opposite, probably due to the filtering of initiatives as an outcome from sharing and exposure of ideas. Also, the authors find no evidence that the interactive use of MCS affects performance through an indirect effect on product innovation. However, they conclude that the impact of product innovation on performance is moderated by the way MCS are used.

Henri (2006) examines the relationship between diagnostic and interactive uses of PMS and concludes that the interactive use of these systems contributes positively to developing capabilities of entrepreneurship, organizational learning, market orientation, and innovativeness. But when using the PMS for diagnostic purposes, it contributes negatively to the deployment of these capabilities. Furthermore, the author concludes that the balanced use of the two systems generates a dynamic tension that will also contribute positively to developing these capabilities in uncertain environmental contexts. These conclusions are based on the results from a questionnaire sent to Canadian manufacturing firms.

Koufteros *et al*. (2014) reach conclusions similar to those of Henri (2006). With a research-based questionnaire administered to Italian companies, Koufteros *et al*. (2014) stress the positive influence of the interactive use of PMS. However, the study provides evidence that the diagnostic use of PMS also contributes positively to the development of organizational capabilities. Indeed, the authors note that, statistically, the effect of diagnostic use is the strongest. In a second phase of the study, Koufteros *et al*. (2014) conducted retrospective interviews that allowed them to further conclude that the combination of an interactive and diagnostic use of PMS, in a concurrent logic, proves quite beneficial for companies.

In relation to the interactive use of MCS, some studies are devoted exclusively to its link with innovation. Analysing a sample of medium-sized Spanish companies, Bisbe and Malagueño (2009) conclude that the specific choice of an individual MCS for interactive use is related to the company's type of innovation mode. The authors found evidence that companies dedicated to simple and isolated forms of innovation and companies looking to create a rich portfolio of innovations usually tend to select BSC for interactive use. Lopez-Valeiras *et al.* (2016) use a survey of companies in the Spanish agrifood industry to highlight the role of the interactive use of MCS in process and organizational innovation[10]. The authors conclude that the interactive use of MCS is a key determinant for process innovation since it facilitates the necessary internal and external information flows. Moreover, Lopez-Valeiras *et al*. (2016) state that interactive use of MCS acts as a moderator in the relationship between process innovation and financial performance. On

[10] Lopez-Valeiras *et al.* (2016) follow the definitions of the OECD (2005), which associate process innovation to the production environment and the delivery methods, and organizational innovation to the improvement of administrative methods.

the other hand, although there is no evidence to support that the interactive use of MCS is also a moderator in organizational innovation, the authors were able to determine a positive relationship between the interactive use of MCS and this type of innovation.

Bedford's (2015) survey-based research in Australian firms corroborated the conclusions of Bisbe and Otley (2004). Bedford (2015) concludes that the interactive use of control systems is found to be associated with performance in companies more focused on exploratory innovation. Furthermore, Bedford (2015) states that interactive control increases the effectiveness of innovation processes rather than the propensity of companies to engage with new products and technologies. However, companies looking to refine first-order skills tend to benefit more from focusing on diagnostic use and the boundary system. In the case of companies looking to achieve both modes of innovation, the author concludes that it is the dynamic tension created by the diagnostic and interactive use that permits a higher performance. Using a different methodology, also in 2011, McCarthy and Gordon developed a conceptual framework, which they subsequently validated with semi-structured interviews that allowed them to reach very similar conclusions. McCarthy and Gordon (2011) predicted and confirmed that the diagnostic system and the boundaries system contribute to exploitation while the interactive and beliefs systems contribute to exploration.

Still considering all Simons' levers of control, the Bisbe and Malagueño (2015) study examines the association between these levers and the different phases of product innovation processes. They argue that the influence of MCS in innovation processes depends on the entrepreneurial orientation of the firm that is reflected in its values and in its strategic uncertainties. Using survey data collected from senior managers of medium and large Spanish companies, the authors conclude that the value system (a group that includes Simons' boundary and beliefs systems) and the interactive control systems have significant effects on each phase of the innovation process. The findings reveal that the interactive use of MCS stimulates creativity in conservative and entrepreneurial companies. The interactive use of control systems in entrepreneurial companies is not only positively associated with the filtering stage, but its use also activates this stage. Emphasis on the value system is also positively associated with the filtering phase in conservative companies, while the interactive use of control systems is positively associated with creativity. Additionally, the results achieved by Bisbe and Malagueño

(2015) suggest that the diagnostic control system plays a minor role in each of the various phases of the innovation process.

Based on Simons (1995a), Adler and Chen (2011) also look at the impacts of the four levers of control but considering motivation, dedicating some propositions of the framework they intended to develop to them. These propositions state that the use of interactive and beliefs systems are expected to be positively associated with motivation. However, they propose that when boundary and diagnostic systems are used in an enabling way they should be positive for motivation, but when managers choose to use them coercively a negative effect could be expected. The authors also indicate that an optimal mix of the use of diagnostic and interactive systems is expected to have a positive effect on motivation.

Chiesa *et al.* (2009a) investigated the use of MCS in radical research projects through a multiple case study in two companies from the Italian automation industry. Their results show the Simons framework's relevance for exploring control in radical innovation projects. According to the authors, interactive and boundary systems have a broader use in response to uncertainty of these projects in the early stages, and diagnostic use of MCS is more used at the commercialization stage. Rezania *et al.* (2016) use surveys to 113 project managers to study the use of the LOC framework in relation to the performance of research projects. The authors confirm the importance of the four levers working together and their interdependence, and that these levers are positively related to project performance. Also, Rezania *et al.* (2016) discover enough evidence to affirm that the diagnostic and interactive systems are positively related to the performance of these projects. The same positive relationship is found regarding boundary systems, but beliefs do not have a strong effect on performance.

Very recently, Curtis and Sweeney (2017) have provided a different perspective. They report on a case study of a highly innovative company in which the mutually reinforcing combinations of MCS are analysed, according to the LOC framework and considering the tension created between different types of innovation (customer oriented innovation and technology oriented innovation). In this case, the authors conclude that although MCS trigger a push for consistency, they end up excluding one of the types of innovation rather than creating a dynamic tension between the two. The study also underlines the protective role of MCS in managing innovation. Curtis and Sweeney (2017) also report

that value systems create an infrastructure to innovation and show how interactive and diagnostic use of feedback and measurement systems protect innovation. Feedback and management systems are said by the authors to command management attention, stimulate action, and drive accountability on innovation projects.

Overall, the wide array of studies have explored the different relations in LOC use and innovation. Table 1 shows a summary of the LOC levers analysed by each reference, the methodology that was followed therein and the main conclusions taken.

Notwithstanding the wide variety of conclusions and the interconnections between innovation and the LOC framework, there are also other topics that are worth addressing, as is the case of how literature has explored the management of innovation processes.

Study	Methodology followed	LOC levers analysed	Main Conclusions
Bisbe and Otley (2004)	Survey	Interactive system	Interactive system fosters innovation only in the case of low innovative firms by providing guidance for search, triggering initiatives, and providing legitimacy to these initiatives. The opposite effect appears in high innovative firms, due to the filtering of initiatives from the exposure of ideas.
Henri (2006)	Survey	Interactive system and diagnostic system	Interactive use of PMS is positive to development of innovativeness. But a negative effect is expected by the use of PMS in a diagnostic manner. Furthermore, support is found that balanced use of the two types of use benefits the development of innovativeness.
Bisbe and Malagueño (2009)	Survey	Interactive system	The choice of which controls are used interactively depends on the company's innovation mode. Interactive use of BSC tends to be used by companies dedicated to simple forms of innovation and to companies that look for rich portfolios of innovation.
Chiesa *et al.* (2009a)	Multiple case study	Interactive system, diagnostic system, beliefs and boundary systems	Reliance on interactive systems in the early stages of radical projects. There is a broader use of interactive and boundary systems in response to higher uncertainty. Diagnostic control is more used in the phase of commercialization.
Adler and Chen (2011)	Theoretical work	Interactive system, diagnostic system, beliefs and boundary systems	Some propositions of the model propose that interactive and beliefs systems are expected to be positively associated with innovation. Diagnostic and boundary systems when used in an enabling way could be positive to innovation, but when used coercively are negative. A mix between diagnostic and interactive systems should have a positive effect on motivation.
McCarthy and Gordon (2011)	Theoretical work	Interactive system, diagnostic system, beliefs and boundary systems	Interactive and beliefs systems contribute to exploration while diagnostic and boundary systems contribute to exploitation.

Koufteros *et al.* (2014)	Survey	Interactive system and diagnostic system	Interactive and diagnostic use of PMS contributes positively to the development of organizational capabilities.
Bedford (2015)	Survey	Interactive system, diagnostic system, beliefs and boundary systems	Interactive use of controls is found to be associated with performance in exploratory innovation and exploitative innovation firms tend to benefit from diagnostic and boundary use of controls. Diagnostic use is found to be important for firms that focus on the refinement of first-order skills.
Bisbe and Malagueño (2015)	Survey	Interactive system, diagnostic system, beliefs and boundary systems (value system)	The influence of MCS on innovation depends on the entrepreneurial orientation of the firm. Value systems and interactive systems have significant effects on the phases of innovation processes. Diagnostic use of MCS plays only a minor role in each phase.
Lopez-Valeiras *et al.* (2016)	Survey	Interactive system	Interactive use of MCS is a key element to process innovation and there is a positive relation of this type of use and organizational innovation. Interactive use of MCS is a moderator between process innovation and financial performance.
Rezania *et al.* (2016)	Survey	Interactive system, diagnostic system, beliefs and boundary systems	The levers are positively associated with project performance and the authors stress the importance of the combined work of the four. Diagnostic, interactive and boundary systems are positively related to project performance. Beliefs do not have a strong effect on their performance.
Curtis and Sweeney (2017)	Single Case Study	Interactive system, diagnostic system, beliefs and boundary systems (Value systems)	The relationship is studied between mutual reinforcement of MCS and the generation of tensions in two types of innovation. Value systems provide an infrastructure for innovation to flourish. A positive role of diagnostic and interactive is stressed with evidence on how feedback and measurement systems can protect innovation.

Table 1: Studies using LOC and their main conclusions

3.3.2. MCS for managing innovation processes

Within the actual context, characterized by the rapid obsolescence of products companies have the need to engage in innovation. In this way, it is only natural that some studies have taken research projects as the unit of analysis to study various aspects, components of control, control mechanisms, and how they are used.

In this realm there are authors arguing that more organic forms of control are more adequate (Ylinen and Gulkvist, 2014) and that MCS should accommodate a degree of flexibility (Jørgensen and Messner, 2009; Chiesa *et al*., 2009a; Kapsali, 2011; Maier and Branzei, 2014) to reduce uncertainty (Davila, 2000; Akroyd and Maguire, 2011). For example, Ylinen and Gulkvist (2014) found support for the importance of organic control in both incremental and radical innovation projects. On one hand, they found that organic control had an indirect effect through innovativeness in radical innovation projects. On the other, there was no evidence of this in the case of mechanistic control. In addition, they state that the interaction effect of organic control and mechanistic control enhances performance in both types of innovation.

Concerning flexibility, Jørgensen and Messner (2009) show through a case study focus on new product development how different control mechanisms have permitted the organization to strike a balance between it and efficiency. Kapsali (2011) found that operational flexibility and boundary management are more significant to successful practice than formalization or control mechanisms. Following this thought, Maier and Branzei (2014) highlight that control systems need to be flexible for project managers to respond to the uncertainties of the projects. Uncertainty is also explored by other studies. Davila (2000) reports that MCS are used in new product development to obtain information that allows the uncertainty of these developments to be reduced. However, the author also states that too much emphasis on formal systems limits innovation. Still on this topic, Akroyd and Maguire (2011) also show that MCS reduce uncertainty during the development process and promote goal congruence at each decision gate of a stage-gate approach. The stage-gate model is also addressed by Jørgensen and Messner (2010), who point out that the approach creates a formal structure of accountability, serving as an incentive to think about accounting numbers in the design choices debate and in the trade-offs that need to be made between the strategic objectives due to their financial impact.

As for control mechanisms used, based on the principle that managers use different controls in parallel, Rijsdijk and van den Ende (2011) mention that synergies and conflicts arise from these uses. Revellino and Mouritsen (2009) introduce another important perspective by assuming that innovation must go through several phases that are mediated by sets of unique controls. The authors substantiate this thesis by following the development of Telepass[11], an innovative product developed by an Italian company. In short, they try to understand how MCS interferes in and shapes the development of innovation activities and argue that a mix of various control elements will be changed and adapted as the innovation process itself evolves. To use the authors' words: "*controls are not durable, coherent and consistent*" (Revellino and Mouritsen, 2009: 360). Reinforcing this idea, Artto *et al*. (2011) argue that a natural path exists from a first emphasis on the use of diagnostic and control systems and, later, interactive and belief systems. Chiesa *et al.* (2009a) observe that MCS adopted in a project evolve as the information needs vary.

Additionally, Chiesa *et al.* (2009a) report that the use of interactive and boundary control systems is more appropriate in the early stages of innovative processes given the higher level of uncertainty, but that the diagnostic control system is generally adopted in the final stages. This is not only because it is easier to implement at this point, but information processing requirements are incompatible with its use in the initial stages. Also, Richtnér and Ahlstrom (2010) conclude that it is important for top management to step away from detailed control in the early stages of a project and at the later stages of the development informal controls can have a positive influence. Bisbe and Malagueño (2015) acknowledge the importance of MCS use according to interactive, beliefs, and boundary systems in each phase of innovation projects and attribute to diagnostic control only a minor role.

Still based on Telepass, some years later Revellino and Mouritsen revisited the Telepass case to investigate how calculative practices develop knowledge that can be used for innovation activities (Revellino and Mouritsen, 2015). Tracking a longer period than in the first study, they argue that calculative practices are engines that catalyse both the development of innovation and insights about its effect. The insights about the effects of this innovation were obtained by accumulating knowledge about drivers' behaviour on

[11] Telepass is an electronic toll for payments used on motorways in Italy (Revellino and Mouritsen, 2009; 2015)

motorways. Apart from these conclusions, Ditillo (2004) is able to conclude that each project team requires different control mechanisms depending on the complexity of knowledge inherent to each project. He also found that the reason for the design and use of MCS resides in the complexity of knowledge. Still speaking about knowledge creation, Richtnér and Ahlstrom (2010) conclude that it can be reduced for using control in the wrong phases of new product development.

However, the development and the unfolding of innovation projects have to considerer a connection to strategy as well.

3.3.3. MCS, innovation projects and strategy

Bonner *et al*. (2002) mention that managers are faced with the challenge of establishing control mechanisms to orient projects in the right strategic direction and monitor their progress. And some evidence points to this role of MCS in putting research projects on the right path. Akroyd and Maguire (2011) attribute to MCS a role in promoting the alignment at each decision phase of the stage-gate model. Akroyd *et al.* (2016) report that managers at the case company of their study use MCS to enable the alignment between new product development projects and multiple conflicting strategies. Indeed, it is important to recall that the general idea of the majority of studies is that innovation projects are a complex set of activities that should be treated as an independent organization, from which a certain level of performance and a final output is expected (Rezania *et al*., 2016). So, in managing this "micro-organizations" some alignment with the overall strategy is needed. Therefore, MCS are relevant in the management of projects (Davila, 2000), providing some level of strategic direction (Bonner *et al*., 2002).

In providing alignment and to control for the progress of innovation some techniques have been covered in the literature.

3.3.4. Budgets and BSC on innovation projects

Meanwhile, some studies have scrutinized the use of various elements or components of control in research projects (Chiesa *et al*., 2009a; Moll, 2015). The role of budgets in

innovation has been analysed, being traditionally used to manage product developments (Sandström and Toivanen, 2002). The results of Dunk's (2007) study indicate that the pressure of the innovation budget influences the effect of the quality of the information system on departmental performance. When there is strong pressure on the innovation budget, the quality of the information system has a positive influence on performance. In 2011, Dunk used the same data sample to address the impact of budgets specifically on product development. He concludes that the use of budgets as a planning mechanism, consistent with the Simons' interactive system, facilitates the positive impact of product innovation on the company's financial performance. But when budgets are used essentially as a control mechanism, innovation does not foster better performance. Knardal and Petterson (2015) also argue that for their case study, by using budgets interactively it was possible to achieve a balance between creativity and control. Tervala *et al*. (2017) add a new dimension, concluding that the financial information for project purposes should be designed and used in line with the views of their project managers, as they have a strong influence on the performance of these projects. Based on the interviews conducted, the authors also reveal that managers seem to require financial control to play a more active role.

The applicability of the BSC approach for innovation activities and research and development (R&D) is also addressed by a few authors, mainly in the innovation literature (e.g. Kerssen-Van Drongelen and Cook, 1997; Sandström and Toivanen, 2002; Bremser and Barksy, 2004; Yawson *et al*., 2006; Chiesa *et al*., 2009b). These authors build their studies upon the managers' need to measure the performance and contribution of R&D activities to value (Lazzarotti *et al.*, 2011). Using mainly qualitative methodologies, they prove the value of the BSC in various scenarios and innovation systems. For example, Bremser and Banksy (2004) integrate the BSC and the stage-gate approach to create a framework that shows how companies can link the resource commitments to the strategic objectives. Lazzarotti *et al*. (2011) use the BSC and the differentiation between indicators of input/output and process to develop an algorithm to operationalize the measurement of performance for innovation areas.

Given that most of these studies are no more than examples of BSC models for innovation activities, the authors have primarily focused on the choice of the best metrics and indicators for R&D (e.g.: Chiesa *et al*., 2009b). Most of these studies therefore provide examples that could be useful to practitioners when developing models for these areas.

4. Gaps in the literature and possible further research directions

Summing up the literature reviewed above, it is undisputable that the new control tools that appeared from the 1980s on could support innovation without blocking creativity or innovation, as did the thought that characterized the period before. From the studies reviewed it is possible to perceive some prescriptions for the use of MCS. Building on the knowledge developed using the LOC framework, it is possible to see that the use of controls in an interactive way is more adequate to favour innovation (e.g.: Bisbe and Otley, 2004; Henri, 2006; Bisbe and Malagueño, 2009; Koufteros *et al*., 2014; Bedford, 2015; Bisbe and Malagueño, 2015; Lopez-Valeiras *et al*., 2016). This type of use is said to further the guidance and legitimacy for initiatives (Bisbe and Otley, 2004) and facilitate the flows of information (Lopez-Valeiras *et al.*, 2016). Nevertheless, interactive use of MCS could also be counterproductive in highly innovative companies, or *vice-versa* in low innovative companies (Bisbe and Otley, 2004; Bedford, 2015). Diagnostic systems are said to constrain innovation (Simons, 1995a; Henri, 2006) but recent findings cast some doubts on this (McCarthy and Gordon, 2011; Koufteros *et al*., 2014; Bedford, 2015), which cautions managers to use MCS diagnostically with parsimony. Goals should also be stable (Amabile, 1998) and the variety of controls used in innovation projects should evolve along with the project (Revellino and Mouritsen, 2009), depending as well on the complexity of knowledge that is required (Ditillo, 2004). Not having Simons' levers of control as the main theoretical framework, some studies prescribe more organic forms of control (Ylinen and Gulkvist, 2014).

Aside from these prescriptions, it is also possible to identify some positive and negative consequences of using MCS in an innovation context. MCS allow the appropriateness of the benefits of innovation (Lopez-Valeiras *et al*., 2015), reduce uncertainty in innovation projects (Davila, 2000; Akyord and Maguire, 2011), and increase the performance of the company (Bedford, 2015). Moreover, it is also possible to acknowledge that the correct use of MCS in new development projects depends on the phase of that project (e.g.: Chiesa *et al.*, 2009a; Richtnér and Ahlstrom, 2010; Artto *et al*., 2011), not being durable (Revellino and Mouritsen, 2009).

Despite these achievements, in general the literature so far has failed to capture some interesting dynamics on the role of MCS in innovation. First, with some exceptions, due to its practical and functional nature, surveying and searching for the nature of relationships have prevented authors from diving deeply into their analysis. Indeed, they give a superficial interpretation of the practices and the realities under study. The quantitative empirical nature of most of the studies reviewed provides a narrow view of reality, where organizations are coherent units and individuals behave toward rational means (Moll *et al*., 2006b, Vaivio, 2007). As a result, the potential of this stream of literature is yet to be realized. To do it, it is necessary to go beyond the functional and managerial view of the management accounting phenomena (Vaivio, 2007) adopting other types of empirical methodologies and extending the theoretical background to organizational and social theory.

Methodologically, here a case is made for more research resorting to qualitative methodologies. As Moll *et al*. (2006b) mentions the multifaceted nature of accounting practices can only be analysed by qualitative methods. It would be important to have more case-based research built on rich empirical data collected through a diversity of sources in the context examined. Qualitative research with longitudinal contact in the field to study the processes in their natural settings deeply embedded in the perceptions, realities, and behaviours of the actors would bring richer and broader evidence to this stream (Ahrens and Dent, 1998; Vaivio, 2008; Parker, 2014). Furthermore, adopting this methodological view, many gaps and questions become visible. As noted by Parker (2014: 15), qualitative research "*opens up the possibility of asking and interrogating questions no-one has previously bothered to ask, and better understanding and reconstituting what we thought we already knew*". With the adoption of more qualitative methodologies, a change of the theoretical background will follow. Any stream of institutional theory or, even the actor network theory could be used to inform researchers in this demand for qualitative research.

Following this new methodological positioning, some research paths arise as worth exploring. When studying the use of MCS according to LOC framework behind the prescription that could be taken from this review, the questions on how to use these systems remain broadly unanswered. In an organizational context, the role that belief and boundary systems play in promoting innovation has warranted little attention and the literature would benefit from richer insights in these fields. How do beliefs and boundary

systems act regarding innovation? How could boundaries be established without restricting creativity and blocking the experimentation needed for innovation? The role of the diagnostic system in the development of new products is another area of interest. In their analysis of radical innovation projects, Chiesa *et al*. (2009a) conclude that diagnostic control is used more in the commercial stage or in the final stages of development. Researchers may therefore investigate how and when MCS are used both diagnostically and in other systems. How does the use of these controls evolve during the development stage?

Furthermore, a stream of literature on the LOC framework has highlighted the mutually reinforcing aspect of the four levers of control (e.g.: Tuomela, 2005; Widener, 2007; Mundy, 2010; Speklé *et al*., 2014; Heinicke *et al.*, 2016; Kruis *et al.*, 2016; Curtis and Sweeney, 2017). The whole model is based not only on the complementarity of the levers but also on the dynamic tensions generated by their combined use. Only by having all these systems working together, as Chenhall and Moers (2015) report, is it possible to ensure the effective management of both innovation and efficiency. However, the literature has merely addressed the tension between the diagnostic and interactive systems in this regard (Henri, 2006; Koufteros *et al*., 2014; Bedford, 2015; Chenhall and Moers, 2015). To the best of our knowledge, the only insights on this come from the study by McCarthy and Gordon (2011), but as this was aimed at validating a conceptual framework and simply gives examples of the application of control levers, it does not provide strong and rich empirical evidence showing the balance between these levers. Further research is therefore needed to understand how the dynamic tension between Simons' four control systems can be managed and balanced to promote innovation from an organizational perspective. In addition, researchers may investigate other types of tension, following Curtis and Sweeney (2017) who analyse the tension between the coexistence of two forms of innovation in a company rather than the tension between the various levers. Tervala *et al.* (2017) also identify tension between the fact that project managers are being monitored by objectives but also have the financial control of their projects. Lövstål and Jontoft (2017) make a broad literature review about tensions and also claim for more research around this idea. Thus, the role of the LOC framework in the internal management of tensions created from aspects related to innovation is an interesting avenue for research and is one in which the case field advocated could provide various insights.

Passing on from the LOC framework, the use of case studies could also be helpful to analyse how "packages" of control are used in the case of innovation. Several authors have recently claimed that MCS do not exist in isolation (e.g. Malmi and Brown, 2008; Sandelin, 2008; Ferreira and Otley, 2009; Grabner and Moers, 2013). The control mechanisms work as complements or substitutes in their influence, and neglecting the interdependencies could lead to inadequate insights on how to manage innovation (Rijsdik and van den Ende, 2011). With this, several implications could be drawn. First, as Moll (2015) mentions, the literature in this area is scarce and the current understanding on how accounting can be made practicable and effective to innovation context is limited as well. The same applies to MCS, in which the simultaneous use of different techniques with different purposes is still to be explored. Second, by relying on this interpretation of MCS working as a package of systems, it is also possible to analyse the tensions spoken of earlier; when various systems are in place, how do tensions appear and disappear from their combined use (Moll, 2015)? How do these tensions impact the success of new products developments? How do the tensions that appear change the development processes and the practices of control over time?

Keeping to the realm of change, a possible way to move forward is to introduce institutional theory into the debate. Institutional theory has been well-known in broadening management accounting, with social and institutional considerations of both the organizations and their environments (Ribeiro and Scapens, 2006). In fact, institutional theory is considered as a theoretical framework able to explain change, and how structures shape individual's behaviour. Therefore, it could be an excellent theoretical background to explore how MCS change the internal views of innovation or how the development of new products change MCS over time. Depending on the conditions of the field of study, it would also be interesting to study how practice variations of MCS affect the internal ideals and processes of innovation, or even how the control practices of new developments are coupled or decoupled from the overall control practices of the organization. Additionally, the literature so far has not explored how and why MCS influence or determine the sensemaking of actors and their decision-making processes regarding innovation. Here institutional theory could also be helpful. The role of actors that is portrayed in every stream of institutional theory could provide a theoretical background in these matters.

Still on the internal demands of the organizations, further research could explore relations of power and the distribution of responsibility. How do the relations of power existing inside the organizations affect innovation? How do MCS distribute responsibility and manage it? As Fried (2017) mentions, a better understanding of the effect of material forces could provide a basis for the development of MCS. Alternatively, adopting an approach closer to new institutional sociology or new economic institutionalism, researchers could explore economic and institutional pressures on organizations (Scapens, 2006). For example, researchers could analyse how the environmental demands for innovation affect the use of MCS and change the control practices related to innovation processes, or how the regulatory mechanisms for innovation change affect the practices of control in relation to innovation. How can funding and grants for new developments affect MCS and change them?

Besides these thoughts for further research, other factors could be explored. Although the underlying idea of some studies is that the various components of MCS could have a positive or negative influence on the attitude of employees toward innovation, a link has not yet been established between the LOC framework and the individual's motivation to be creative (Chenhall and Moers, 2015).

On the other hand, some studies interpret development projects like independent micro-organizations with strategies and MCS as being independent as well. The questions that arises with this assumption is: how are the practices of control applied to these projects are connected to the overall practices of control of the organizations? How are MCS used to provide strategic direction and alignment of these projects to the overall strategy? Improving knowledge about these matters is another possibility. Furthermore, today innovation sometimes passes through temporary collaborative research projects or alliances in which separate organizations come to work together in the development process (Smets *et al*., 2016). In this scenario, further research could explore how MCS are established to monitor the progress of these projects. How are MCS applied and used? What are the links between the practices established for the project and the practices of their main organizations?; or returning once again institutional theory, how are MCS coupled or decoupled from the practices determined by their main organizations?

To finish, future studies elaborating on existing work can analyse other types of innovation behind product innovation. It is clear that most researchers have focused on

the study of product innovation (e.g.: Davila, 2000; Bisbe and Otley, 2004; Davila *et al*., 2009b; Bisbe and Malagueño, 2015). Frank and Moers (2015) stress that innovation goes beyond product innovation, and propose the analysis of innovation in services functions; this may involve marketing and transport or innovation in business models. Process innovation is another typology to possibly explore.

5. Concluding Remarks

Building on the relevance of innovation as a key to organizational success, and the recent importance given in the literature to the role of MCS in innovation, this essay has provided a broad overview of the evolution of the research developed to date. However, as was remarked at the very beginning of this work, this evolution should be perceived in the light of the practices that were in place at the period and the contextual factors that they determined. In this way, the analysis was divided into two historical phases. A first phase is associated with a more traditional view of management, determined by practices for mass production (Wickramasinghe and Alawattage, 2007), in which internal efficiency was the main goal. At this moment, innovation was perceived as inefficiency and therefore MCS constrained it. Following this moment, a transition is perceived with the changes in the organizational environment and the rise of new techniques more focused on strategy and less on the return and efficiency. To this period, a more contemporary one, a wide array of research has left to question the paradigm that MCS are not a hindrance to innovation (Davila *et al.* 2009a). But these studies have failed to provide in-depth analysis on certain dynamics due to is functional and practical view of MCS.

To overcome this flaw, it is argued that this stream of research should adopt other types of theoretical backgrounds and methodologies based on qualitative methods. Research needs to take a step forward and seek alternative frameworks that go beyond the managerial traditions. Furthermore, with this, the adoption of more qualitative approaches can infuse the debate, allowing researchers to dig into contexts to provide new and rich insights to the debate. With these approaches, several paths of opportunities open for researchers. Analysing tensions and the role of MCS in managing them is a possibility. Resorting to institutional theory and borrowing the interpretation of how institutions

influence behaviour could allow us to perceive in detail how MCS influence behaviour. Still on institutional theory, studying how innovation change practices over time or, how MCS change the development of innovation could also be possibilities. Studying how and which MCS are used in the different phases of development projects and how they evolve is another. These are only a few examples of possible paths that can advance the current knowledge.

With the descriptive research developed, and the paths enunciated, we believe that a more holistic view can be enhanced and better knowledge developed, and that these can bring a new flavour to this area of research.

III. MANAGEMENT CONTROL SYSTEMS AND INNOVATION: A LEVERS OF CONTROL ANALYSIS IN AN INNOVATIVE COMPANY

1. Introduction

Kruis *et al.* (2016) emphasised that the Levers of Control framework had a great impact on accounting literature, achieving a prominent position in the way that management control practice is understood. In particular, the contribution of this framework to the line of research that addresses the issues related to management control systems and innovation is undeniable. The use of this framework amounted to a paradigm shift, and today a stream of research has highlighted the positive role that these systems play in innovation (e.g.: Bisbe and Otley, 2004; Henri, 2006; Bisbe and Malagueño, 2009; Bedford, 2015; Lopez-Valeiras *et al.*, 2015; Revellino and Mouritsen, 2015; Bisbe and Malagüeno, 2015), breaking with the traditional view that control represents an obstacle to it (e.g.: Ouchi, 1979; Rockness and Shields, 1984; Damanpour, 1991; Abernethy and Brownell, 1997).

The LOC framework was initially used in quantitative studies to explore the nature of the relationship between MCS or performance measurement systems with innovation. Most of these studies seek to understand which the four conceptualizations best relate to innovation, search for positive or negative relations. Through this research, it is relatively clear that the interactive system represents the greatest force in promoting innovation (Bisbe and Otley, 2004; Henri, 2006; Bisbe and Malagueño, 2009; Bedford, 2015; Koufteros *et al*., 2014; Lopez-Valeiras *et al*., 2016; Bisbe and Malgueño, 2015). And although not conclusive, recent works have provided evidence on the positive role of diagnostic use (Koufteros *et al*., 2014; Bedford, 2015). Boundary systems are not very well explored. Bedford (2015) and McCarthy and Gordon (2011) conclude about a positive role of this system, going against the expectations of Simons (1995a). Belief system has been somehow neglected and not much evidence exists beyond the positive relationship that was postulated by Simons. However, the power of the LOC framework does not reside in the individual use of the four levers but, instead, on how these levers work together, complement each other and, more important, on how they achieve balance (Simons, 1995a; Kruis *et al.*, 2016). This balance creates dynamic tensions between the

positive and negative forces of these systems and promotes an effective control environment that will enhance organizational capabilities (Simons, 1995a; Simons, 2000; Henri, 2006; Widener, 2007; Mundy, 2010). So, without considering the levers together it is probably that an incomplete analysis will occur. In this way, rather than quantitatively explore the nature of the relationship between each type of use of MCS in innovation, research should also focus on the balancing use of these systems on innovative companies and in the dynamic tensions created as a consequence of these uses.

With this background as a base, using a case study in an innovative company this paper sheds some light in the following research questions: How do managers of the case company take advantage of MCS, and balance their use according to the LOC framework to deal with innovation? And, how do the dynamic tensions that these uses create contribute to the innovation effort? To answer these questions, it is followed a single case study approach. By using a case study, under a qualitative and interpretative methodology, it is possible to explore in a richer way all the dimensions of the LOC framework, providing a grounded understanding that can capture the complexity of MCS in a real context. In this sense, this study looks at MCS in a holistic and comprehensive way, in order to mirror the control environment of the company (Sandelin, 2008; Grabner and Moers, 2013). MCS are seen as a collection of controls that instead of operating in isolation have links that make them operate as packages (Malmi and Brown, 2008; Sandelin, 2008; Ferreira and Otley, 2009; Grabner and Moers, 2013). However, since the analysis of that package is done considering the LOC framework, it is generally followed Simons' own definition of control systems in conjugation with the one provided by Chenhall and Moers (2015). Therefore, MCS are interpreted as the formal information routines and procedures used to maintain or modify patterns to achieve the organizational goals of the company. Specifically, in the case company of the study this package is composed majorly of a PMS[12] and a stage gate model for innovation processes which are therefore the base systems for most of the analysis conducted.

To provide this in-depth understanding, the case study organization is an innovative branch of a Portuguese industrial group that has implemented a PMS for a considerable time, and it has a very strong orientation toward innovation. In this study, semi-structured

[12] PMS can, thus, be defined as a set of financial and non-financial measures that operationalize the strategic objectives (Franco-Santos *et al*., 2012).

interviews are the main data source, although they have been complemented with internal documents and direct observations. A total of 32 interviews were conducted, with an average duration of 60 minutes. Amorim Cork Composites continuously engages in product innovation driven by customers' requests or needs. Innovation at the case company most often takes the form of new cork products, new developments of existing products, a new application for an existing cork product, or the transfer of an existing product to another, and completely different, segment. Thus, this is also the concept of innovation that will be applied throughout this essay.

This paper contributes to research in several ways. First, the essay enhances the current understanding of the role of MCS in innovation, responding to recent calls in the literature to deepen the knowledge on which contemporary control systems work best with innovation (Moll, 2015; Fried, 2017). The case study of ACC provides evidence on how managers mobilize their packages of MCS as a way to maintain a strong strategic emphasis on innovation, offering insights on the management control practices used.

Secondly, by using the conceptual framework developed by Simons (1995a), this essay analyses the four levers simultaneously. Therefore, this essay addresses a gap that has been previously identified by Chenhall and Moers (2015) speaking about the limitation of the previous literature in the field of MCS and innovation in focusing too much on interactive and diagnostic systems. With this, it is also possible to boost research on studying beliefs and boundary systems compared with the study of interactive systems (see Martyn *et al*., 2016).

Thirdly, this essay answers to recent calls in the literature to dig into the tensions that are generated between management control and innovation (Lövstâl and Jontoft, 2017; and Moll's (2015) incentive research to investigate how tensions appear and disappear). With this digging into tensions and balance of the four levers, this essay is able to reinforce the argument that the levers of control mutually reinforce each other (e.g.: Mundy, 2010; Speklé *et al*., 2014; Heinicke *et al*., 2016; Curtis and Sweeney, 2017).

Fourth, in looking to the MCS in the case company as a whole or as a package, instead of focusing on only one isolated system, this essay furthers the current understanding on how a range of control systems complement and work with each other (Malmi and Brown, 2008) in the specific case of the innovation effort. Thus, it is also possible to respond to

another of Moll's (2015) calls in providing evidence with the base point that systems do not work in isolation.

In the end our results allow us to conclude that Simons' four levers of control represent a good infrastructure to promote and manage innovation. From the package of control used by the managers, the integration of PMS and the stage gate model creates balance and allows dynamic tensions to arise. Specifically, managers use the PMS in an interactive and diagnostic way. Also, used in an interactive way, is the stage gate model, showing that there is a preponderance of the interactive system. This accompanies the literature on the argument that this system is the one that contributes the most to the promotion of innovation (Bisbe and Otley, 2004; Henri, 2006; Bisbe and Malagueño, 2009; Bedford, 2015; Koufteros *et al*., 2014; Bisbe and Malgueño, 2015; Lopez-Valeiras *et al*., 2016). Including financial measures within the PMS also makes it possible, through the diagnostic use, to promote innovation, as it directs the employees' behaviour to the need to engage it. This breaks with the idea of constraint of that type of use and provides a possible explanation for the positive relationship of diagnostic systems and innovation found in some studies (McCarthy and Gordon, 2011; Bedford, 2015). Belief and boundary systems are necessary for an effective tension between the positive and negative forces of the LOC framework. Dynamic tension is generated so that more than innovation can be weighed against the necessity of goal achievement, it can take place within fields in which the company can appropriate the expected benefits of new solutions. This latter part is an essential task of the combined use of diagnostic control and belief systems that act to reduce uncertainty, while the remaining two systems are more linked to the creation of motivation and forums for the development of new developments.

The rest of the paper is organized as follows. The next section presents an analysis of the LOC framework and a synthesis of the research that has been developed on MCS and innovation. The methodology and the adopted methods are described in the third section, as well as the data analysis procedures and the operationalization of the levers of control. The fourth section starts by introducing the company and then describes the characteristics of the PMS used. The same section, also provides a description of how management control tools are used according to the LOC framework, regarding innovation, as well as the identification of the dynamic tensions that emerge from these uses. The fifth section provides a discussion of the results and in the sixth section we

present the main conclusions, limitations of the study, and some possible avenues for future research.

2. Theoretical background

Traditionally there was a current of thought that considered control to be an inhibitor of innovation (Davila, 2000; Ditillo, 2004; Davila, 2005; Mouritsen *et al*., 2009; Davila *et al*., 2009a; Haustein *et al*., 2014; Christner and Strömsen, 2015; Lopez-Valeiras, 2015; Lövstâl and Jontoft, 2017). MCS were perceived as tools to help the organization achieve a number of predetermined objectives as efficiently as possible, emphasizing an idea of execution rather than exploration (Davila *et al*., 2009a; 2009b). Traditional systems sought to guarantee that the established processes delivered the value that they were intended to generate, eliminating innovation, which was perceived as an inefficiency (Davila, 2005; Davila *et al*., 2009a). Ouchi (1979) goes so far as to state that no rational forms of control could be applied in innovation settings. Corroborating these ideas, studies such as Rockness and Shields (1984), Damanpour (1991), and Amabile (1998) provide further empirical evidence that control is detrimental to innovation. However, today, there is little room to question the importance of management accounting and control to innovation (Moll, 2015). Since the publication of the seminal works of Simons (1987; 1990; 1991; 1994; 1995a), some authors have re-examined the role of MCS and PMS on innovation (Moll, 2015). For that reason, Davila *et al.* (2009a) posit Simons' levers of control framework as a paradigm shift in this traditional thinking. Furthermore, Pfister (2014) mentions that LOC framework reflects a more flexible use of accounting.

The next section offers an overview of the LOC framework, followed by the general image of the research work carried out in the context of the framework's relationship with innovation. This is followed by a discussion about the importance of balancing Simons' levers, the dynamic tension created by them and the lack of studies in an environment of innovation that comprehensively approach all this.

2.1. LOC framework

The LOC framework is a theoretical reference introduced by Simons (1995a) that has helped to describe the evolution of MCS and the different styles of their use (Chenhall and Moers, 2015). With the role of business strategy in the middle (Martyn *et al.*, 2016), LOC framework proposes that to successfully implement strategy, managers must considerer four levers of control: Diagnostic, interactive, beliefs, and boundary systems (Simons, 1990; 1994; 1995a; 2000; Widener, 2007; Ferreira and Otley, 2009; Mundy, 2010; Speklé *et al*., 2014). Diagnostic systems are the more traditional information systems used to monitor, motivate, and reward the achievement of the intended goals (Simons, 1995a; Henri, 2006). It is a system that has as its main function aligning employee behaviour with the organizational objectives, reporting and monitoring the compliance to organizational strategies (Widener, 2007; Chenhall and Moers, 2015). Interactive systems are a two-way process of communication that force the dialogue within the organization and allow managers to involve themselves in the decisions of subordinates on a regular basis (Simons, 1991; 1995a; 2000; Widener, 2007; Mundy, 2010). Belief systems are a set of definitions for communicating core values, purpose, and direction within the organization (Simons, 1995a; Widener, 2007; Speklé *et al.*, 2014; Martyn *et al.*, 2016). They inspire and motivate employees to explore and engage in appropriate action (Widener, 2007). Boundary systems establish the rules for organizational activity, indicating behaviours and risks that should be avoided (Simons, 1995a; Widener, 2007; Ferreira and Otley, 2009; Martyn *et al.*, 2016). In simple terms, boundary systems indicate activities that avoid wasting resources (Mundy, 2010).

2.2. Earlier research regarding LOC framework and innovation

The debate around the LOC framework and innovation has been mainly about the individual impact of the four systems on innovation. At this point, and as predicted by Simons (1995a), the interactive system has gained consensus on its positive role in innovation (Henri, 2006; Bisbe and Malagueño, 2009; Adler and Chen, 2011; Koufteros, *et al*., 2014; Bisbe and Malagueño, 2015; Lopez-Valeiras *et al*., 2016). Bisbe and Otley (2004) explain that this system provides guidance for search, legitimacy to autonomous initiatives, and stimulus. Bedford (2015) reports that interactive systems provide an open

forum for debate that permit employees to challenge the current plans. Lopez-Valeiras *et al*. (2016) also underscore that interactive use of MCS facilitates both the internal and external information flows necessary for innovation. Nevertheless, there is also evidence to the contrary. Bisbe and Otley (2004) report that in the case of more innovative companies the interactive system is unlikely to be beneficial. Bedford (2015) also mentions that in the case of companies that search to exploit existing markets and technological capabilities, a greater emphasis on diagnostic systems provides the space for the necessary experimentation. Both of these studies contradict the empirical conclusions of Henri (2006), who in line with Simons (1995a), found a negative effect of diagnostic systems. Koufteros *et al*. (2014) also contradicts Henri (2006) concerning the negative force of diagnostic use. And, McCarthy and Gordon (2011), who had already reached similar conclusions in the case of biotechnology companies, report that the diagnostic system ensures things are on track, tracking the processes and if there are deviations, other control systems can be adjusted to respond to them. McCarthy and Gordon's (2011) and Bedford's (2015) conclusions also point to a positive contribution of the boundary system. Regarding boundary system, McCarthy and Gordon (2011) mention that they specify how things are done according to predefined standards and regulations. These arguments, therefore, contradict the assumption and Simons' basic idea (1995a, 2000) that diagnostic and boundary systems affect innovation in a negative way. Finally, the belief system has collected only a few empirical evidence that can support or refute Simons' postulate. McCarthy and Gordon (2011) study this system using the same reasoning as Simons and detect a positive role of this lever. On the other hand, Rezania *et al.* (2016) have not found a strong effect of belief system in the performance of projects.

2.3. Innovation and the dynamic interplay of forces

This body of research has focused on the individual roles of the levers, a limitation because, "*to be most effective in balancing innovation and efficiency, the LOC framework was envisaged to operate with the four levers working in combination*" (Chenhall and Moers, 2015: 7). In fact, although with different purposes, these four systems work on the proposition that only by being integrated simultaneously is it possible to achieve control of the business strategy (Simons, 1995a). They have an inherent opposition of

positive and negative forces and energies that conflict with each other and end up generating dynamic tensions (Simons, 1995a; Tessier and Otley, 2012). If, on the one hand, the diagnostic system acts as a constraint on employee behaviour, on the other hand, the interactive system gives managers tools able to influence experimentation and the search for new opportunities (Simons, 1995a; Widener, 2007). Regarding these two systems, Henri (2006) reports that their power relies on the tension in the balance of their use, which reflects competition and complementarity. The belief system, in turn, also inspires and motivates. However, in a dynamic environment some constraint is needed to prevent activities of greater risk (Mundy, 2010). This restriction is provided by the boundary system, which acts in opposition with the belief system (Simons, 1995a; Mundy, 2010). Thus, interactive and belief systems represent positive forces and diagnostic and boundary systems represent negative forces, which must be balanced and work together (Simons, 1995a; Speklé *et al*., 2014). Supporting this idea of joint work between the levers, Tuomela (2005) concludes that PMS can be used as both a diagnostic and an interactive system, and that their use could also have an impact on the belief and boundary systems. Later, Widener (2007) concludes about the interdependence and complementarity relationships that the levers are subject to. Mundy (2010) stresses the importance of using the four systems together to gain a broader understanding of the interaction between managers and MCS in the former's attempts to guide, direct and control organizational activities. Consistent with Mundy (2010), Speklé *et al.* (2014) reinforce that the use of the levers is related with creativity. Kruis *et al*. (2016) conclude that balancing does not mean that all levers must have the same weight, and instead balance can be achieved through various combinations of these levers. In sum, the importance of the combined use of the four levers is well established in the academic world.

Related to the context of innovation, some research has also revealed the importance of the complementary relationships and the importance of the dynamic tension generated (Curtis and Sweeney, 2017). Empirically, Henri (2006) addresses the dynamic tension created between the use of PMS in a diagnostic and interactive way. He concludes that the tension created between interactive and diagnostic uses of MCS contributes positively to the deployment of innovativeness capability in a context of uncertainty and with a culture reflecting flexibility values. Bedford (2015) provides further evidence. With the expectation that the complementary effects of the control levers create dynamic tensions

that may help performance, in companies pursuing contradictory types of innovation, he provides evidence that the opposition of interactive and diagnostic is beneficial for firms. However, Bedford (2015) is not able to conclude the same about the complementary effect of belief and boundary systems. Also, the study of Curtis and Sweeny (2017) starts from the importance of dynamic tension, but nevertheless, analyses it in the perspective of the dynamic tension created between different forms of innovation and not between the levers of control.

So far it has been explained that few studies and very few insights have addressed how the different levers of control generate dynamic tension in a context of innovation, which is a necessity of research also identified by Moll (2015). Furthermore, most of the studies in this area adopted quantitative based approaches, which has precluded in-depth insights about the balanced and dynamic tensions created by combinations of the control levers (Curtis and Sweeney, 2017). In this vein, "*qualitative methodologies would be particularly useful to provide further explanations and new insights into these issues*" (Henri, 2006: 549). The LOC framework can have different roles across different aspects of innovation and in integrating them (Chenhall and Moers, 2015). So, exploring these matters with qualitative methodologies gives the opportunity to capture the richness and complexity of it, contributing to this field with a strong handle on what real life is about (cf. Miles *et al.*, 2014). Therefore, in general terms the aim of this essay is to understand how the managers in an innovative company attempt to balance and use their packages of MCS and how dynamic tension arises from that use. To do this, MCS are considered a package of system, which work in combination with each other (Sandelin, 2008; Malmi and Brown, 2008).

3. Research Methods

3.1. Research approach and research site selection

To gain a deep, richer, and holistic view on accounting practices in their social and economic context an intensive field research case study is an approach with great potential (Ryan *et al*., 2002; Adams *et al*., 2006). As Ahrens and Dent (1998) express, field research brings out the messy world of organizations, which affords a better understanding of management accounting and control. Yin (2009) clarifies that the case

study, as well as being an appropriate method for "How" and "Why" research questions, is also of special importance when these questions require extensive and in-depth descriptions of social phenomena. Bearing this in mind, an in-depth case study approach was followed to fully understand how MCS are used, according to the LOC framework, in an innovative company, and how the dynamic tensions arise from that use. The field site for this study is ACC, an industrial company dedicated to the production of granulates and agglomerates of cork for multiple applications. As Scapens (2008) points out, the selection of case studies should be done in such a way that the researcher can focus on the research questions to be addressed. In this sense, the case firm was selected because it gathered two essential characteristics for the purposes of the study. First, it has a strong culture and history of innovation. The company is today considered the more innovative business unit of a larger Portuguese group with an agenda and strategy very connected to innovation. In fact, the institution's image starts with the motto that innovation is their attitude and driving force. Also, the case company is constantly engaging in product development projects having, at the moment of the study, several ongoing projects. In second place, the case company has a well-known orientation to results supported by the use of performance measurement and control practices based on a Balanced Scorecard methodology in continual use for about 15 years.

3.2. Data Collection

Data were collected between November 2015 and September 2016 in two phases. First, a pilot case study was conducted with the goal of gaining insights and a broad understanding of the company, especially in their management control practices and innovation processes. Six interviews and three visits including guided tours to the facilities were conducted (see appendix C and D for a list of the interviews and visits). After this first phase, lines of inquiry and the full range of employees to interview for the main case study were established, and twenty-six more interviews were conducted. Although prepared in advance with a set of questions, these interviews quickly evolved into a more informal conversation that allowed us to pursue new issues and ideas as they emerged (Scapens, 2008). Furthermore, to triangulate the insights collected and to include the perspective of as many levers of management involved in the PMS as possible, it was decided to interview employees from all of the departments (Eisenhardt, 1989; Scapens,

2008). In this, besides interviewing all the department heads except one, in the case of the departments with more than five employees, two more employees in the second line of management were chosen. In the specific case of the production department, which includes most of the employees in the company, all the second line managers were interviewed. At the end, a total of thirty-two interviews were conducted with an average duration of one hour. Except for the first one, in which only practical aspects about the field work were discussed, all the interviews were recorded and then transcribed for further analysis. In the visits made to the company, since recording was not feasible, extended reports were written soon after to facilitate analysis.

Also, the data collected in the interviews, in both phases, were complemented with internal documents of the case company. In addiction to the publicly available documentation, throughout the whole period we were given copies of internal information such as: internal reports; organizational charts; Powerpoint presentations of the strategic map and the strategy plan; information about the goals to achieve and their evaluation measures; employee performance evaluation examples; and examples of monthly reports of results.

3.3. Data analysis and the operationalization of the levers

In terms of data analysis, standard practices according to Miles *et al.* (2014) were followed. As a starting point, a deductive coding protocol cycle was followed (Patton, 2002; Miles *et al.*, 2014) to clearly identify the levers and how the case company MCS were being mobilized. Interviewees' responses were coded according to operational definitions of these levers, previously delineated. The scope of these definitions, which are in Table 2, were based on studies or theoretical references that have taken several approaches into the operationalization of Simons' levers (Mundy, 2010) and in examples that they provide. This allowed the coding process to progress in a consistent way throughout the interviews (Miles *et al.*, 2014). The coding process was done resorting to the qualitative software package, MAXQDA, which allowed no selective choice of data in the case study findings (Mundy, 2010). With the responses coded, the next stage was to analyse them. During the coding process it was possible to start understanding how the dynamic tensions between these levers appeared and what they represent to innovation.

Notes were taken throughout the coding process that later helped in the writing of the case study. A second round of analysis was conducted to more clearly perceive where the dynamic tensions were arising.

Levers of control	**Systems or techniques involved:**
Diagnostic (Simons, 1995a; 2000; Tuomela, 2005; Henri, 2006; Ferreira and Otley, 2009; Mundy, 2010; Speklé *et al.*, 2014; Bedford, 2015; Kruis *et al*., 2016; Martyn *et al.*, 2016)	- Tracking progress toward goals; - Providing information about deviations from established standards that represent the basis for monitoring and feedback; - Review of key measures and critical success factors; - Explicit rewards (not mandatory).
Interactive (Simons, 1991; 1995a; 2000; Marginson, 2002; Tuomela, 2005; Bisbe and Otley, 2004; Henri, 2006; Mundy, 2010; Speklé *et al.*, 2014; Bedford, 2015; Kruis *et al*., 2016; Martyn *et al.*, 2016)	- Processes to challenge and promote regular debate on underlying data, assumptions, and action plans with subordinates and peers; - Enable discussion in meetings; - Tie the organization together and allow a focus on common issues and critical success factors; - Focus on strategic uncertainties; - Encourage and facilitate dialogue and information sharing with subordinates; - Promote communication between the various hierarchical levers.
Levers of control	**Tangible and/or visible design features:**
Belief (Simons, 1995a; 2000; Widener, 2007; Ferreira and Otley, 2009; Marginson, 2009; Mundy, 2010; Adler and Chen, 2011; Speklé *et al.*, 2014; Bedford, 2015; Kruis *et al*., 2016; Martyn *et al.*, 2016)	- Missions; - Visions; - Credos; - And core values.
Boundary (Simons, 1995a; 2000; Widener, 2007; Marginson, 2009; Mundy, 2010; Speklé *et al*., 2014; Bedford, 2015; Kruis *et al*., 2016; Martyn *et al.*, 2016)	- Codes of conduct - Activities categorized as ‘off-limits’; - Statements to define appropriate behaviour.

Table 2: Scope of Simons' levers

4. Case Findings

4.1. Setting the scene: The company and its attitude toward innovation

With most of its operations centralized in Portugal, the ACC's main activities are the production of granulates and agglomerates of cork and cork with rubber, as well as their subsequent commercialization in several geographic locations. These products can be sold at the end of any stage of production, but they can also be transformed into products closer to the end consumer. Taking advantage of the thermic, acoustic, sealant, esthetic, and insulation qualities of the granulates and agglomerates produced, the posterior uses of these products can vary widely. For example, these agglomerates may give rise to components for footwear, memo boards, home accessories, joint seals for cars, transformers, expansion joints, anti-vibrators for trains, or thermal and acoustic insulation for floors, among others. Given this diversity of products, the company has devoted special attention to research and development, especially in the search for new solutions and new applications for its raw materials. This attitude and posture, has made ACC the most innovative business unit of the Corticeira Amorim group and the starting point of most innovation projects, as noted by this passage:

> *(…) the quantity of new applications that come out, the reinvention of products and their applications leave from here [The company]*. (Head of innovation)

The same interviewee goes on by saying:

> *If there is innovation in Corticeira Amorim, it is here that you find it for sure.*

Another aspect that shows the company's innovative commitment is this excerpt from the description of this business unit in the group's annual report for 2015:

> *The launch of new products on the market and the development of new applications, two central goals of the BU's strategy, also made an important contribution to sales growth as well as helping to create value in the market.* (Corticeira Amorim 2015 report)

In fact, shortly before the beginning of this work, the importance of this focus on innovation led to an internal restructuring of the company that allowed a greater alignment of innovation activities and a better use of resources to develop new solutions

in a faster way. These changes led to the creation of a specific department dedicated to innovation, alongside with the implementation of an innovation system based on a stage gate approach. The model implemented is a classic stage gate with decision gates that compartmentalize the entire process and allow following the projects in development. Also, as Kaplan and Norton (2004) mention it gives a structure for allocating resources. At each gate decisions are made by the management team, while the projects are guided by a manager who works together with a multidisciplinary team of internal elements of the company. This implementation also signalled to the workforce the importance of innovation. In the words of the head of quality and environment department:

> *Over time we have always had, in one way or another, innovation, and lately we are giving a greater focus.*

In addition, the structure of sales departments and the old department and the segment management department has undergone some changes that led to the creation of a matrix structure between those departments of the company. A new department called Global Management of Segments and Business Development was created and given the responsibility of managing and determining the strategy for the company main segments. Sales departments, in turn, are responsible for sales and the development of economic potential in their geographic region. So, we can find the sales departments on one axis and the new department on the other, with the main segments in the middle. The final structure of the company is represented in Figure 2 of Appendix E, where is possible to see all of the first-line departments.

These were important changes. It was understood by the company's managers that the new structure is able to give a better answer to the challenges in terms of innovation. Also, historically innovation has been a process initiated by the sales teams. The case company promotes a very close relationship with its customers, meaning that most of the new development ideas are brought by the sales team to the company, as recognized by the head of innovation:

> *This process comes from the market, comes through product management, through sales study. It is made an internal filter of ideas with the sales responsible to see if it's worth pulling the concept further.*

Despite these changes, management control practices and the performance measurement system itself have remained stable over time. Here is a synopsis of these practices.

4.2. Using a strategic performance measurement system

The main visible feature of the case company's management practices is a well-structured and fully integrated PMS. Implemented for about 15 years, the system is based on the BSC methodology with a very well defined cycle. Each year after reviewing the strategy, a set of objectives is framed within the normal four BSC's perspectives (financial objectives, clients, processes, and infrastructures) and some strategic guidelines that make a double input matrix in the form of a strategy map. For 2016 four strategic guidelines were identified: growth, value, efficiency, and infrastructures, with 22 objectives divided between them. These guidelines represent the pillars on which the whole strategy is based. Next, a strategic scorecard is created for each of these guidelines, where a set of strategic initiatives, the person responsible, milestones, resources needed, and actions to be taken during the following year, are considered and established. In parallel, a scorecard is designed for the business unit (BU) itself. These objectives, strategy map, and initiatives are then communicated throughout the organization, with some alignment sessions. Moving beyond a corporate level, these objectives are decentralized to all of those involved in the system by creating an individual objectives contract. The contracts of the various heads of the departments thus represent the contract of their departments. The drill down process of the objectives continues in a top-down perspective so that all of these contracts are chained among the various hierarchical levels of the organization. The contract between each manager and employee is then finalized and the weighting of each objective is negotiated for the final evaluation computation that can give access to the company's incentive system. Usually these contracts consist of five to six objectives.

Apart from some very specific uses, such as the planning of raw material consumption, in the company there is no use of budgeting practices. This is a practice that has fallen out of favour, being replaced by some principles associated with the beyond budgeting approach (see, for example, Østergren and Stensaker (2011)).

Throughout the BSC system, the importance that the company gives to innovation is visible. While the company has a serious commitment to deliver remuneration on invested

capital, which is emphasized in the strategy map, it is clearly in the minds of all employees that innovation represents the path to follow. Furthermore, the model also incorporates measures and objectives related to innovation. At the corporate level, innovation is reflected in three objectives in the year of 2016. One is framed in the growth strategic guideline related to the development of new products, that is measured by the volume of sales of products that did not leave, yet, the development stage. Another is in the infrastructure perspective for the operation of an innovation network that allows for a more solid innovation structure and a continuous flow of innovation. And, the third is in the guideline of value and it is related with the renewal of products and applications, measured by the sales of the portfolio of new products.

Then, the individual contracts created also reflect the need for innovation, even though this effort is not divided, or subdivided, equally to all the employees:

> *And so, of course, the [innovation] effort, which is always like this, is not distributed by everyone even if it is communicated and, it is strategic, that we talk about it. (…) When we start to make the chain of what is the development of business and innovative products it does not fit everyone. That is, typically, for example, the management control department and the administrative and financial department only have innovation in their contracts of objectives in an indirect way. The department of innovation of course has, the sales department has, because it must sell the products. The operations department also ends up with innovation objectives because it contributed a lot to the industrialization part.* (CEO)

As expected, the person responsible for the innovation department has his individual objectives contract centred on the first two strategic objectives related to this area, but since new product development is very market oriented, the sales team of the various sales departments themselves have in their individual objectives contracts goals of sales for new products in value.

This aspect, thus, reinforces the attention of the sales team in the sale of new products already developed and also in the constant attention to the search for new ideas. A similar idea applies as well to the global segment management and business development department:

> *It is one of the goals that the segment managers have. Development of new products. Then the objective is based on the number of products that are developed and their sales volume* (Head of the Global Segment Management and Business Development Department).

However, the effort to promote innovation lies not only with what is included or defined in the system, but also with the way the company uses this PMS and other related control systems. This use is analysed next, in light of the LOC framework.

4.3. The LOC framework in use

Diagnostic and interactive systems

It is commonly understood in the literature that PMS can be used in both an interactive way and in a diagnostic way (e.g.: Tuomela, 2005; Henri, 2006; Widener, 2007; Kaplan and Norton, 2008; Ferreira and Otley, 2009; Tessier and Otley, 2012). As Henri (2006) states, the use of PMS can range from a more diagnostic way to a combination of diagnostic and interactive way. That it is also true in the case company, where managers used it in a diagnostic way, but especially in an interactive way. Diagnostically, the strategic scorecard is used for the basic functions of tracking the achievement of the established objectives, through the analysis of the variances and indicators perceived as fundamental for the accomplishment of the strategy. Consequently, there is a formal established routine that allows the management control department to undertake a monthly monitoring of all company objectives as well as those of the individual objectives contracts of all employees. This monitoring is then communicated to all those who intervene in the system through a software created for the company that automatically sends reports to those evaluated and to their respective superiors. This process and the extension of the analysis is evident in several of the interviews conducted:

> *(…) Then the monitoring, which is monthly, is done in this software. And, this software automatically sends, when the monitoring is closed, an email with the monitoring in pdf format to the people, to the person in charge and to his\her superiors, and to other people that can be parameterized in the system. (…) They*

have the details, and why they have reached or not [the objectives]. Both the boss and the collaborator. (Head of management control)

Therefore, we, on a monthly basis, always look at this [BSC] and see what is better and what is worse. To deepen, too, to correct ourselves by changing what is needed. (CEO)

Likewise, these reports include the monitoring of the objectives dedicated to creating momentum amongst the employees who are understood to be important for the innovation effort, ensuring that there is constant attention to variances and a focus on achievement. Associated with this tracking process, we also have an incentive system to all the employees that have an individual objectives contract. As mentioned by Simons (2000), extrinsic motivation in the form of bonuses and incentives can be made contingent upon performance reported in diagnostic control systems. In the case company, according to some predefined stages of achievement of the objectives, a financial bonus is awarded.

This monitoring process is quite extensive and detailed, serving later as the basis for the monthly executive and directors' meetings[13].

But monitoring is just the trigger of a discussion process and it is the basis for us to define our strategic or more operational guidelines. (Head of Human Resources)

Here, interactive control processes arise, in which by focusing on strategic uncertainties the managers guide the rest of the organization to search for new opportunities (Simons, 2000). These meetings, in which, in addition to serving to analyse these results also are used to analyse the specific state of each strategic guideline and their implications. This search for dialogue begins at the close of the monitoring phase. After the close of the monitoring process the executive committee have a period of a few days to ask questions about any of the presented results. These questions are often forwarded to the various departments, which have a few more days to respond. This process is explained by the person in charge of management control:

[13] The executive management meetings are internal meetings in which nine of the twelve department heads are present. They form the executive team of the company. The meetings of directors are meetings with the elements of the executive team and with the members of the group holding.

[The monitoring report] is sent to the board of directors and the executive board who, traditionally, have two business days to ask questions. Therefore, they read the folder, the documents and say: I did not realize this, I did not quite understand that. Or, it may not be a matter of not realizing it, it may be a matter of: I would like to approach and drill down a bit of this. (...) We internally distribute these issues and find who is responsible for answering these questions.

Continuing to speak about that matter, the head of management control added:

(...) This was a great gain, indeed, in the dynamic of the process. In addition to all the involvement it brought from all executive direction.

In this way, the managers encourage the subordinates of various hierarchical levels to engage in searching, analysing and discussing the monthly information (Simons, 2000). Thus, internal communication and involvement is promoted at the same time that the meetings become more productive about the strategic reflection, the actions, and the measures necessary to consider against the results obtained. Later, several additional meetings are also held in the various departments to discuss and interpret the results of regular monitoring, a characteristic of interactive systems as, Henri (2006) acknowledged.

Monthly, all sales managers hold meetings with their teams to measure gaps and to see what action is taken to ensure that goals are met. The same goes for the marketing and segment management teams. (Head of the global segment management and business development department)

The department holds monthly meetings (...) about the measurement of the objectives with the data that we obtain from the management control. We have a monthly meeting, and see if there are deviations in the fulfilment of certain type of indicators, what can be done to reverse some negative tendency, and act in consonance. (Project manager)

This participatory process also involves aspects related to innovation, and two more specific forums occur. Firstly, in addition to the two discussion meetings already spoken of, a third is carried out with an agenda dedicated exclusively to innovation projects. In this, information sessions held by the project managers themselves lead to the necessary

discussions and approvals in the stage gate process. In this sense, the gates of decision of the stage gate model also act as an interactive system, leading to a participatory discussion between different hierarchical levers either in the decision moments or at the early stages of classification of ideas. About the format of this meeting the head of innovation commented:

> *All that has to do with project status, with innovation initiatives, is discussed and approved in this executive committee of innovation, where it is the administration of the company of all the areas.*

After this moment of discussion and learning with the top management and the elements of the innovation department, there is still a second moment, which is also explained by the head of the innovation department.

> *We once a month on the board of directors of the holding, which meets once a month with us, we always make a point of situation of the most important projects.*

By this, there is a clear involvement of top management around the pillars of strategy, and innovation is given a primary focus of discussion and debate. This debate is not restricted to the executive management, since a number of formal meetings are held for innovation issues with a more open internal population, especially amongst the sales, innovation, and global segment management teams. These processes thus fall into the category of what is meant by "interactive control". Interactive control implies that managers are highly involved in the use of the system, that these systems are used throughout the organization, and that there is a recurring flow of information that constitutes an agenda for discussion and interpretation (Simons, 2000; Tuomela, 2005; Henri, 2006). Hence, the company case is an example of the application of this type of process and, as in the study of Tuomela (2005), such processes play an important role.

Boundary and Belief systems

It is also possible to identify the presence of boundary and belief systems. As in the study of Curtis and Sweeney (2017), in this case too, these systems are used to communicate and promote the importance and involvement of the organization with innovation. As far

as to the belief system is concerned, a multitude of formal and informal mechanisms and procedures could be used as a way of establishing it (Marginson, 2009). In the case company, it is well established that the company's vision is based on innovation as a foundation. The mission, simple and short, makes it clear that what is wanted is to take a more innovative attitude, working as a statement that inspires employees and communicates the core values. In the core values of the company, "innovation and creativity" clearly indicates what the company stands for. There is also a set of mottos constantly spread by the vast population of the organization. As an example, an internal institutional Powerpoint presentation of general information about the company has as heading the following expression:

Together towards innovation

Another example comes from the expression that is the beginning of the company's presentation to the world:

Innovation is our attitude and driving force (ACC´ website)

This innovation message is also accentuated and perpetuated by the strategy of the company which is mostly communicated through the strategy map. The strategy map is seen everywhere in the reports in which it has a mandatory presence, and because it is posted in the various common spaces.

> *(…) We have, for example, a commercial manual in which, in the first chapter, it has the strategic positioning of the company and, in which, X% of the growth in the triennium, must result from innovative products. New products. (Head of Human Resources)*

> *We in the strategy map say that we want to have a certain sales volume, but that we also want to have new products, and that we also want to have priority segments. (Head of management control)*

Then, there is the boundary system. In general, the company's boundary system engages managers in strategic behaviour by defining acceptable activities, although it does not do it very formally. As Chenhall *et al.* (2010) put it active belief systems circumvent the codes of conduct. So, the boundaries of strategic action are communicated through the principles and pillars of the strategy, giving guidance on various aspects such as financial

performance and market positioning. In relation to innovation, they give guidance on the field to which the development effort should be directed. Likewise, the company seeks to ensure an alignment of the innovation projects with the company's own strategy, which ultimately culminated in the identification of the strategic priority segments and ranges of products to bet on.

> *The first fundamental aspect was the clarification of the strategy of the company. (…) And so, afterwards, from this clarified process we had a clear strategy, a strategic path from today until 2020. This was then deployed across the various strategic segments and beyond.* (Head of innovation)

The person responsible for innovation also spoke about the determination of the challenges within each segment. This represents a way of guiding the innovation effort and ensures that it also acts as a formal document of acceptable activities.

> *(...) What are the areas of strategic challenges for innovation in all these segments that are important for the company? We are now finishing this process of clarification, to give us clues. Then we have to go after concepts and begin to develop.*

These limits are then more specifically materialized in the stage gate system. At the monthly decision meeting exclusively dedicated to innovation issues, the "go" or "no go" to the next phase is given with decision makers having in mind these defined limits. For example, soon in the first decision gate, the ideas are set in a referential based on these limits, which will indicate if it is worth or not to continue the development:

> *Then we have here a way to measure which projects fall into this definition [strategic alignment]. And it is the entry point of all the value propositions we have developed. (...) They will be classified in these referential so that we can give a sense of priority to develop.* (Head of innovation)

Furthermore, Simons (2000) states that a set of prescriptions and rules must be linked to a credible degree of punishment. In the case company, it cannot be strictly stated that there is a punishment for misbehaviour, although it is implicit that failure to meet the objectives of individual contracts will mean that the annual bonus incentive will not be

awarded. Innovation objectives are included in some of the contracts, so not achieving these objectives could block the access to an incentive at the end of the year.

In addition, another way to set boundaries and promote appropriate behaviour is in the transmission, through internal newsletters, of " jobs well-done " as the head of Human Resources put it:

> *(…) we get a job well-done from someone within the newsletter. Obviously, the person is going to give his testimony and tell us what it is that he did. (…) It is a stage for the person and a way to give him visibility.*

4.4. Dynamic tensions between the different MCS uses

In the case company the balanced of the various LOC levers ends up generating dynamic tensions within them. On the one hand, all the dialogue, debate and discussion promoted by the interactive use of BSC and the stage gate model (as discussed in the previous section) creates the necessary forums to generate ideas.

> *We perceive the trends, we perceive how the market is evolving. And then we try in advance to develop products that are likely to be used in that segment of activity.* (Head of the global segment management department and business development)

Indeed, this represents a positive and inspirational force that ties all the organization around the innovation issues, unleashing a proactive stance for the emergence of new products and/or new applications of the existing ones. However, this proactive stance promoted by interactive use of MCS needs to be balanced within the company strategy and, for that purpose it comes in work the diagnostic and boundary uses of MCS. They come into play to provide broad constraints:

> *It is good that the company has implemented a set of processes that ensures that we have, on the one hand, processes of attracting opportunities and ideas. (…) but, we have to leave some opportunities behind (…) for opportunities that we perceived to be more oriented with the strategic alignment of the company and to be more attractive.* (CEO)

> *Innovation is a panoply and a very large field. We cannot say: look, let's innovate! Let's innovate! We need to have a strategy. We need to know what it is that we want to innovate. Which way do we want to go? What alternatives do we want to explore? And the best way to do this is with a contract of objectives.* (Head of Production)

First, dynamic tension comes from the use of BSC in both diagnostic and interactive ways given that the two represent two opposite forces, although, complementary and nested (Henri, 2006). More specifically, this dynamic tension comes from the need of assuring the profitability of new developments.

> *(…) The focus of the organization is that being new is not enough. Only innovate is not enough. We must innovate and bring in two very important components: One, we have to bring value. We must innovate and bring value. And, bring sales volume.* (Global Segment Manager)

This need of profitability is central to the case company given their past in which new products appeared but most were not able to generate sales. For its part, the use of the BSC in a diagnostic way reinforces the need for new developments to be able to generate value and sales. The placement of sales targets of the new products developed to the various teams involved in the innovation processes ends up ensuring this. This was commented on by the projects managers:

> *If I have a sales goal it means that I will do the developments thinking that has to be really developed and I will not simply deliver a report that will be the best possible. (…) It is an objective [the sales objective] that really has a more concrete way of measuring and that has an impact on the objectives of the company. Because, in practice, the company does not only want to do projects.* (Project Manager 1)

> *It makes sense that the objectives cover a real value associated with the product whose clear objective is to put it on the market and make sales and results.* (Project Manager 2)

Also, through the monthly monitoring that is done on the achievement of these sales objectives there is a constant unconscious reminder of the need to generate sales volume

in the new developments. Another situation in which there is also dynamic tensions between the innovation effort and the need for profitability of the new developments comes from the objectives of sales of new products in innovation and Global Segment Management and Business Development departments. Although the sales process is not in the hands of these employees, this objective once again reinforces that these departments cannot be making major developments without considering if they are viable for the future. In both cases, we should keep in mind that monitoring is linked to an incentive system that rewards the accomplishment, amongst others, of these objectives. Furthermore, internal management control also monitors a set of indicators that are considered necessary for the attainment of these goals, and the strategy map very clearly indicates that the primary purpose of the company is to create value for the capital invested.

However, to guarantee the profitability of the new developments, the company also uses its stage gate system. As reported by Jørgensen and Messner (2010), the stage gate process also plays a critical role in calling the attention of project managers and their teammates to product profitability. Throughout the various decision gates, expected costs, market potential, and other metrics of interest are considered, which allows assessing the return and size of the potential businesses for the product that is being developed. For example, about the first step in evaluation of the proposals the Head of innovation commented:

> *When the value proposals come to us to evaluate, we see if it has business potential, if met our capacity and our strategic alignment. And, we have a set terms defined that we cross with product management*. (Head of innovation)

Another important source of dynamic tension with interactive use of systems is the need to align the new developments to the strategic segments of the company. These strategic segments are framed within the boundary system and are reflected in the strategy map itself, but more clearly in the stage gate model, where it ends up as one of the screening criteria. The head of innovation points this out even when talking about the set of projects under development:

> *Another thing here [the projects in the pipeline] is the strategic alignment of the projects. Here are the segments that are strategic for the company.*

Subsequently, similar to the findings of Chenhall *et al.* (2010) strong belief systems help to maintain employees' awareness and bonding to the core values, and, therefore, supports and complements the work done by the interactive system.

> *Usually at meetings we always talk about goals and performances. And so, it is not possible not to talk about innovative products. We give them a lot of importance ... We always talk about it. In every communication, we talk about it.* (CEO)

As explained in the previous section, a belief system provides the basis for interactive control by embracing people in a proactive spirit in relation to innovation. Notwithstanding, this innovative impulse must somehow be controlled by balancing it with the constraining forces. Dynamic tensions are, therefore, created between this system and the boundary and diagnostic systems that set the limits for the requested innovation effort.

To sum up, the constraining effect of the diagnostic use of PMS is also necessary to indicate the limits on which innovation must be developed. This also becomes the task of the boundary system. Together they generate a combined effect that provides broad constraints to employee behaviour so that a dispersion is avoided, establishing the results that employees are expected to deliver (diagnostic use of PMS) and the domains within which the innovation effort must be developed (boundary systems). In other words, the involvement of the company's leaders and the debate surrounding the innovation serve to facilitate the emergence of new products and applications that, later, the diagnostic control refocuses with its constant monitoring of the objectives, and boundary control with the indication of priority segments and the definition of what innovation means internally. In the case company, the four levers and their interplay provide an appropriate infrastructure that is needed to ensure that innovation flourishes and represents the present and future of the company. And, of course, this infrastructure also results from the dynamic tension created between positive and inspirational forces (interactive control and belief system) and behaviour control forces (diagnostic control and boundary system).

5. Analysis of the case findings

Depending on the needs of each organization, managers choose what control tools should be used and how far they formalize them (e.g.: Mundy, 2010; Curtis and Sweeney, 2017). These controls end up working as a package, which means that they do not work in isolation, but instead complement one another. Thus, it is not strange that the balance of Simons' levers of control differ according to the organization. This case study report has sought to describe how managers, in the effort to manage and direct the organization to innovation, are mobilizing the MCS at their disposal according to the four Simons' levers of control and how the dynamic tensions arise from their use. From the collected data, ACC uses BSC, the stage-gate model, meetings, mission, values statements, and internal communications to mobilize the levers of control in relation to innovation.

Individually speaking, the case shows that the use of PMS in a diagnostic way more than working as constraining force of innovation, it promotes direction to reach the innovation goals without entering in adventurous behaviours on these matters. However, the inclusion of financial measures for the sale of new products in the company's BSC and, then, codified in the individual objective contracts plays an important role in signalling the company's position toward innovation. Their presence, and consequent monitoring, analysis of deviations, and incentives will ensure constant employee attention to innovation. Furthermore, it will increase awareness and motivate employees to look for development and search for new ideas, since they also know that more new developments will be needed to ensure the achievement of this objective in future years. This goes against the main ideas of Simons, and indeed represents a new perspective to the role of diagnostic use of MCS in innovation. With these characteristics, the results show that even when used in a diagnostic way, MCS are able to provide an important part in the innovation effort. Also, this could be aligned with Bedford's (2015) and McCarthy and Gordon's (2011) studies that found a positive relationship between this type of use of MCS and innovation as well.

For interactive use, managers at the case company rely on both the BSC and stage gate model. Interactive use, is the most preponderant use of these systems, what, in fact, is in line with most research that predicts that this lever of control has the greatest capacity to positively encourage innovation (Henri, 2006; Bisbe and Malagueño, 2009; Adler and Chen, 2011; Koufteros, *et al*., 2014; Bisbe and Malagueño, 2015). Therefore, it allows to

present evidence on the preponderant role of interactive control in the promotion and development of innovation. Specifically, our results point out that interactive control provides the necessary discussion forums and the involvement of all the organization around innovation. This is in line with Henri (2006), who acknowledges that interactive use of the case company PMS contributes to the process of knowledge generation and dissemination as well as fosters collaboration within and between the various departments. The same happens to the stage gate model, which with its various gates, promote debate and draws management attention to innovation issues.

Regarding boundary systems, in the case company these systems play a constraining role in the innovative behaviour since they direct where the innovation effort should go. Boundaries reflected in the stage gate model and in the strategy map inform about the strategic segments of the company and the priority product ranges. This extends the findings of Akroyd *et al*. (2016), who have already identified the role of the stage gate model in producing an alignment between product development projects and a company's strategy. Furthermore, to the best of our knowledge, it is the first time that strategy maps are used to indirectly communicate boundaries to the individuals' actuation. ACC's strategy map clearly indicates the need to grow sales for the strategic segments, identifying some of the segments.

The inspiring force of a belief system creates the environment for the emergence of new product development and new applications. The belief system strongly communicates the need for innovation, installing it in their minds and motivating employees to engage in an opportunity-seeking behaviour that is consistent with the delineated strategy. To some extent, this system represents the basis for action of all other levers by promoting a proactive behaviour expected to obtain creativity and new product developments. This comes in line with the study of Heinicke *et al*. (2016), who conclude that belief control drives the control systems in firms with a flexible culture.

The balance of the four levers then generates important dynamic tensions so that the innovative effort executed in the case company could be triggered and could be align with the strategy and be profitable. This matter, then, represent the main contributions of the tensions created between the uses of the different systems of the company. In ACC, regarding innovation, beliefs and interactive control work together and in a complementary way create dynamic tension along with the complementarity work of

boundaries and diagnostic control. Thus, it is shown that it is possible to have structured processes that do not hinder the innovation effort and, on the contrary, allow to better explore that effort. Indeed, these negative forces do not constrain innovation acting in the bottom line in reducing the uncertainty of the innovation results. These results reinforce to an organizational context the importance of this role of control, which Akroyd and Maguire (2011) had already revealed in the specific case of innovation projects. Furthermore, Henri (2006) mentions that the tension that emerges from the interactive and diagnostic use of PMS expands the positive effects of interactive use on the achievement of innovativeness capacity by promoting dialogue, stimulating creativity, and focusing organizational attention. Following this line of thought, through the results presented, it is possible to point out that the tension that emerges between the combined use of interactive / beliefs control systems and the combined use of diagnostic / boundary control systems, allows expanding the positive effects of the first group without having a dispersion that does not benefit the company. By drawing an analogy with a car, the inspirational forces are the accelerator providing speed while the more constraining forces of the model are the steering wheel that permitted to reach the destination. Without this steering wheel, probably the inspirational forces would result in a deviation from the attention in relation to the more general objectives of the company, as the employees would perceive innovation as more glamorous, as happened in the study of Marginson (2009). Also, Ylinen and Gullkvist (2014) had already realized in their study that the use of mechanistic control in combination with an organic control emphasized the performance of projects. The results obtained with this case study, in terms of the complementarity between these levers, thus follow Ylinen and Gullkvist' (2014) line of thinking but in a more organizational context. All of these complementarities are also consistent with the theoretical argument suggesting that the four levers mutually reinforce each other, as has been reported in the literature (e.g.: Mundy, 2010; Speklé *et al*., 2014; Heinicke *et al*., 2016; Curtis and Sweeney, 2017).

6. Concluding Remarks and possible research directions

Earlier research on the role of MCS in innovation has relied on the LOC framework ascertaining the impact that the use of the four levers has on innovation (e.g.: Bisbe and Otley, 2004; Henri, 2006; Bisbe and Malagueño, 2009; Adler and Chen, 2011; Koufteros,

et al., 2014; Bedford, 2015). Nevertheless, something that remains weakly examined is the way of balancing these levers and the dynamic tensions that emerge from these uses in innovative companies. Following the theoretical argument, originating from Simons (1995a), the four levers of control need to work together to really promote a control environment and so that the company can generate benefits from an innovative effort. The current essay has sought to gain a greater understanding and explore how the innovative company ACC and their managers balance the MCS at their disposal within all the four levers and how dynamic tensions arise in relation to innovation. In doing so, it is considered that the MCS in use by the case company act as package (Sandelin, 2008; Malmi and Brown, 2008; Grabner and Moers, 2013)

From what was found in the case organization, the four LOC systems and their interplay provide an appropriate infrastructure that is needed to ensure that the innovation flourishes and represents the present and future of the company. Of course, this infrastructure also results from the dynamic tension created between positive and inspirational forces (interactive control and belief system) and behaviour control forces (diagnostic control and boundary system). It was possible to find the presence of all levers, as would be expected by Simons' own instructions. Still, the complementarity within the positive and negative forces allows strengthening the argument that these levers mutually reinforce each other (e.g.: Mundy, 2010; Speklé *et al*., 2014; Heinicke *et al.*, 2016). In fact, the constraining forces of diagnostic and boundary systems work closely with each other, providing the strategic direction for the innovation effort, reducing the uncertainty of their results while the inspirational forces of interactive and beliefs systems create the needed proactivity. In this way, it is shown how the co–existence, in day-to-day routines, of all levers and the tensions they cause allow the enhancement of the organizational capability of innovation. As such, following the conclusion of Speklé *et al*. (2014) in relation to creativity and control, this study shows that managers do not need to make a trade-off between innovation and control. Structured control systems can ensure the strategic fulfilment of the objectives to which an organization commits to all its stakeholders without needing to sacrifice innovation.

Beyond this practical implication, the present essay contributes to the current literature in many aspects. First, the largest contribution goes to the body of literature that has been dedicated to analysing the relationship between MCS and innovation. Going beyond quantitative methodologies, this essay uses a case study approach to better understand

how MCS packages are being used by managers in an innovative company to manage and promote the innovation effort within the company. Therefore, this essay contributes to research by responding to the call for more research to understand how the two situations interconnect with each other (e.g.: Moll, 2015; Field, 2017).

Second, this essay also responds to recent calls to look into tensions in more depth and closer to practice (Lövstâl and Jontoft, 2017; see also Moll (2015), who offers as a possibility for further research to look at how tensions appear and disappear). From the results achieved, it is also possible to better understand how the dynamic tensions created by the different uses of MCS according to the LOC framework emerge. The emergence of these dynamic tensions is a central concept of Simons' model, which until now has been little explored in the context of innovation. Thereby, it is possible to close a bit more the gap in the literature about tensions between management control and innovation (Lövstâl and Jontoft, 2017). Furthermore, by exploring the dynamic tensions principles, this essay also complements the works that analyse it, such as Mundy (2010), Speklé *et al.* (2014), and Kruis *et al.* (2016), providing additional evidence to support the argument that Simons' levers mutually reinforce each other.

Third, by considering the four levels simultaneously, this essay helps to augment the research that exists on beliefs and boundary systems when compared to interactive systems (see, Martyn *et al*., 2016).

Fourth, by considering MCS as a package, this essay addresses the point of Moll (2015), that these systems do not act in isolation, and for that reason we advance our knowledge on how different controls are related to each other.

Of these contributions, there are several possibilities for future research. First, since this study reports the example of only one company, generalization is restricted (Mundy, 2010; Miles *et al.*, 2014). Furthermore, different companies, sectors, and management styles may need to use different levers, and the choice of the way that an MCS is used ultimately depends on the managers. As Simons (1991) suggested there are fundamental differences on how managers use control systems. Thus, the literature would have much to benefit from more case studies and even multiple case studies. Even more if it is taken into consideration the idea of Revellino and Mouritsen (2009) that innovation and their controls are co-developed. Against this, it will be worthwhile to use longitudinal case

study approaches to study the role of MCS in innovation. Different types of organizational tensions other than the concept of dynamic tension resulting from Simons (1995a) may also be analysed. An example of such a study is the work by Curtis and Sweeney (2017), which discusses how managers used the four levers of control to manage the tension created between two different types of innovation. Second, the study highlights the importance of the complementary between interactive and belief systems and diagnostic and boundary systems, as well as the dynamic tensions that the two blocks cause. So, further research could conduct quantitative studies to explore these matters. In addition, the combined effect of the four control levers could also be analysed. Third, the case study showed that the diagnostic use assumes a role of ensuring that employees, perceived as essential to the innovation effort, are oriented to it, requiring them to present results linked to innovation and making the rewards at the end of the year dependent on those results. This shows that MCS can play an important role in guiding employees for innovation, promoting direction and focus on it. Future research could analyse these aspects in further detail, leaving behind the way managers use their control systems and focusing more on the influences of MCS in the behaviour of the employees. In this way, it would be possible to contribute to a greater perception and specification on how and why MCS influences innovation.

IV. MANAGEMENT CONTROL SYSTEMS AND INNOVATION: A CASE STUDY ENLIGHTENED BY INSTITUTIONAL THEORY

1. Introduction

To help managers accomplish their innovative goals, new challenges for Management Control Systems have arisen (Chenhall and Moers, 2015), as these systems are understood as an instrument for organizations to achieve their goals (Merchant and Van der Stede, 2012). In this way, it is natural that a body of research has addressed the relationship between MCS and innovation (e.g.: Haustein *et al*., 2014: Bedford, 2015; Bisbe and Malagueño, 2015; Chenhall and Moers, 2015; Lopez-Valeiras *et al.*, 2015; Rezania *et al.*, 2016; Curtis and Sweeney, 2017). Empirically, these studies leave little room for questioning the importance of control in successful innovations (Moll, 2015) or even their potential role in initiating and motivating the innovation effort (Chenhall and Moers, 2015). This potential relies heavily on the use of MCS, according to Simons' interactive systems (e.g.: Bisbe and Malgueño, 2015; Lopez-Valeiras *et al*., 2016), since the use of MCS in harmony with what Simons defines as diagnostic systems, has collected dubious findings (e.g.: Henri, 2006; Bedford, 2015). Within the array of these studies, some prescriptions for how managers should use their MCS could be drawn, but, overall, they only provide a weak and vague understanding about the role that MCS play in innovation. These studies are more focused on the uses of MCS in relation to innovation, and not so much on the institutional aspects that affect behaviours.

Specially, this body of research offers little reflection and theoretical explanations on how and why MCS can shape the behaviour of the organizational actors toward innovation. Therefore, this essay relies on institutional theory to provide a theoretical frame for these matters, also analysing and questioning how this background can offer a foundation for their understanding. The conceptual approach of institutional theory has provided a focal point in many accounting studies, being considered helpful when it comes to understanding a phenomenon, taking into consideration their social-cultural context (Moll *et al.*, 2006a; Ribeiro and Scapens, 2006; Lounsbury, 2008). However, this essay diverges from previous approaches of institutional theory in management accounting in the sense that the emphasis is not on isomorphism (Lounsbury, 2008) or the

institutionalisation of practices, practice variations in management accounting (e.g. Cruz *et al.*, 2009), or even processes of change. This essay draws on the understanding of action and the influence of institutions over actors to develop a model of how and why MCS affects behaviours toward innovation. Furthermore, by relying on how institutions influence actors' behaviours the recent developments made by Cardinale (2018) are introduced.

To achieve these purposes, a more comprehensive concept of MCS is adopted. Following the more recent trends, MCS are seen, not as systems that operate in isolation, but as a collection or package of controls that incorporate the whole strategic process from formulation to implementation (Malmi and Brown, 2008; Sandelin, 2008; Ferreira and Otley, 2009; Grabner and Moers, 2013). In general terms, based on Simons' (1995a) and Chenhall and Moers' (2015) definitions, MCS are understood as formal information routines and procedures that companies adopt to maintain or alter patterns in order to achieve the organizational goals.

Methodologically, an in-depth an intensive case study on Amorim Cork Composites was embraced to allow a grounded and fine-grained access to MCS and their surroundings in a real-life context, with all the specificities and rich descriptions that are inherent to this methodology (Ryan *et al.*, 2002; Yin, 2009). The case study mainly takes the form of an exploratory and explanatory study (Ryan *et al.* 2002; Scapens, 2006; Yin, 2009). ACC is the innovative arm of a large industrial Portuguese group with a solid orientation to the use of management control practices. Chosen for having a strong history and culture regarding innovation, ACC has also implemented and guaranteed the use of a Balanced Scorecard methodology for about 15 years now. Since then, this methodology has been used by its managers as a tool to implement and revise strategy over time. With this stability, it was possible to have a certain assurance that the degree of institutionalisation of these practices was in an advance state. Throughout the field work, data was collected from several sources, such as interviews, documental information, observation of meetings and visits to the company. Notwithstanding, the main source of data was the thirty-two interviews to various employees from different hierarchical levels. Thirty-one of these interviews were recorded and transcribed, which allowed for further analysis with the qualitative software MAXQDA. Data was analysed by highlighting and coding passages according to the themes in study, granting a structured view of the findings.

For all purposes, this essay borrows the understanding of innovation of ACC. Innovation at the case company is perceived as the creation of a new product where cork can provide additional value, a different application for an existing product or an existing application of cork, a transfer of products between segments or simply a new development for a product of the portfolio. In broad strokes, the main form of innovation experienced in ACC is product innovation.

Based on this background, the results of the present study allow the development of a model that is informed by both the evidence collected and institutional theory. This model presents three main contributions. First, this essay contributes to the refinement and improvement of the debate on how and why MCS influence innovation. In doing so, this essay links the dimension of communication, guidance/focus and institutional theory to account for the influences of the MCS routines in the behaviour of the employees. Therefore, it has shifted the focus on the type of use of MCS that have dominated the research so far. Secondly, with these dimensions, an orienting posture of the MCS toward innovation becomes clear. MCS guide cognition, which increases the awareness, proactivity and propensity of actors with the presentation of innovation as a viable path and solution, indeed represents the second contribution. The routines of the MCS are able to orient individuals to innovation, like the orienting posture that is theorised by Cardinale (2018). Thirdly, this essay contributes to the literature of institutional theory in general by providing an empirical analysis of the theoretical development of Cardinale (2018). Cardinale (2018) did not ground his view of the influence of structures on actors' behaviour with a specific empirical situation; he just built the case in theoretical terms. And, in fact, the orienting posture of MCS is, in broad terms, consistent with the position taken by Cardinale (2018).

The rest of the paper continues with six more sections. The next section assembles the prior literature on MCS and innovation and then provides the explanation of what institutional theory provides about the behaviour of actors. The third section explains the methodological approach, the data collection process and how the analysis of the data was done. The fourth section shows the importance given to innovation by the company and how MCS incorporates it. The fifth section compiles the analysis of the field study, showing the dimensions that appear on the MCS' routines, specifically, the dimension of communication, as well as guidance/focus on innovation. The sixth section develops the model on how and why MCS affects the behaviour of employees, connecting the evidence

collected with the theorisations of institutional theory. The last section discusses the results using previous literature and provides the conclusions, limitations and some possibilities of future research.

2. Literature review

2.1. Prior research in MCS and Innovation

A growing stream of literature has tried to understand how MCS affect innovation since the time when cybernetic management accounting processes (Chenhall and Moers, 2015) were in place. These processes, which have a strong emphasis on efficiency and financial aspects, dominated the management accounting practices until the mid-1980s. In this period, MCS were perceived as mechanisms to guide the organization to the achievement of the goals decided at the strategic level (Davila, 2005; Davila *et al*., 2009a), with the promotions of the same routines over time (Davila *et al.,* 2009b; Ylinen and Gulkvist, 2014). Within this mind set, any deviation from strategic planning should be avoided. With a high probability of failure and uncertain outputs, innovation was perceived as an inefficient process given the risks involved (Davila *et al.,* 2009a). Therefore, because of its characteristics, innovation was a process that was necessary to avoid in the name of the so intended efficiency (Davila, 2005; Davila *et al.,* 2009a, 2009b). Perceiving innovation on these grounds and consideration of the idea that MCS were a hindrance to it have proliferated (e.g.: Ouchi, 1979; Rockness and Shields, 1984; Damanpour, 1991; Abernethy and Brownell, 1997). MCS were said to constrain the freedom and motivation to innovate (Amabile, 1998), repressing creativity (Cardinal, 2001), and therefore no rational form of control could be applied in innovation settings (Ouchi, 1979).

However, gradually the literature has revealed the significant role that MCS can play in innovation (Bedford, 2015). On the one hand, in the last 40 years, MCS have registered an evolution that allowed them to advance to more complex and open controls (Chenhall and Moers, 2015). New techniques are more connected to strategy aspects (Langfield-Smith, 2008), and incorporation of non-financial measures has allowed MCS to be perceived as sources of valuable information in decision making (Pfister, 2014). With

this, remarkably, Simons introduced the framework about the levers of control,[14] and his identification of the interactive use of MCS recognised the role of these systems in exploring strategic uncertainties (Simons, 1995a; 2000; Davila *et al.,* 2009a). This acknowledgement opens the door for management control practices to accept the necessary variation and, with that, the acceptance of innovation as well (Davila *et al.*, 2009a). As Chenhall and Moers (2015) explain, when the importance of environmental uncertainty was assumed, organizations were forced to organise their structures to help achieve innovation in a way that allowed them to acquire competitive advantages.

Within this context, researchers have started to dedicate some attention to the role of MCS in innovation, establishing links between the two. For example, resorting to the Levers of control framework, scholars have found significant links between MCS and innovation at an organizational level (Moll, 2015). MCS use that is consistent with that of interactive systems has provided evidence to support the argument that they are the main promoters of innovation (Bisbe and Otley, 2004; Henri, 2006; Bisbe and Malagueño, 2009; Koufteros *et al*., 2014; Bedford, 2015; Bisbe and Malgueño, 2015; Lopez-Valeiras *et al*., 2016). Some reasons that are given as support for this positive role are the contribution for knowledge generation and dissemination, the fostering of collaboration (Henri, 2006) or, even the promotion of internal and external information flows (Lopez-Valeiras *et al*., 2016). Regarding diagnostic use of MCS, there was also some evidence to support Simons' claim (Henri, 2006) that they provide and act as a constrainer of innovation, but recent findings have casted some doubts on this evidence (e.g.: McCarthy and Gordon, 2011; Koufteros *et al,* 2014; Bedford, 2015). Beliefs and boundary systems have not been explored very much. Bedford (2015) attributes to them a supplementary role, arguing that boundary systems provide structure for lower levels during implementation phases and beliefs systems enhance the returns from exploration activities.

Undeniably the use of Simons' framework by researchers has provided remarkable advances in this field. However, the clear majority of the studies have only provided associations or indications of the best type of use of MCS in the context of innovation.

[14] Simons' (1995a) levers of control framework identifies four systems/levers (interactive, diagnostic, beliefs and boundary systems) about the way that managers can use MCS to support strategy implementation. Interactive systems provide a base for managers to be involved in the decisions of their subordinates, forcing the dialogue. Diagnostic systems monitor the achievement of the predefined goals, seeking to correct deviations as soon as possible. Beliefs systems are a set of definitions that provide to whole organization actors with the basic values and purpose of the organizations. At last, boundary systems establish limits to prevent employees of engaging in risky behaviours.

Therefore, the need for further research to learn how MCS are implicated in innovation persists (Chenhall and Moers, 2015; Moll, 2015). Davila *et al.* (2009b) offer indications that MCS are stable and provide a frame for cognition, mental models and actions, but from this point on, the literature fails to provide deep analysis on how and why MCS could affect individuals' cognition and decisions regarding innovation. To respond to this challenge, this essay finds theoretical support in institutional theory.

2.2. Institutional explanation on individuals' behaviour

Institutional theory has been the dominant approach for understanding organizations (Greenwood *et al.*, 2008), and the production and reproduction of social practice (Christensen *et al.*, 1997). Institutions are seen as a sort of relatively permanent social establishment (Zucker, 1977) that allow sociological theorists to understand social life and human activity as determined by these institutions (Jepperson, 1991; Meyer, 2008). Indeed, institutional theory portrays the theme that organizational behaviours or individual thoughts and actions are influenced by institutions (DiMaggio and Powell, 1991; Hoffman, 1999; Lawrence and Suddaby, 2006; Ribeiro and Scapens, 2006). As Lounsbury (2008) mentions, an institutionalist considers that action must be perceived as constituted by institutional rules and beliefs. Therefore, after the 1990s, institutional theory has been widely used in management accounting research as an alternative to the mainstream perspectives (Wickramasinghe and Alawattage, 2007). Introduced by Robert Scapens, in this field, institutional theory was a way to help understand how and why individuals respond in a particular manner to management accounting and control practices (Scapens, 1994; Burns and Scapens, 2000; Wickramasinghe and Alawattage, 2007).

Over time, various branches of institutional theory have been developed and used in management accounting research. Scapens (1994; 2006) starts to distinguish between old institutional economics (OIE), and new institutional economics (NIE). NIE understands institutions as static and tacit, focusing on equilibrium and on rationality, while OIE is more focused on the dynamics and the active roles of institutions that could be of help to understand accounting (Scapens, 1994; 2006; Wickramasinghe and Alawattage, 2007). Under the teachings of OIE, Burns and Scapens (2000) have developed a model to study

management accounting change that conceives of their practices as a set of routines that can potentially be institutionalised. Through institutionalisation, the authors further explain that management accounting has the potential to become the "*'taken-for-granted' ways of thinking and doing in a particular organizations*" (Burns and Scapens, 2000:5). Achieving this point, these routines are then able to govern people's action acting through habits (Burns and Scapens, 2000; Wickramasinghe and Alawattage, 2007).

But later, OIE has been criticised for not perceiving the reasons and processes that led to the introduction of alterations to the existing practices (Ribeiro and Scapens, 2006). So, more recently, accounting researchers have come to adopt new institutional sociology (NIS) in their studies (Wickramasinghe and Alawattage, 2007; see also, Dillard *et al*., 2004; Hopper and Major, 2007). NIS in management accounting has provided the means for digging into how the institutional environment of organizations leads to a change of management accounting systems (Wickramasinghe and Alawattage, 2007). For NIS theorists, organizations exist within a set of highly institutionalised cultural rules and social norms that make them adopt structures and procedures valued in accordance with that environment (Ribeiro and Scapens, 2006). In this way, organizations are able to secure the resources that they need (Ribeiro and Scapens, 2006), and legitimise themselves (Ribeiro and Scapens, 2006; Greenwood *et al*., 2008). This new perspective, therefore, emphasises the ways in which action is structured by shared systems of rules (DiMaggio and Powell, 1991), viewing behaviours and practices affected by the social environment (Meyer, 2008).

Overall, these approaches, despite the differences of perspectives, have similarities about the role of actors and the influence of institutions on individual behaviour. Action under the dome of institutions has always been a debated question in institutional theory literature (Cardinale, 2018). Early institutionalists analysed how institutions constrained actors' behaviours, organizational structures and activities (Battilana *et al.*, 2009; Scott, 2014), assuming actors to be limited by organizational factors (Cardinale, 2018). Thus, as Burns and Scapens (2000) mentions, institutions are able to impose form and social coherence upon the activity of individuals through the reproduction of a set of habits and actions.

However, the conception of individuals as "*slavishly devoted to the reproduction of the same habits*" (Battilana *et al.*, 2009: 67) has become problematic when institutionalists

start to look to the issue of institutional change. The conceptualisations about action did not make it possible for institutional theorists to explain change. As a result, DiMaggio (1988) argued for the incorporation of agency. In other words, the way in which the actors, conditioned by institutions, can change rules and relational ties to have an impact on the social world (Thornton *et al*., 2012; Scott, 2014). As Battilana *et al.* (2009) mention, for institutional theorists, the challenge is to account for agency of the actors that are embedded in the institutions.

This acknowledgement, in turn, means that actors are empowered and, at the same time, they are controlled by institutions (Meyer, 2008). Institutions now imply the idea, imported to a great extent from structuration theory, that they not only constrain the actors' behaviours but also enable it, although it does not determine these behaviours (Moll *et al*., 2006a; Battilana *et al.*, 2009; Cardinale, 2018).

Indeed, these ideas have been highly influential in institutional theory. Cardinale (2018) came to argue that this view suffers from the lack of existence of a clear definition of what "enable" really means. For the author, many institutional theorists would agree that enable refers to the structures make actors' actions possible. Nevertheless, the author argues that a structure does not only "*open up possibilities for action, but also that it actively encourages actors to settle upon some of those possibilities rather than others*" (Cardinale, 2018: 17). In this way, Cardinale (2018) theoretically builds the case that structures constrain, enable and imprint dispositions that orient action. On the one hand, institutions constrain action by making some possibilities impracticable and, on the other hand, they enable by making some other possibilities feasible. But, institutions also orients actors to choose some worthwhile possibilities instead of other viable possibilities. Ultimately, this has some implications on the way structure affects action since actors are pushed toward some courses of action instead of others (Cardinale, 2018).

Considering this, it becomes clear that institutions, to some extent, have the ability to influence individual behaviours. Institutions involve actors in multiple and complex ways (Meyer, 2008) and guarantee cultural persistence (Zucker, 1977). Therefore, in studying organizational practices, it is not detrimental to account for these effects. Management accounting and control are known as routines that are able to become institutionalised (Burns and Scapens, 2000; Scapens, 2006; Wickramasinghe and Alawattage, 2007) and with this knowledge it is possible to understand how and why individuals behave in

relation to it. MCS are no exemption, and consequently they are seen as systems that determine organizational life by the routines they impinge in daily practices that could become institutionalised (Burns and Scapens, 2000; Scapens, 2006; Ribeiro and Scapens, 2006). As such, these systems are like an institution, impacting on actors' behaviours in the same way.

As such, institutional theory, specifically the understanding of how humans behave under institutions' influence, is used in this essay to shed light on the role of MCS in innovation. In fact, institutionalism can move the focus of analysis of the understanding of MCS in innovation to a wider context and broader frames of meaning. Answers about the role of MCS in the behaviours toward innovation cannot be found without acknowledging that MCS are structures embedded in taken-for-granted assumptions of the organizations. Building on all of this, by resorting to the case of an innovative company and their MCS, this study observes and reports the unique case of ACC. In doing this, the following questions are drawn:

(1) How and why do MCS of the case company affect individuals' behaviours regarding innovation?
(2) How do the understandings of action under institutional theory' teachings help explain the role of MCS in innovation at the case company?

3. Methods

The research questions outlined earlier were answered through a qualitative and interpretative methodology using a case study approach. The case study appears as the best approach, considering the limited extent of insights on the role of MCS in innovation (Ryan *et al*., 2002; Marginson, 2002; Scapens, 2008; Yin, 2009). As Adams *et al*. (2006) highlight, an intensive case study in the interpretative tradition can permit a broader and richer understanding of management accounting practices. In fact, case studies are considered the best way to gain deeper and holistic insights on complex organizational processes (Ryan *et al*., 2002; Adams *et al*., 2006; Eisenhardt and Graebner, 2007). Therefore, a single case study was conducted using an exploratory and explanatory approach. This choice allows for a greater focus and a more detailed analysis, offering

richer descriptions and a contextualisation of the phenomenon under study (Ahrens and Dent, 1998; Eisenhardt and Graebner, 2007).

3.1. Case selection

The selected case company for this study is ACC, a medium-size Portuguese company integrated in a larger economic group. The case company's main activities are the production of granulates, agglomerates of cork and, agglomerates of cork with rubber that are then used for the production of different solutions to diverse industries and final clients.

The history, culture and posture of the company toward innovation was one of the reasons that motivated its selection for this study. As will be further explored in the fourth section, innovation is clearly associated with the company, from its historical roots until today. Furthermore, its strategy was built with innovation as an important feature, and throughout its history it is possible to find the continuous development of new products, and new cork applications. So, as Scapens (2008) notes, when selecting exploratory case study fields, the most important aspect is to select a relevant case that helps the initiation of the theory development process. It should be, therefore, a case considerer revelatory where the researcher has an unusual opportunity of access (Eisenhardt and Graebner, 2007; Yin, 2009). These two aspects were achieved with ACC. In a preliminary meeting, the case company demonstrated its availability to host the research and, at the same time, brought together two aspects considered as essential: a strong orientation toward innovation and, a set of formal management control practices in use to achieve the intended strategy. In fact, for 15 years now, ACC has implemented a system based on a Balanced Scorecard methodology and, more recently has implemented a stage-gate model system to help in the management of the innovation projects. These aspects were confirmed in a prior pilot case study that will be explained in the following section. In addition, the time in which the BSC was in use was a good indication of the high degree of institutionalisation that allows for a clear exposure of the impact of MCS on individuals' behaviour.

3.2. Data collection

Data collection progressed in two phases between November 2015 and September 2016, including interviews (See Appendix C), observations (See Appendix D) and company's internal documental information. The first phase comprehended a pilot case study to ensure the company's availability and suitability for the purposes of the research. In this phase, six interviews were conducted, there were two visits to the company facilities, participation in an internal meeting and diverse internal documentation was collected. The pilot case study allowed the researcher to ensure that ACC met the criteria previously defined to the selection of the case and, also, to get a clear picture of the full range of employees available to interview. Furthermore, it allowed for the definition of the most relevant lines of questioning (Yin, 2009) to be developed. In the second phase, the main case study, the primary source of information was more twenty-six interviews. Purposely, informants from various levels within the company were interviewed to obtain multiple perspectives and maximise the depth of the analysis. At the same time, this strategy ensured the triangulation of information (Eisenhardt, 1989; Scapens, 2008; Yin, 2009). More specifically, interviews were held with all the heads of the departments except one, and in the major departments, two more employees were chosen. Here, as Eisenhardt and Graebner (2007) put it, the strategy was to choose numerous and highly knowledgeable informants. In the production department, which involves most of the company' employees, all the second line managers were interviewed.

In the course of the interviews, although a guide with a set of questions was prepared in advance, the conversation quickly evolved into a more informal and unstructured dialogue form. This allowed the interviewer to simultaneously to adapt the interview to the expertise of the interviewee and to gain flexibility to pursue new issues and themes as they arose in the conversation (Ditillo, 2004; Scapens, 2008).

Throughout these two phases, a total of thirty-two interviews were conducted and two visits to the facilities and showroom were held. Also, the researcher attended a meeting held for all employees who have a contract of objectives where the results of the last year were discussed and the objectives for the following year were presented. The interviews had an average duration of one hour each and they were all tape recorded (except the first one, where only logistic aspects of the research were treated) and transcribed verbatim

afterwards. Since recording was not feasible in the visits, detailed reports were written immediately on the day.

A wide variety of documents were also gathered and requested over the time and their existence was addressed in the interviews. This allowed for the triangulation of information between different sources, building stronger interpretations (Eisenhardt, 1989; Scapens, 2008). Thus, we had access to documents related to the MCS and the innovation processes, such as internal reports, organizational charts, PowerPoint presentations of the strategic plans, information about the goals and evaluation measures and examples of monthly reports of results both from employees and the company.

3.3. Data analysis

In order to create an integrated database, facilitating the generation of codes, their tracking and a more systematic comparison of the results, all the files with the transcribed interviews and the visit reports were imported into MAXQDA, qualitative data analysis software. Then, the analysis was started through the creation of first order codes or open ended coding (Gioia *et al*., 2013; Miles *et al*., 2014). At this stage, the strategy followed involved the use of *in vivo* coding to keep coding as faithful as possible to the terms of the informant in a way that it allowed the data to speak for itself. In this way, it was possible to highlight sentences and evidence that was interesting for the research questions. In the course of this process, notes in the form of memos were made to register observations or raise questions that arose during the analysis. As Ahrens and Dent (1998) posit, the process of perceiving patterns is the most difficult and the least codified part of data analysis. However, throughout the analysis, and consistently with the notes and impressions perceived during the field work, patterns regarding the research questions start to emerge. Therefore, the coding process evolved for a categorisation of the passages according to the dimensions[15] of influence notice, and the previously coded data was reassessed. As is normal in these types of analysis, this phase requires the researchers to move back and forth between the data and theory, questioning interpretations that were arising and repeatedly analysing the evidence (Ditillo, 2004; Curtis and Sweeney, 2017).

[15] The dimensions referred here are the ones that are developed in section four.

4. Innovation and ACC

As was mentioned in the methodological section, ACC is a company very oriented toward innovation. ACC's historical background can be traced back to the 1960s when an industrial unit was created to take advantage of the cork wastes generated from the manufacturing of cork stoppers. The goal was to transform these wastes into cork granulates and, with them, valuable agglomerates. The creation of this company was, by itself, an innovation in the sense that it came about as way to create more value for a material. Today, ACC is a result of the merging of this activity with another business unit (BU) of the group that permitted the production of agglomerates of cork with rubber, in addition to the production cork granulates and agglomerates.

These materials are later used by ACC to produce a wide range of different applications that are subsequently commercialised around the world. More specifically, ACC takes advantage of the acoustic, sealant, thermal, resistance, resilience and even aesthetic characteristics of its cork granulates and agglomerates to later produce solutions with differentiating characteristics. Their products range from seals joints for cars or diverse machinery to anti-vibrators for trains, or even components to footwear. They work for the aerospace, automotive, construction and furnishing industries (among others). Because of the variety of properties of its raw materials and applications, from the very beginning of its existence the company felt the need to invest in research and development. Innovation is, indeed, historically associated with ACC, which made the company achieve the position of the most innovative business unit of the group, as can be seen in the passages below:

> *We are the only business unit of the group, which has in its strategic plan a turnover growth based on innovation.* (Head of Human Resources)

> *ACC, from a generic point of view, has always been quite innovative, is one of the companies within the group, not demeaning anyone, but always with a high index of innovation and new products.* (Industry global segment manager)

From the passages outlined above, it is clear that innovation is a key aspect of ACC's business and that there is a determinant role for innovation recognisably in its future. This is clearly perceived and reinforced in the following comment of the CEO:

> *I would say that in strategic terms in the company, the most important objective is linked to innovation. Even if it is not the one that has more ponderation in what is the result but, I think it is the one that is more strategic. In the sense that it is the one that guarantees future … future sustainability. (...) Because we know that in this area selling the same products to the same customers is not the topic. Therefore, the issue of innovation is something that we realise that the more innovation the greater the increase of value.* (CEO)

Therefore, creating value to cork and the products of the company was always a vexed subject within the group and particularly at ACC. This emphasis makes innovation to be considered a major determinant of the day-to-day job of most of the employees:

> *This is a company with many years, and there is the constant concern of all business areas in having new processes, new materials, new applications for our raw material. Or, otherwise we will easily stagnate.* (Retail segment manager)

Furthermore, as a critical question within the company and a critical success factor, ACC has structures to ensure that special and continual attention is given to it. These structures, in parallel with other matters, incorporate innovation measures and practices to guide the day-to-day activities of the organization.

4.1. Innovation at ACC's structures

As a company that identifies innovation as critical for its future, it is only natural that there has been an adoption of a set of practices and systems dedicated to the management of innovation and the inclusion of metrics in the formal BSC model. The case company works with a system based on the stage-gate model approach to managing the developments of new products, which starts with a funnel of ideas with grids to evaluate and to select the best value propositions. Innovation in ACC is very market-oriented and the value propositions come mainly from salespeople or segment managers.

> *It has a lot more to do with projects that start from objective needs of customers, which are captured through the product management, and the problems come to us to solve.* (Head of innovation department)

These propositions then pass through the funnel; after an evaluation of the business potential they pass through a series of milestones until they arrive to the industrialisation phase.

Besides this, the case company has used a BSC methodology that was implemented about 15 years ago and which outlines very clear routines throughout the whole year. Not being so strongminded in the management of new product developments, the routines and procedures promoted by this structure affect a larger population. In this way, BSC and the strategy map are the most visible features of the management control practices within the company. The strategy map is defined annually, representing a double entry matrix with, on one hand, the four normal perspectives associated with the BSC (financial objectives, clients, processes, and infrastructures) and, on the other hand, three strategic guidelines that represent the pillars of the whole strategy (growth, value, efficiency). For the year 2016, there were a total of 22 objectives divided by the various perspectives and guidelines. Once the strategy map is defined, a strategic scorecard is delineated that incorporates the goals and indicators for each objective, as well as the set of initiatives that must be put in place that year, identifying the employees responsible for each, milestones and resources needed.

As Chenhall and Moers (2015) state, the BSC methodology includes behavioural aspects and can be prepared to help in the motivation of the innovative effort. Accordingly, at the time of the research and, in the realm of the macro level practices, innovation is clearly perceived through the inclusion of three very specific and broad objectives. The first one, which is more structural, is included in the perspective of infrastructure and is specifically for the year 2016. It relates to the operationalisation of an innovation network, which is understood as strategic to the company. The head of the innovation department explains:

> *The innovation network is a strategic system and we are preparing several initiatives for next year, and here the goal is that we can have ... there are two big goals. One is to put cork in the minds of students, researchers, educational institutions and technology partners. And the other is to know what is being done in the world within our key scientific areas. So, then, we could establish a relationship that is effective.* (Head of Innovation department)

The second objective appears within the market perspective in the strategy map and simply states “Develop new products”. Measured by the sales of products that did not leave yet the development phase, this objective aims to ensure that developments completed before the end of the previous year record sales. To a certain extent, the idea is to guarantee the acceptance of these new products in the market. The third objective is broader, in the sense that is not declined by the innovation department, and it is integrated in the guideline of value and in the market perspective. Again, it is a financial objective measured by the sales of all the portfolio of new products and applications in absolute value. Different from the second one, this objective focuses on sales of products that have left the development stage. Also, it is an objective that has become more stable over the years, appearing in various strategy maps. For example, for the year 2014 and 2015, the same objective appears, defining a percentage of whole sales volume that has to come from the sale of new products.

Then, these objectives, whether related to innovation or not, are cascaded for the whole organization by the individual objectives contracts that are carried out in the top-down direction through a negotiation between manager and employee:

> *(...) The BU has a goal of selling new products, up to a certain value. These new product sales goal will be broken down into goals for each of the employees or areas that have or can contribute to selling new products. Obviously, we are talking about salespeople, we are talking about business developers and, we are talking about the innovation.* (Laboratory Manager)

At this point, it is possible to start organizing the puzzle about the allocation of actors’ cognition of innovation promoted by the MCS. The next subsection will be dedicated to this subject.

5. Driving actors to innovation

Throughout the analysis of the data collected, a puzzle composed of the patterns of answers starts to become clear for how and why MCS could exert influence over the innovative behaviour of the individuals. From prior studies, MCS are said to frame cognitive models, communication patterns and action (Davila, 2005; Davila *et al*., 2009b;

Adler and Chen, 2011). According to this, we found two major dimensions related to the characteristic of the MCS: the communication dimension and the guidance/focus dimension. From the conducted analysis of the case study on ACC, the MCS orientation starts from the communication underlying the procedures of the methodology. Going from there, the orientation then starts to become clear through the guidance and the focus that these procedures provide. From this point forward, this essay will explain the particularities of how these dimensions manifest in the day-to-day activities of this case company.

Communication dimension

In the case company, the efficiency of the diverse mechanisms and routines of the MCS in communicating the importance and relevance of innovation for the company became clear. At the very beginning the communicating role of innovation that these systems play was perceived. In general terms, MCS affect individuals' behaviours toward innovation because of constant communication about its prominence. As Kaplan and Norton (2006) mention executives should communicate what the organization wants and how it intends to achieve it. Therefore, this communication stance of MCS come in different ways and from different procedures. Like Curtis and Sweeney (2017) clearly found in their case study, ACC also presented in their belief systems the core value of innovation and mission statements related to innovation that communicates to individuals the importance of it for the development of activities inside the company. That value is presented in the list of values of the company and in presentations for various internal publics. Despite that, the most prominent mechanism for communicating this importance stems from the inclusion of innovative goals in the final set of objectives:

> *I do not think the system, by itself, makes people be more creative and innovative. But, if the goals are all business as usual, this promotes doing the business as usual, and doing nothing else. So once again, if we want innovation, it is good that this is clear in the objectives, it is good that the goals for innovations are ambitious.* (CEO)

We have the PMS which is our great system. And, there, the question is, in the key functions and functions that should promote innovation, we have goals that to do this. (Head of Human Resources department)

Nevertheless, only including innovative goals does not necessarily mean the attention to innovation will reach all employees. The objectives and strategic positioning need to be disseminated by the organization. Only including goals for innovation in the system is not sufficient:

There was no point in making the BSC, having a strategy map, having a good strategy defined if it is not disseminated by the organization, and if the organization does not have tools to ensure that everyone really ... that the whole organization knows [the objectives]. (Head of Management Control)

On the other hand, the cascading process made from the strategy map to the individual contracts of objectives represents a clear signal with the inclusion of objectives connected to sales of new products. Therefore, like Mouritsen *et al.* (2009) found in their study, sales performance is assembled in relation to innovation. Although many of the contracts of objectives do not specify goals of value propositions that everyone should bring in, this objective ends up passing on the perspective of searching the market for new opportunities. Some comments point exactly to this:

[When asked about the objective of sales of new products]
New products, yes. They all have [The sales team]. (…) But what, in fact, probably, they have more difficulty and, is less in focus, is that after that they have to go looking for them, right? (Head of Asia sales department)

People are encouraged to sell what is new and what is different and not just follow the traditional product portfolio. Therefore, and all people, as a rule, have goals of selling new products. It means that if they exist, they have to sell them; if they do not exist, they must create them. Or, give ideas so that they are created. (Head of Human Resources department)

> *Everyone realises what the goal is. There are objectives and there are indicators. That is, there is clear communication that sales and results that come from innovative new products have an impact on the business unit, and having an impact on the business unit, they can have an impact on the individual performance of each. Therefore, this is clear!* (CEO)

Also, one common aspect that was evident in various interviews was the degree of understanding of a mutual reinforcement between innovation and growing sales (another important objective in the case company).

> *I think the individual contracts of objectives that are done do not specifically … nobody has a contract that says that you must come up, you know, with one good idea that I think that will be well unfair (…) Try to grow sales is a large aspect of my contract and of my team, and we realise that new business or new product line will help that dramatically.* (Retail segment manager)

This reinforcement is similar to the dichotomy found by Curtis and Sweeney (2017) between the importance of profitability and new product developments that was intentionally transmitted by the managers at Caseco.[16] Overall, in a very ingrained way, this constitutes another important reference to the communication of the need for the sales teams and segment managers to be aware and engage with the search of opportunities in the market and to bring proposals of new products to the company. Therefore, the contracts, inserted in the BSC methodology used by the firm, are used interactively to "*motivate employees to make innovation their everyday job*" (Chenhall and Moers, 2015: 6).

Besides the cascading process, there are other forms at managers' disposal to put emphasis on innovation. One of the first opportunities is the meetings that seek to mobilise the internal employees, covered by the system, to the goals that have been defined at the top management level. These meetings, internally called alignment sessions, happen two times per year. The first one happens as soon as the strategic

[16] Caseco is the name of the case company of Curtis and Sweeney's (2017) study.

orientations and the strategic map are defined for the following year. In there, a follow up of the strategic scorecard of the first semester of the year is done and, subsequently employees get a first contact with the orientations for the next. The second meeting takes place at the beginning of the year after the strategic scorecards are closed, and all the individual contracts of objectives as well. These matters are commented on by the head of management control:

> *Usually, there are two alignment sessions that basically involves everybody who has contracts of objectives. (...) Where we talk about… we are going to talk about the new strategic map of the business unit. Therefore, it only makes sense to start disseminating [the objective] when the business unit objectives contract exists.* (Head of Management Control)

Throughout the meeting, the objectives regarding innovation are also revised and the CEO has the opportunity to motivate and mobilise the individuals regarding the importance of these objectives for accomplishing the strategy. Being paramount to the company, the importance of innovation is also transmitted and emphasised. In addition to the communication at these meetings, the strategy map also plays an important role as an element of day-to-day dissemination of the importance of innovation. This map is able to provide a comprehensive idea of what the intended value creating activities will be and, in the case company innovation is the core of these activities. As Kaplan and Norton (2008) report, communication of the strategy map and the Balanced Scorecard is the first step to motivating employees. It is on a sheet of paper, offering a graphical representation of the objectives and their causal relationships, the relationship between the renewal of the product portfolio and the return of invested capital is easily identifiable. Then, this map is spread by the company either in workspaces or in living spaces:

> *[The strategy map] is a paper sheet, which has a set of objectives, in those four perspectives to achieve certain results, certain goals. So, it's by the book. (...) But at the level of support I have no great doubts that people know all. In the areas of support is well disseminated and, in the operational areas is also widespread in their coffee zones and therefore communicated to them.* (Head of Management Control)

In short, MCS are used by the managers, apart from other purposes, to communicate and disseminate the need for innovation with an active attitude of constant reminder about their importance. This achievement stems from a set of attitudes that involve the actors within the company. These initiatives, however, also allow for the individuals to get guidance/focus on the intended purpose of innovation.

Guidance/focus dimension

Another dimension through which the MCS affect the behaviours of the employees about innovation is from the guidance/focus that they put in their minds. Indeed, letting internal actors know the overall scheme of objectives of the organization represents just the beginning of the intrinsic and complex processes of MCS in innovation. The characteristics of the systems in use ensure that employees know the importance of all the objectives necessary to achieve the main goals of the BU. Then, the existing tools work in orienting the individuals to behaviours that guarantee that all the employees are moving in the same way. As reported by the head of management control:

> *Knowing is a bit guaranteed by such meetings with employees, with the fact that they are spread all around the company [the strategy map and the contracts of objectives]. That is to know. Another thing is to align the organization. And, aligning already requires a more powerful tool that guarantees that we are all rowing for a certain purpose.*

As noted in the above comment, the managers use the tools at their disposal to align the employees and, within the background that has been developed, align employees' behaviours so they are associated with innovation. Here, the cascading process of the overall objectives, through the contracts of objectives, represent the first alignment tool of the all internal levels of the company. As it has served to communicate and reinforce the importance of innovation, it also represents a way to guide employees to the activities that managers perceived as more valuable. In this regard, the objectives of selling new products reach the key elements in the context of innovation through the cascading process. Sales teams, the innovation team and segment managers end up with innovation objectives that oblige them, in a very discrete way, to search for new opportunities in the

market. These kinds of financial measures regarding sales of new products impose on the sales teams the importance of their awareness:

> *When you say it like this… Moments ago I was talking and trying to set goals… X millions of sales of new products for 2018. By 2018 we have to launch X million of new products. If you ask me, but what products? I have no idea. (...) And, therefore, if we don't have pipeline for that, what do we have to do? (…) People do not have another thing to do than move. Because if they do not have pipeline, what they should do immediately? Cause opportunities with sales teams, global segment management, in internal meetings, with partners, with customers, because we must immediately provoke the market to come up with new ideas to develop them.* (CEO)

> *We are a very results-oriented company. And, if we have as one of our goals to have x% of sales volume in new products, necessarily there is a permanent concern: add products to the portfolio, create new products, find new products for new applications.* (Head of business development and global segment management)

In this way, the practices and processes of control increase the propensity of the employees for a course of action, which in this case is innovation. This propensity is further reinforced both by the commitment that is created with the signing of individual contracts of objectives and by the prioritisation of innovation. Individual contracts result in a personal commitment created between the employee and the company, similar to the commitment seen by Davila (2000) in one of research projects analysed. Although there is a small negotiating margin on the part of the employees, there is a negotiation process that ends with the definition of the contract of objectives and respective weightings of each objective for the awarding of a prize at the end of the year:

> *The way we do the drill down (...) I think there is a commitment of everybody* (CEO)

> *[the contract of objectives] is transparent and rigorous, is defined by mutual agreement, so the employee knows, or the worker knows when signing the*

contract that there is a goal that both the employee and the manager understood and reached on a consensual basis. (Head of production department)

Financial measures related to innovation are included in these contracts, so like in the study of Curtis and Sweeney (2017) accountability as created for meeting these goals. The commitment created by this symbolic act of signing the contract then is able to focus the employee in the areas covered by it. The employees end up showing a greater propensity for those areas, prioritising the themes underlying the objectives they must achieve:

People who specifically have a contract for individual goals, work for that and, look hard at the areas that impact that, which have that relationship. This in turn forces them to interact in all aspects to get a better performance. (Treasury manager)

An objective also has a way of indicating where you want to go, and of helping us clearly realise that if I have this, it is because this is a priority. If there is something else that is not here it is because it is not a priority. (Project Manager 1)

As we put things into people's objectives contracts, we will have the absolute guarantee that they will focus on the achievement of those goals. (Head of business development and global segment management department)

As the comments above show, employees become focused on those objectives, in which innovation is also measured, giving, to some extent, the guarantee of their prioritisation. Thus, the commitment and focus promoted by these contracts end up fostering a direction for the behaviour of the employees. They provide a way forward as is conveyed in the following comments:

[The objectives] indicate the path and, when someone has a path it does not have to question every day: Where am I going? Being 10 minutes thinking, or an hour, before going to work is to here or to there. (…) And there are times when the person will review the goals and think if things are working and make sense

or not, but it is not every day, every moment. The goal has this function: to explain to us exactly what is the company's priority for us. (Project Manager 1)

Is [the BSC methodology] also, a model that, and for me this is very important, that is not only about the "what" but the "how". And, the how ... that is, the direction is also part, it is not only the speed and the point of arrival. That's how we want to go to the destination! (CEO)

Also, the methodology adopted by the case company ends up serving as guideline for the allocation of employees' attention. Focusing on some strategic points, these contracts make innovation appear as a point of arrival, guiding the behaviours. This idea is further reinforced in the comment above:

It is not because it is linked to the contract of objective that there is a desire to be innovative. Okay, if you have a goal whose relative weight represents 30, 40% of the objective is obvious. So, in a way, we are forcing the team to devote more attention to innovation. (...) If you can be more pressured, it is obvious that the contracts or the objectives can influence or push the direction of innovation. (Retail segment manager)

Briefly, the analysis made earlier provided an understanding on how the communication dimension and the guidance/focus inherent in the management control methodology used in the case company ultimately affect behaviour, action and cognition within the company. Figure 1 shows a schematic of this model which will be discussed next.

6. A model on MCS and innovation

Up to this point, it has been described how and why MCS play a role on the innovative behaviour of ACC's employees. The combination of these insights with the existing knowledge about the institutions and the actors' behaviours informs the model depicted in Figure 1. This model will be now developed in more depth.

Institutional theorists argue that institutions influence and shape individuals' actions (Burns and Scapens, 2000; Ribeiro and Scapens, 2006). The management control

practices of ACC are clearly a set of routines that are institutionalised at the organizational level. In fact, these practices have been in place for many years and were perpetuated and maintained despite the rotation of the employees through time. Furthermore, MCS-associated practices strongly determine the internal routines that are truly used by the managers and enacted in a natural way.

This stability is, therefore paramount to the present model. Thornton *et al.* (2012) report that the stability of institutions and organizational practices allow for the activation of the schemes embedded in the logics of the organization as a default of actors' cognitive processes. MCS are developed to help managers achieve the intended strategies, assisting decision making and representing the institutions of the organization. Indeed, in light of institutional theory, they could be understood as top-down schemas providing to actors' cognitive structures to shape their attention, help with problem solving and guide their decisions. This idea of schemas, as Thornton *et al.* (2012) further explain, highlights how actors understand, remember and act upon complex information by relying on knowledge about the working mode of the world. Moreover, the authors also explain that the capacity to allocate cognitive resources from individuals is scarce, which means that organizations tend to develop structures and processes to shape individuals focus of attention (Thornton *et al*., 2012). In the case company, this is what happens with their MCS system. ACC's strategy maps and the BSC model comprehended multiple objectives that are defined at the top level to drive the action and cognition of the overall organization into issues perceived as fundamental to the achievement of the pre-establish vision.

MCS impact the behaviours of the individuals through the routines and procedures that they impose in daily life of the employees. The employees are eventually absorbed by these routines, as predicted by old institutional economics (e.g.: Burns and Scapens, 2000; Ribeiro and Scapens, 2006), and by the constant communication and by the guidance/focus dimensions that these systems create, the actions of the individuals are shaped. These two dimensions happen practically simultaneously and with the same tools. Communication and guidance/focus dimensions are really two sides of the same coin. The act of exposing strategy maps in meetings and in public spaces within the installations of the company represents a way to communicate the importance of innovation since innovation appears as a main objective. Also, the messages passed from institutional communications and presentations, values that are shared, the cascading process of the objectives contracts came as way of reinforcing the importance of innovation for the

company. Then, again, the cascading process of the objectives, the commitment from the signing of these contracts increases commercial awareness, accountability and the propensity of employees to innovation matters.

Additionally, the constant interaction of these dimensions assures that innovation is retained in employees' minds and is understood as central for their tasks. Innovation is presented as the viable possibility, as it represents one of the critical success factors of the organization and, from that the strategic positioning of the company.

Deep down, what these dimensions do is affect the sensemaking of actors, which become more oriented for engaging in behaviours perceived as necessary to guarantee a constant flow of innovation. As a matter of fact, the tools inherent to the methodology are purposely managed by the company to orient the individuals. This is consistent with the principles of Cardinale (2018) in the sense that MCS give to employees a frame of reference with the viable alternatives when faced with the eventualities of the day-to-day activities. Thus, it makes decisions more automatic because innovation represents a more viable course of action. Demonstrating the perceived viability of this course of action, the objectives of sales of new products have never failed, thereby, indirectly, showing the power of the routines in the orientation aspect:

> *When you have a results-oriented culture, determining a set of objectives associated with the development of new products is essential. I do not remember ... I think since this objective was created, ACC never failed.* (Head of business development and global segment management)

Cardinale (2018) theorises structures as more than enablers and constrainers of action, but as having an orienting effect on individual behaviours. Following the author's own arguments, the implications of the theorisation done for this study are that MCS establish dispositions that orient the action of actors toward behaviours that are more fruitful to innovation. For Cardinale (2018) the transposition of schemes to attend to unfolding situations lead to two effects on action. The first effect is that possibilities understood as falling outside these schemes are not even considered, and, the second underlying effect is that from the set of viable possibilities, some appear evident to actors in a way that actors are drawn to them. In the case company this is what happens regarding innovation and MCS.

In sum the model in Figure 1 shows that MCS representing the institutions of the organization can orient individuals toward innovation through the communicative and guidance/focus dimensions of their routines. This study, consequently, results in the significant insight that the role of MCS in innovation comes from the enunciated dimensions.

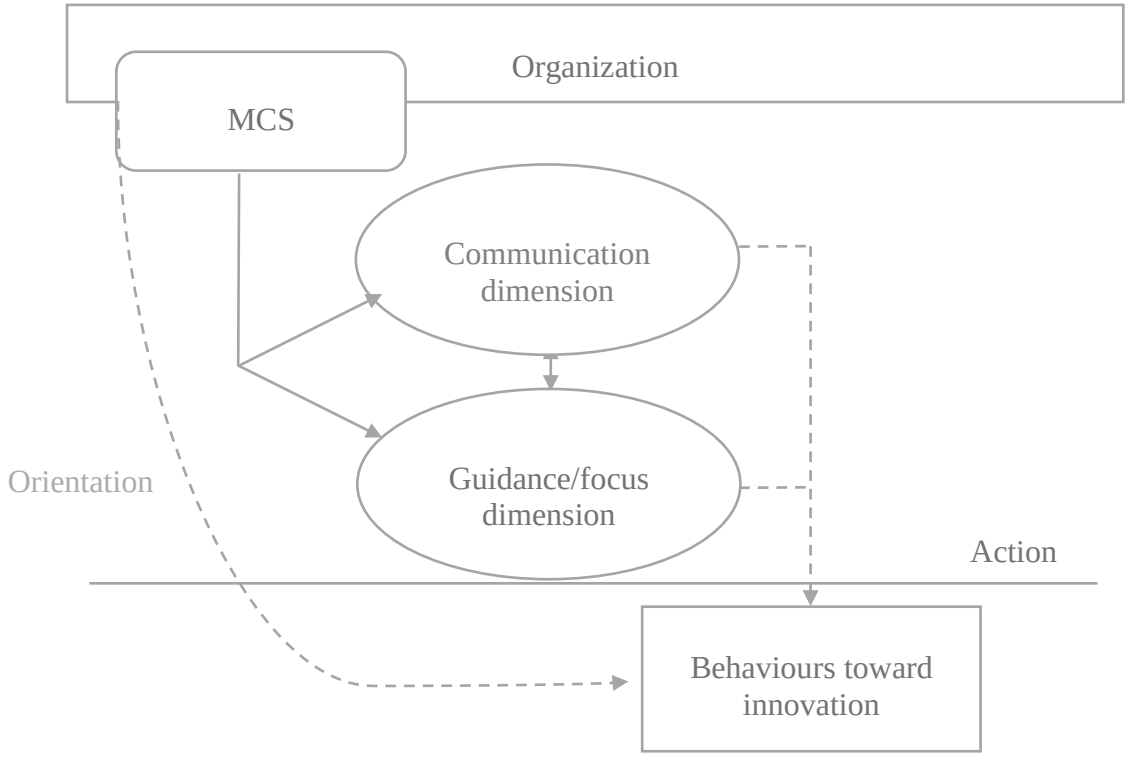

Figure 1: MCS, dimensions promoted by them and innovation

7. Discussion and conclusions

Some authors have mentioned that MCS are capable of framing cognitive models, actions and communication patterns (Davila, 2005; Davila *et al.*, 2009b; Adler and Chen, 2011). The data from this study underlines this matter. Using an in-depth case study at ACC, an acknowledged innovative company, with very firm and institutionalised management control practices, it was detailed how and why MCS can influence the individuals' behaviour. Furthermore, relying on institutional theory to sustain this investigation it was also questioned how this theory could provide insights in this context.

At ACC, the set of management control practices in place are purposefully managed to guarantee the accomplishment of the strategy. Innovation, being an important component of the strategy and a way to achieve future success, is incorporated in these routines. This is not far from the works of Revellino and Mouritsen (2015) and Davila (2005), when they highlight the role of accounting in providing background so that innovation can happen in the realm of the defined strategies.

Resulting from this essay, the model in Figure 1 informs on how and why MCS direct the employees to the path of innovation, with the understanding of institutional theory being paramount to its development. With its institutional positioning, the findings of this study have allowed the development of the idea that MCS have inherent routines that promote the constant communication of innovation and provide a focus and guidance for it. And, through these dimensions, the MCS as a set of institutionalised routines can orient the employees to behaviours associated with innovation. MCS influences the employees' decisions by turning their attention and cognition. These systems have clear routines and procedures that ensure that the individuals are involved in the innovation processes maintain a proactive attitude toward it. Moreover, among the alternative strategies and positioning that managers at the case company could choose in order to conduct their businesses, innovation is seen as critical and, therefore, MCS are used to promote the viability of the path of innovation in the minds of the internal actors, thereby affecting their decisions and cognition through sensemaking.

The model developed contributes to the literature in at least three ways. First, the model helps to improve our understanding of the role of MCS in innovation, depicting the dimensions through which they could affect innovation. Furthermore, previous studies looked at the different types of use of MCS and tried to perceive which use was better for promoting innovation (e.g.: Bisbe and Otley, 2004; Henri, 2006; Bisbe and Malagueño, 2009; Bedford, 2015; Bisbe and Malgueño, 2015; Lopez-Valeiras *et al*., 2016). Our model does not make any point on how these systems are used, taking out the focal point of the type of use (e.g.: interactive or diagnostic use of controls) and puts it on the more sociological aspects of how MCS as institutionalised routines affects behaviour. In this way, this essay presents another perspective on the matter. Likewise, the model is not presented as an opposing idea from what the literature has said so far, but rather as a complement and as a more detailed account of the influence.

Second, in the light of institutional theory and the recent theorisation of Cardinale (2018), the model developed show that the routines of MCS make innovation appear to internal actors as the most viable solution since it is offered as a viable solution or option. With this, the actors' propensity to search for new proposals and opportunities in the markets are increased. At the bottom line, this is similar to what Curtis and Sweeney (2017) perceive in their case study at Caseco about the role of MCS as increasing the commercials awareness to market opportunities of future developments. Interestingly, following this logic, the study shows that in part it is possible to contradict Bisbe and Otley (2004) and Bedford's (2015) view that MCS does not increase the propensity of the company to experiment with new products. Following Cardinale's (2018) logic that institutions increase the propensity for certain solutions and according to the specific characteristics of the system seen in ACC, it is possible to verify that MCS can increase the propensity of certain employees for the search of new ideas. Through the increase of the commercial awareness of the employees connected to the processes of innovation, the managers are able to increase the proposals of new solutions. In general lines, these findings can be perceived as an increase of the propensity to innovate promoted by the MCS. However, this only happens for those employees strictly connected with sales, innovation or segment management. Employees not linked to innovation do not suffer from this influence.

At last, and quite apart from that enunciated earlier, this essay also provides empirical verification on the developments proposed by Cardinale (2018) showing the power of institutions and routines to have orienting mechanisms to the action of actors. It also follows from this that institutional theory provide an essential background to frame our model. Most of the prior studies in the field have a very practical nature and, the clear majority did not take a stand regarding any theoretical background. So, by introducing institutional theory, the topic is taken a step forward, and we can start to consider the importance of the role of institutional structures such as MCS in the promotion of innovation.

Aside from these contributions, from the research choices made, there are also some limitations to acknowledge. First, the results presented should be carefully analysed. The methodology of a single case study raises questions about the generalisation of findings, which means that although this study has provided a very in-depth analysis of the role of MCS on innovation at ACC, this represents only the situation of the case company.

Different companies, in different sectors, with different contexts and with different management control protocols may choose to use other tools to represent the innovation.

On the other hand, the analysis conducted using the institutional theory perspective was very focused on the sphere of organization, underplaying the influence of external institutional pressures or the impact and tensions of other level institutions (such as society and markets) on the behaviour of individuals.

However, these limitations may also be perceived as future research opportunities. Case studies in other contexts are welcome to reinforce the dimensions of influence perceived here or even to add others. Longitudinal studies to analyse a broader period of time also constitute a way to develop research in this field. Especially, when it is considered that innovation at ACC is very market driven, it is possible to ask if other postures regarding the origins of novel ideas could require different approach and different controls. In this regard, Revellino and Mouritsen's (2009) study acknowledges that the development process of new products entails for a multiplicity of controls, which could also be the case of managing different forms of innovation. Furthermore, the case of ACC represents an organization that recognizes innovation as a critical success factor. Organizations without this characteristic can see MCS acting in different ways in the promotion of innovation. So, researchers could explore this matter in more detail. Lastly, the use of quantitative questionnaire studies to verify this course of influence is also an opportunity to promote some generalisation of results.

V. CONCLUDING REMARKS

1. Summary of the dissertation

Overall, the aim of this dissertation was to holistically explore the role of MCS in innovation using as an empirical method an intensive and in-depth case study and, with it, extending and improving the existing debate in the literature.

To this end, a set of essays were organized and written. Each of these essays corresponded to one section of the dissertation. All of them, each in its way, have addressed different aspects and gaps in this growing body of literature. Using the literature review developed in the first essay as a frame, two empirical essays were then presented. The empirical data for those essays were collected between November 2015 and September 2016 in Amorim Cork Composites. ACC is a well-known innovative company, and has used a set of management control practices for about 15 years, making it an ideal case for the scope of this study.

The first essay, building on the principle that the results of the research conducted in this field should be considered in the light of the usual management control practices that were used by organizations and the context that determined these practices. Therefore, the research on the role of MCS in innovation is followed in parallel with the history and the development that management control practices have been through. Two periods are clearly perceived in the research. The first period was categorized as a traditional approach to MCS and innovation. This period interprets the MCS as constrainers of innovation, representing formulations of control designed to act in harmony with the ideas of standardization, in bureaucratic environments, and with rigid rules (Davila, 2005; Wickramasinghe and Alawattage, 2007). Control existed to ensure that the value that the managers projected to generate was extracted from the internal processes of the organization (Davila, 2005; Davila *et al.*, 2009b; Ylinen and Gulkvist, 2014), and efficiency was paramount (Johnson and Kaplan, 1987). Against this, it is not strange that innovation, a process associated with uncertainty and a lack of routine (Abernethy and Brownell, 1997; Davila *et al*., 2009b) was necessary to avoid. The research developed at this stage interpreted control as a hindrance to innovation (e.g.: Ouchi, 1979; Rockness and Shields, 1984; Damanpour, 1991; Abernethy and Brownell, 1997).

Since that period, much of the MCS practices have changed, now focusing more on strategic aspects (Langfield- Smith, 2007) and less on operations. These systems start to integrate uncertainty (see, Simons, 1995a, 2000), and contribute to flexibility and autonomy (Wickramasinghe and Alawattage, 2007). Research now acknowledges a new paradigm in which MCS are not an obstacle to innovation, but are systems that can play a central role on it (e.g.: Davila, 2000; Bisbe and Otley, 2004; Henri, 2006; Bedford, 2015; Lopez-Valeiras *et al*., 2016; Curtis and Sweeney, 2017). However, these studies establish links, and following practical or functional approaches do not dig into dynamics that are interesting for this body of research. For those reasons, the first essay argues for more qualitative approach in this body of research and offers the readers some possible avenues to explore.

Two of these avenues are then explored in the following essays. The second essay, analysing how the managers at ACC have used the packages of systems at their disposal, to manage innovation according to the Simons framework (Simons, 1995a; 2000) have achieved interesting findings. In this regard, more than working as a constraining force for innovation, diagnostic use of MCS by ACC's managers also promotes the accomplishment of the innovative goals. The inclusion of financial measures to selling new products in the model are then cascaded to the individual contracts of objectives of some employees, and end up signalling the company's positioning toward innovation. Subsequently, these objectives are regularly monitored and employees end up paying constant attention to innovation, increasing their awareness for finding new ideas for developments.

Interactive use represents the major form of mobilizing the MCS, accomplishing with this use the creation of the necessary forums, and the involvement of the population of employees around innovation. In this sense, both the BSC model used and the stage-gate implemented are mobilized interactively.

Boundary use of systems, although, not very formally defined, play a restraining role and their presence is found both in the strategy map and in the stage-gate model. The control tools inform the employees where they should direct their efforts to on the development side, informing the priority segments to bet on. The use of control tools according to belief systems strongly creates the ground for innovation, putting into the minds of

employees the need for engaging in innovative behaviours. These systems impart to employees an opportunity-seeking behaviour consistent with the strategy.

As expected, these systems end up generating tensions. The inspirational forces of beliefs and interactive systems promote the necessary tools for the triggering of the innovation effort. In opposition, the forces of diagnostic and boundary use of MCS permit an alignment of that effort with the strategy in which the company perceives that it will achieve more profitable developments. In this essay, it is shown that it is possible to have structured processes that do not hinder innovation to the point of constraining it in some way, but in allowing to make a better use of that effort.

With this, the third essay is developed. The third essay takes out the focal point from the type of use that it was given in the second essay. This study portrays a reflection made on how and why MCS affects behaviours toward innovation. To make this reflection and analysis we use institutional theory, and more specifically, the institutional understanding of action as influenced by institutions. Institutional theory is linked to two dimensions of MCS routines that determine an orientation of individuals to innovative behaviours. These dimensions are categorized as: communication, and guidance/focus.

First, it is necessary to acknowledge that in the case company innovation plays a major role in the definition of the strategy of the company, and for this reason is incorporated in the MCS routines. This is no different from what has been showed in the second essay. The communication dimension refers to the efficiency of the mechanisms and routines of the packages of MCS in communicating the importance and relevance of innovation to the population of employees. This communicative role is perceived in the use of a set of values, mission statements, internal presentations to employees, strategy maps, but overall, from the inclusion of innovation goals and objectives. This inclusion of measures to selling new products is disseminated through a cascading process from the strategy map to the individual contract of objectives. Although these measures do not impose upon employees a number of value propositions to the development of new products that they should bring in, it passes to them the need of searching the market for new opportunities. Apart from this, the communication is also achieved by a set of meetings where emphasis is put on innovation in order to mobilize and motivate the employees.

Then, knowing the importance of the communication dimension is not sufficient. In this sense, another interrelated dimension arises. MCS are also able to provide guidance/focus guaranteeing that all the employees are moving to the same point. Once again, the cascading process, through the individual contracts of objectives, is used to guide the employees to activities understood as more valuable. That, in this case, is innovation. This guidance imposes on sales teams the importance of their awareness to the market opportunities, increasing their propensity to engage in this course of action. This propensity is also reinforced by the commitment created with the signing of the individual contract of objectives that make the employees prioritize the points covered in them. The methodology also can serve as a guideline for the allocation of employee's attention, focusing them on some points over others.

With the two dimensions explained, a model of what happens is created (Figure 1). What this essay argues is that MCS inherent routines promote a constant communication of innovation and guidance/focus for employees to understand it as a path to follow. MCS indeed are a set of institutionalized routines, able to impact the behaviours of the individuals with these routines and procedures that are imposed in day-to-day life of the same individuals. In this way, these routines shape action, decisions and thoughts. Employees are absorbed to these paths (Burns and Scapens, 2000) and, according with the interpretation to Cardinale (2018), these institutionalised routines can orient the individuals to some paths over others. This means that MCS routines are used to promote the viability of innovation as a path, ending up orienting the individuals to innovation, turning their attention and cognition through sensemaking.

In fact, points of contact exist between the last two essays. While in the second a focus has been put on the use of MCS, the third looks on how and why MCS affect the individuals' behaviour toward innovation. Therefore, these two essays should not be interpreted as mutually exclusive, but as complementary. The type of use could not be completely dissociated from the dimensions enunciated. Ultimately it is the type of use that is given to the MCS by the managers that determines these dimensions, although the intention with the study is to show the dimensions that could mediate the relationship between MCS and innovation.

2. Theoretical contributions

Overall, the main contribution of this dissertation passes through the refinement and the extension of the understanding on the role of management control practices in an innovative context. By using a method not very common in this field of research, the empirical studies make a necessary counterpoint to a field mainly dominated by quantitative approaches. With it, it was possible to obtain a deeper analysis and richness of context acknowledging the multifaceted and multitude of relationships that may exists in the field where they are happening. Also, by introducing institutional theory in the third essay, it was possible to start to overcome a practice and functional perspective that has been transversal in most of the studies conducted so far. Furthermore, there are some more specific theoretical contributions that emerge from each of the three essays presented.

The first essay composing a literature review on the role of MCS in innovation linked with the evolution of the management control practices, presents two main contributions. First it contributes to the literature by providing a structured review of the main literature joining MCS and innovation. Second, it unveils some direction for further studies that researchers could explore in the future. By doing this, the essay is of value to researchers interested in this field in the way that clarifies the current state-of-art.

The second essay starts by responding to some calls to deepen our knowledge about which contemporary MCS systems practices work best with innovation (Moll, 2015; Fried, 2017). This is achieved by exploring the case of ACC. As a second contribution, the study covers a limitation of the previous literature by analysing the four Simons LOC simultaneously and the dynamic tensions that emerged between them. With this it is also possible to contribute to the research that exists on beliefs and boundary systems when compared to the study of interactive and diagnostic use of systems (Martyn *et al.*, 2016). Third, it also responds to recent calls to dig into tensions between MCS and innovation. And fourth, but not least, by looking at MCS in the case company as a package, it complements our understanding of how a panoply of control systems complement and work together.

Regarding the third essay, the model developed contributes to the literature in three ways. First, it furthers our understanding of how and why MCS can influence innovation. The

essay categorizes the dimensions of communication, guidance/focus, attributing them a role in driving individuals to innovation. Second, it links these dimensions to institutional theory to determine that MCS have an orienting posture, guiding cognition of individuals and, with it, increasing their awareness, proactivity, and propensity to innovation. As a third contribution, the essay presents an empirical validation of the developments proposed by Cardinale (2018).

3. Practical Contributions

There are also contributions for practitioners. In general, the two empirical essays based on a case study close to the reality of the day-to-day practices of an innovative company could be used as a benchmark to managers. Practitioners could explore this case and try to improve their practices. Particularly, the case shows how the stage-gate model and a BSC model are used together, indicating how it is possible to integrate the two methods.

Furthermore, the analysis done in the second essay also points to another contribution. With the ACC's case it was possible to show how managers could mobilize their MCS to create the necessary atmosphere for a stimulating innovation environment and, at the same time, create the necessary conditions for an adequate exploration of the benefits of that effort. The case also shows that the various types of uses create tensions that allow the management of innovation. Therefore, practitioners could once more do benchmarking with this case. On the other hand, the study shows that to realise the full benefits of using MCS in a context of innovation managers should use these systems according to the four levers of control.

Also, the data of the third essay permit us to make another complementary consideration for practitioners. The model presented indicates that the use of MCS could serve as way to drive the employees to innovative behaviours. The MCS could work as tools to communicate, and to focus the individuals on innovation. Although it is not possible to say that the existence of MCS are necessary for innovation to happen, the routines that they determine could indeed serve as an orienting mechanism for it. This, with the adequate use of the systems showed in the second essay, are able to reinforce the determinant role that MCS can have in innovation. These systems can frame cognitive

structures to drive individuals to innovation and, with the correct use, create the necessary environment for an exploration of it.

4. Limitations and possible research directions

As in any research, some limitations are to be acknowledged in this dissertation. The first comes from the choice of a single case study as a base to the empirical essays. As some authors report, with this choice the results cannot be generalized (Ryan *et al*., 2002; Yin, 2009). Furthermore, the packages of systems and the characteristics of the systems differ from company to company, sector to sector, which makes it necessary to replicate the study in other fields and try to perceive what is happening in them. Also, this study bases its analysis on a company that perceives innovation as the main pillar of its strategy, which makes the results very specific. Organizations not so dedicated to innovation also may present different experiences.

The second limitation of the study comes with the third essay. The use of institutional theory in this essay only uses the understanding of action and the role of actors within institutions, underplaying the influence of external institutional pressures or the tensions created by other levels of institutions.

Notwithstanding, research in this field is far from being exhausted. First, the above limitations could be explored in further studies. Furthermore, as it was showed in the first essay, there is a panoply of possible research directions that could be taken in the future. The study presented has left many of these research questions open and, therefore, researchers could explore them. Nonetheless, the need for more qualitative research is further reinforced. Especially, it is now argued for researchers to resort to more field studies and, in them, research designs with longitudinal approaches. For sure, these approaches will allow the debate to be fuelled with clearer pictures and richer insights on the use of tools and techniques in innovations exploring what the perceived benefits of some techniques are over others.

Also, following the third essay future research could rely on an institutional theory background to provide more social and institutional considerations to this field of research. Such background has the potential to deepen our understanding of the dynamics

of MCS in supporting processes of change in the management of innovation or how the management of new developments could affect the overall design of MCS. Also, how MCS change over time to accommodate different forms and emphasis on different types innovation could be addressed.

Overall, this dissertation should help to stimulate researchers to investigate in more detail the role of MCS in innovation. This is now a hot topic in the literature with researchers having increasingly manifested interest in this field, as proven by the growing number of studies in accounting and management journals. Indeed, innovation is becoming more and more pressing everyday with the uncertain and constant changing conditions in the organizational environment.

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APPENDIX A

Interview guide for the pilot case study

(This guide represented only a set of themes to be approach in the interviews)

Head of management control:

A. Brief information about the interviewee:
   a. Education;
   b. Time in the company and in the current functions;
   c. Main areas of responsibility.

B. Brief description of the company structure.
   a. Geographic dispersion, where each department is located;
   b. Who are responsible for each area?

C. Management control practices:
   a. Role of management control in ACC: internal importance.
   b. Strategic definition / review process:
      i. Who is involved, main responsible and timings
   c. Tools adopted and their integration with each other.

D. Description of the Performance Measurement System - Balanced Scorecard:
   a. Role of the BSC within the company: recipients of information
   b. Objectives, strategic initiatives, actions and indicators (Strategy map);
   c. Monitoring of objectives and initiatives:
      i. Frequency;
      ii. Monitoring process;
      iii. How is this monitoring and follow-up done (computer software, alignment sessions, correction of deviations, ...)
   d. Link to the individual performance management system (Individual Contracts of Objectives): people covered, definition process, awards and incentives.

E. Performance measurement in the context of innovation processes / projects:

a. Description of the control process: formal/informal control, instruments used;

Head of innovation department:

A. Brief information about the interviewee:

a. Education;
b. Time in the company and in the current functions;
c. Main areas of responsibility.

B. Description of the structure of the innovation department (employees, responsibilities, role within the company, ...)

C. Description of innovation processes:

a. Characterization of the attitude of the company / managers toward innovation;
b. How is the involvement of people with the culture of innovation? And, how is the transmission of this culture done?
    i. Mechanisms: meetings, brainstorming, computer tools.
c. What types of projects exist: individual / partnership with other entities, how do they arise?
d. What types of innovation are promoted) (products, processes, business models, ...):
    i. History of introduction of new products / modification of existing products, change of processes.

D. Performance measurement in the context of innovation processes / projects:

a. Description of the control process: formal/informal control, instruments used;

APPENDIX B

Interview guide for the main case study[17]

(This guide was only used to orient the interview. Since the interviews have rapidly evolve into an informal conversation some of these questions were not used and some others have been asked instead)

(To be adapted according to the person interviewed)

Thank for participation and availability for the interview.

Start with a brief explanation of who I am and what I am doing. Explain that there are no right or wrong answers, the intention is only to gather the opinion of the interviewee. The recording and the data to be collected are only for the use of this research. Ask permission for taping the interview.

A. Brief information about the interviewee:

a. Education;
b. Time in the company and in the current functions;
c. Main areas of responsibility.

B. Management Control and Performance Measurement

1. Can you, please, describe me how is your performance is measured?
2. What advantages do you recognize in it? And, what are the disadvantages?
3. In your perception what is the role of the BSC (and strategy map) in the company?
4. How do you feel about the usefulness and effectiveness of BSC? In what aspects does the BSC please you or displease you?

[17] Some of the questions are inspired on the guides presented in Marginson (2002), Ferreira (2010) and Mundy (2010).

5. How is BSC used in ACC? Do you think it helps to promote the dialogue or is it only to monitor the results?

... And, how is the BSC used in your department?

Considering your department ...

…What meetings are held to evaluate and discuss the information provided by the BSC?

a. ... If there are meetings: Do these meetings analyze only the critical elements of success, or are more topics addressed?

b. ... If others are addressed, which ones? And innovation?

c. .... Both cases: Do you talk more informally about meeting objectives with employees?

6. Which performance indicators do you think have the most impact in the company?

7. Do you pay attention to any particular goal?

8. Do you pay more attention to financial or non-financial objectives? For what reason?

9. What is your feeling about the information provided by the BSC?

10. In the your day-to-day job, what kind of decisions are made based on the BSC? Can you give some examples?

11. What is your involvement in BU strategic initiatives?

C. Innovation

1. What factors within the ACC encourage you and your colleagues to be creative / experimental / innovative? Can you give me some examples?

2. About performance management, do you think that there are some factors that encourage you and your colleagues to be more creative / experimental / innovative? …Which are?

…And the opposite? What factors?

3. How effective do you think the monitoring process is in promoting a more creative / experimental / innovative attitude? Why?

4. Have you ever felt that the ACC monitoring process gave you no room for maneuver to apply new ideas? Can you give me an example?

5. In internal meetings do you feel there is a search for new ideas?

6. Did you have to introduce some process or system to get around some problem that originated by some objective? What kind of problem was it?

7. Are you currently involved in any procedure / process change process? Where did this idea come from?

8. Do you think that the evaluation that is made in ACC is more motivating or more inhibitory? Why?

9. Among the objectives that you have, in which do you find the greatest motivation to improve processes / products? Why?

10. In what ways do you think the reward system motivates employees to be more innovative / creative / experimental?

11. Do you think that the process since the strategy definition until the monitoring process is, in some way, used to communicate the need for employees to be more innovative / creative / experimental? In what ways? (ask for details)

12. Do you think that the performance system instills in the employees a search for new opportunities of new product developments?

Finally, very directly, do you believe that performance evaluation is good or bad to explore the innovative attitude of the staff? Why?

APPENDIX C

List of interviews and their duration

Phases	Date	Interviewee	Duration (minutes)
First phase: Pilot case study	19-11-2015	-Member of the Holding - Head of innovation department - Head of management control	40
	16-12-2015	- Head of Management Control	95
	16-12-2015	- Head of innovation	65
	23-12-2015	- Head of Management Control	32
	09-01-2016	- Head of Management Control	77
	05-02-2016	- Head of Management Control	52
Second phase: main case study	30-06-2016	- Head of Business Development and Global Segment Manager	80
	30-06-2016	- Head of Human Resource Department	73
	30-06-2016	- Chief Financial Officer	60
	30-06-2016	- Head of Footwear Department	80
	30-06-2016	- Head of Production Department	43
	04-07-2016	- Head of Asia sales Department	58
	04-07-2016	- Head of Marketing Department	50
	04-07-2016	- Head of Innovation	55
	09-07-2016	- Laboratory Responsible	47
	09-07-2016	- Treasury Manager	55
	11-07-2016	- Head of Quality and Environment Department	46
	11-07-2016	- Project Manager 1	59
	11-07-2016	- Project Manager 2	53
	11-07-2016	- Retail Segment Manager - EMEA	60

12-07-2016	- Industry Global Segment Manager	60
12-07-2016	- Retail Segment Manager - NAM	45
13-07-2016	- Japan and Korea Market Developer	50
13-07-2016	- Agglomerates Production Responsible	65
13-07-2016	- Industry Segment Manager - NAM	37
14-07-2016	- Logistics Responsible	73
14-07-2016	- Services and maintenance Responsible	70
14-07-2016	- Granulates Production Responsible	70
15-07-2016	- Cork with Rubber Production Responsible	45
20-07-2016	- India Market Developer	68
20-07-2016	- Industry Global Technical Manager	62
16-09-2016	- Chief Executive Officer	60
	Total duration in minutes	1885

Table 3: List of interviews and their duration

APPENDIX D

List of direct observations and their duration

Direct Observations	Duration (minutes)
1. Tour of the showroom	60
2. Tour of the production facilities	130
3. Alignment meeting with all the employees	60
Total	**250**

Table 4: List of direct observations and their duration

APPENDIX E

ACC' organizational chart

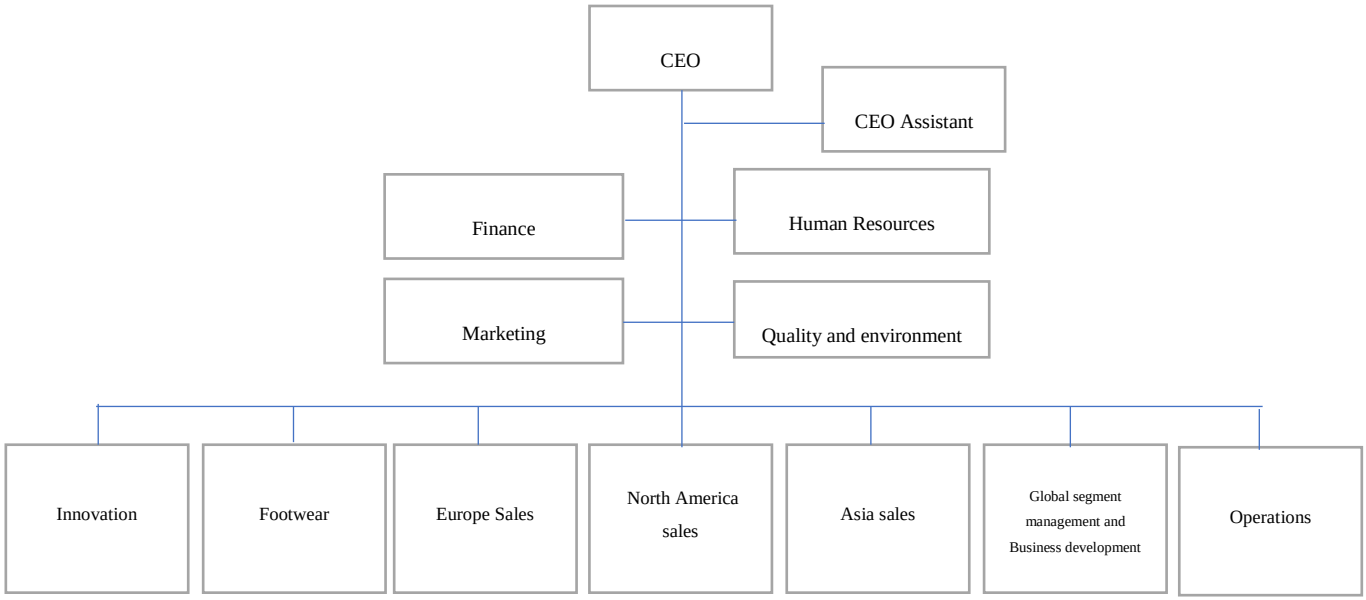

Figure 2: ACC' organizational chart