

**Exploring use and influence of information requirements in a regulated environment:
evidence from Italian utilities**

Abstract

This paper explores the *use* and *influence* of regulatory information requirements on management accounting systems, focusing on a sample of Italian electric and gas utilities. Despite a growing interest in factors driving change in management accounting, yet relatively little is known about the external influence of regulatory authorities in the context of public utilities. The aim of this paper is two-fold. First, it seeks to understand whether management accountants use regulatory information for decision-making and control. Second, through an institutional lens, this paper explores how the regulatory pressure imposed by the Italian energy regulatory authority (ARERA) has influenced utilities' management accounting systems.

Based on an online survey from 33 Italian electric and gas utilities and complementary interviews, this paper shows that the majority of the sampled firms *use* regulatory information for control purposes, though there are differences between utilities according to the size and the extent of regulatory pressure. Additionally, this exploratory study reveals that regulatory pressure has influenced management accounting systems in a radical or incremental way.

The findings underline the role of the regulator, suggesting that regulatory requirements can lead to the development of a loop learning process.

Keywords: electric and gas utilities, management accounting; disclosure requirements; survey

1. Introduction

The interplay between external and internal reporting has been historically a matter of discussion both in financial and management accounting literature, especially following Kaplan's claim (1984) that "management accounting has been subservient to external financial reporting", losing its relevance. Since then, interest in the topic has been growing to better understand the relationship between external and internal reporting, though producing conflicting results. Some studies support that financial and management accounting are two separate realities (Johnson & Kaplan, 1987; Joseph et al., 1996; Richardson 2002), while others provide evidence of convergence between external and internal reporting (Drury et al., 1993; Hemmer & Labro, 2008; Weißenberger & Angelkort, 2011; Taipaleenmäki & Ikäheimo, 2013).

In more recent years, accounting researchers have focused their efforts on identifying innovations (Kaplan & Norton, 1996; Kasurinen, 2002; Liu & Pan, 2007; Lukka, 2007; Busco & Scapens, 2011; de Araujo Wanderlay et al., 2022) and factors driving change in management accounting (Scapens, 1994; de Araujo Wanderley et al., 2011). Particularly, academics have sought to explain management accounting changes in relation to external pressures, such as competitive environment, information technologies, and institutional constraints (Carmona & Macias, 2001; Burns & Vaivio, 2001; Jarvinen, 2006; Liu & Pan, 2007). Little is known about the external influence of regulatory requirements on management accounting in public utility firms (Conrad, 2005; Tillema, 2005; Tsamenyi et al., 2006; Nor-Aziah & Scapens, 2007; Culasso et al., 2016; Quinn & Warren, 2017).

This study tries to fill this gap and to contribute to the discourse by exploring the interplay between external regulatory reporting requirements and internal management accounting, focusing on a sample of Italian electric and gas utilities. In particular, this study addresses the questions of (i) whether management accountants *use* regulatory information requirements for internal management purposes, and (ii) how the requirements imposed by the Italian Regulatory Authority for Energy Grid and Environment (ARERA) *influence* utilities' management accounting systems.

This study focuses on the energy sector. This setting is particularly interesting for two reasons. First, in the mid-1990s, a wave of utility industry privatization initiatives spread from the US and UK to many European countries, including Italy. As a result, utility firms experienced a profound change in financial and accounting information systems (Tsamenyi et al., 2006). The liberalization of public utilities, notably electricity and natural gas, required the establishment of regulatory bodies (i.e., independent authorities) to ensure that the public interest was served. Also, a regulatory accounting for utilities was "premised upon and shaped

by accounting rules and practices” (Preston & Vesey, 2008) to support the regulatory decision-making process (Conrad, 2005).

Second, Italian electric and gas utilities are impacted by ARERA regulations. According to ARERA, utility firms periodically produce detailed information for regulatory purposes, integrating quantitative and qualitative requirements (i.e., Accounting Unbundling, investments, operating costs, pricing, and data on service quality). ARERA usually employs this regulatory information for monitoring and accountability purposes, together with evaluating the adequacy of reporting requirements. Utilities, in their turn, could employ regulatory information for internal control decision-making purposes (Hornngren 1995; Zimmerman 2000; Hall, 2010).

Concerning the *use* of regulatory information requirements, the findings reveal that management accountants employ external regulatory requirements for internal decision-making and control. Particularly, they use external reporting information to prevent punishments (financial losses). Moreover, regulatory information is employed by management for effective cost-based strategies and investment evaluation policies. Larger firms use regulatory requirements for benchmarking purposes in order to readdress internal decisions, trying to fall in line or beat ARERA’s expectations.

Concerning the *influence* of ARERA requirements on management accounting systems, the findings show that cost accounting systems have been impacted in a radical or incremental way. Additionally, ARERA requirements have created new routines and more efficient ways to collect and process regulatory data. The findings underline the role of ARERA, suggesting that regulatory pressure can lead to the development of a loop learning process.

The results also show differences between firms according to the size and the intensity of regulatory pressure, ranging from a tendency to take a passive tick-box approach compliance reporting to a more proactive and thoughtful approach. Large-sized and high-regulated companies are more likely to disclose more detailed information. Similarly, the degree of influence of ARERA on utilities varies from a light-handed regulation to a more pressing one.

This paper contributes to the literature in two ways. First, it extends prior accounting literature, by exploring the interplay between external and internal reporting in the context of public utilities. To the best of my knowledge, this article is the first to explore, through survey and interviews, the interplay between external regulatory requirements and management accounting in the Italian energy sector. Second, this study also adds to the contemporary literature on management accounting change by showing how external pressure imposed by ARERA requirements influences utilities’ management accounting systems.

This study could be of interest to regulators, particularly to ARERA, in increasing its understanding of the degree to which its regulatory requirements influence utility behaviours in terms of decision-making and control. Moreover, the regulator should be interested in the role played by the regulatory requirements in fostering appropriate use of information.

There are also some opportunities for future research. Future researchers can provide additional evidence on the interplay between the regulatory authorities and the utility firms, investigating whether utilities influence regulatory requirements in this two-way relationship. Additionally, future comparative case studies could be undertaken in the context of public utilities, as well as longitudinal analysis.

The remainder of this paper is structured as follows. The next section provides an overview of the Italian energy sector. Section 3 reviews prior literature on the interplay between external and internal reporting (Section 3.1.) and factors driving management accounting changes (Section 3.2.) and develops the research questions. Section 4 present the theoretical framework. In Section 5 the research methodology is presented. Section 6 illustrates the findings, and the final section concludes the paper.

2. The energy sector in Italy

The energy sector has been subject to numerous regulatory changes over the last twenty years. Originally it was based on vertically integrated monopolies under public ownership. Therefore, from 1962-1999, the state-owned ENEL (Ente Nazionale per l'Energia Elettrica) became the incumbent monopoly for electricity power in Italy, whereas, for gas, the leading company was ENI (Ente Nazionale Idrocarburi). The existence of incumbent companies in Italy and other European countries led to inefficiencies in the long run and lower investments. Thus, in the mid-1990s, public utility services worldwide experienced a wave of privatization initiatives.

Italy began its energy privatization process in 1999. Following the European directives (electricity 96/92/CE; gas 98/30/CE), the so-called Bersani (electricity) and Letta Decrees (gas) were adopted with the aim of breaking down national monopolies and promoting competition in the energy industry (Luciani & Mazzanti, 2006). The state-owned electricity company ENEL was required to reduce its production capacity from 80 to 50 percent, as “from 1 January 2003, no company is allowed to produce or import, directly or indirectly, more than 50 percent of the total energy produced and imported into Italy” (Legislative Decree No. 79/1999, article 8, comma 1). Consequently, ENEL began a rapid disinvestment process through the sale of three generation companies: Eurogen, Elettrogen, and Interpower. The same occurred in the natural

gas sector, prompting the diversification of gas importers, thus reducing the state-owned ENI's dominance in the market (Gilardoni, 2020).

On the one hand, the European reforms of the 1990s opened up the energy sector to market competition. Thus, since then, private operators have been allowed to generate, supply, and sell energy in the free market, while local distributors and transport companies operate as natural monopolies and, therefore, are rate-regulated. On the other hand, the privatization of public utilities required the establishment of an Italian independent regulatory authority for electricity and gas (Autorità per l'Energia Elettrica ed il Gas, AEEG), which later became responsible also for water (Autorità per l'Energia Elettrica, il Gas e il Sistema Idrico, AEEGSI) and, in more recent times, also for the waste management sector (Autorità di Regolazione per Energia, Reti e Ambiente, ARERA). The establishment of an independent regulatory authority is necessary in order to contain costs and to ensure that the public interest is served.

ARERA is the authority responsible for regulating and monitoring Italian public utilities. Among its functions, it defines tariffs for regulated activities and disposes of control, inspection, and sanctioning powers (Gilardoni, 2020). It has the mandate to protect consumers' interests and foster utilities' competition with a view to promoting efficiency. The supervisory role of ARERA aims to manage the trade-off between operators' need for financial profitability and consumers' need for cost-effectiveness and adequate service quality. In such a context, ARERA requires utility firms to periodically produce quanti-qualitative documentation for regulatory purposes, generally containing much more extensive information than those disclosed in the accounting statements. The regulation is mandatory and specific for each field of activity (electricity, gas, water, waste); thus, utility firms are directly impacted by ARERA reporting requirements. The main regulatory reporting requirements include, but are not limited to, Accounting Unbundling, investments, operating costs, pricing, and information about the quality of the service provided to consumers.

First, utility firms must respond to ARERA's request to produce annual regulatory accounts (i.e., Accounting Unbundling) consisting of (i) an income statement and balance sheet broken down by activity type, (ii) a note describing the accounting systems used and the procedure followed in drawing up the regulatory accounts, and (iii) physical and monetary amounts. In other words, utility firms must reclassify economic and financial data by first differentiating costs and revenues deriving from the electric/gas business from those not related to the energy sector and then going into a more detailed segment classification. This requirement is crucial to limit cross-subsidization between divisions and permit to allocate resources efficiently. Moreover, it serves the authority to see if there are any extra profits. Note

that from year to year, ARERA introduces changes in Accounting Unbundling reporting, requiring firms to disclose extra information. Small-sized firms, however, are allowed to prepare simplified regulatory accounts, composed of only income statements broken down by activity type.¹ Thus, smaller firms are not required to present regulatory income statements, but they must report changes in tangible and intangible fixed assets.

Utility firms that operate in regulated activities (i.e., rate-regulated firms) must submit tariffs for approval by ARERA, which allows the recovery of “just and reasonable” investment levels (Capex) and operating costs (Opex) incurred in the previous year. Hence, rate-regulated firms are required to detail operating costs, capital expenditure, and fixed assets attributable to the regulated activity. Further, in more recent years, ARERA has developed a reward/penalty system to control costs, awarding/punishing firms that exceed or fail to achieve specific targets. Also, firms that operate in free markets, namely traders and suppliers, are required to disclose quarterly price data per activity, type of customer (domestic, non-domestic), and cost components (supply costs, grid connection charges, metering costs, renewable support costs, general system charges, taxes) for the provision of the service.

The need for information among public utilities goes beyond financial accounting data. Indeed, all utility firms must complete the Annual Electricity and Gas Market Survey made available on the ARERA’s website, disclosing plenty of operating data. Utilities report numerous non-financial information related to physical characteristics (employees, productive units, the volume of electricity/gas generated, distributed, and sold), the quality of the service provided (punctuality of service, electrical outages, gas losses), and customer-oriented data (customer type, by region, per level of consumption, unpaid ratio, churn ratio, new customer acquisition rate; customer satisfaction). All these requirements are important in order to enhance transparency and accountability in public utility services.

¹ Accounting Unbundling is mandatory for all utility firms with more than 100,000 customers. A simplified form is allowed for utilities with less than 100,000 customers and 1,000 - 5,000 GWh of energy sold. Utility firms with less than 100,000 customers and 1,000 GWh of energy sold are not subject to Accounting Unbundling.

Table 1 Summary of the main regulatory reporting required by ARERA

	Accounting Unbundling	Investments and Operating costs	Price data	Quality of the service
Reference law	137/2016/R/com, modified and integrated with 168/2019/R/gas, 223/2019/R/gas, 570/2019/R/gas, 491/2020/R/eel.	568/2019/R/eel 114/2019/R/gas	168/2018/R/com, modified and integrated with 592/2021/R/com	413/2016/R/com 569/2019/R/gas 419/2019/R/gas 554/2019/R/gas
Purpose	To promote efficiency and quality by ensuring a homogeneous and detailed information flow on the financial situation of operators; to prevent cross-transfers of resources between activities and divisions; to ensure a homogeneous disaggregation of costs and revenues	To promote efficiency and service quality	To ensure comparable, and harmonised European statistics on natural gas and electricity prices	To promote transparency on service quality
Obligated parties	All utility firms registered in ARERA's Register of Operators	Rate-regulated services (transmission/transport, distribution, metering)	Electric and gas traders	All utility firms registered in ARERA's Register of Operators
Time horizon	Ex-post	Ex-ante	Ex-post	Ex-post

3. Related literature

3.1. The interplay between external and internal reporting

Prior research provides a growing body of knowledge concerning the relationship between financial and management accounting (Johnson & Kaplan, 1987; Drury et al., 1993; Drury & Tayles, 1995; Joseph et al., 1996; Granlund & Lukka, 1998b; Richardson 2002; Lukka, 2007; Hemmer & Labro, 2008; Quagli, 2011; Weißenberger & Angelkort, 2011; Taipaleenmäki & Ikäheimo, 2013). Consensus is lacking among studies, with different groups producing conflicting results. From a survey among US firms, Johnson and Kaplan (1987) argue that management accounting has been subservient to external financial reporting. This claim is also supported by the work of Richardson (2002), who find that Canadian management accountants depend on financial accounting technically, organizationally, and professionally. He argues that the subordination of management accounting to financial accounting is a consequence of exogenous institutional pressures from auditors, financial accountants, and the government. Scherrer (1996) find that external reporting requirements have impacted management and cost accounting in Germany. On the contrary, Hopper et al. (1992) find no evidence of the dominance of financial accounting on management accounting practices. Similar results are observed from the survey by Drury et al. (1993), who argue that firms use the same product cost information for internal and external reporting. Surveying 308 qualified UK management

accountants, Joseph et al. (1996) extend these findings by showing that financial accounting has little influence on management accounting except by large-sized and publicly listed companies.

More recent evidence points to the convergence of financial and managerial accounting. Hemmer and Labbro (2008) provide empirical evidence that financial and management accounting systems are not independent but linked. On this issue, they suggest that the shift of financial accounting versus a more forward-looking oriented approach leads simultaneously to forward-looking management accounting. Likewise, Weißenberger and Angelkort (2011) observe similarities in the accounting language used by financial and management accountants for business communication. Also, Lukka (2007) reports converging characteristics by finding that managerial and financial accounting measurement principles are almost similar. Additional insights on the issue are introduced by Taipaleenmäki & Ikäheimo (2013), who add that the ongoing digitalization facilitates the integration between financial and managerial accounting. Further studies examine the influence of accounting standards on management accounting (Jermakowicz & Gornik-Tomaszewski, 2006; Angelkort et al, 2009). Focusing on a sample of listed European firms, Jermakowicz and Gornik-Tomaszewski (2006) provide evidence that applying IFRS standards creates an opportunity for harmonizing external and internal reporting practices.

This paper explores the interplay between external and internal reporting in the context of public utilities. In particular, it explores the *use* of regulatory information requirements for internal management purposes focusing on a sample of Italian electric and gas utilities. This setting has some peculiarities since electric and gas utilities provide service in a regulated environment with high scrutiny by governmental regulatory authorities and the public at large. Indeed, they are required to produce detailed information for regulatory purposes, which differs from statutory financial information since it must be prepared according to specific regulatory requirements. According to the Italian Regulatory Authority for Energy Grid and Environment (ARERA), electric and gas utilities periodically produce financial and operating accounting information, integrating quantitative and qualitative requirements. ARERA usually employs this regulatory information for monitoring and accountability purposes, as well as for evaluating the adequacy of reporting requirements. Utility firms, in their turn, could employ regulatory information for internal management purposes. Against this background, this paper addresses the following research question:

RQ1: Do electric and gas utilities use regulatory information for internal management purposes?

3.2. Factors driving management accounting change

Management accounting provides valuable information that guides managers toward informed economic decisions and motivates behaviours in order to accomplish the organization's goals (Horngren, 1995). Consistent with this, Riahi-Belkaoui (2002) argues that management accounting is responsible for producing and disseminating information relevant to internal decision-making. Johnson and Kaplan's claim (1987) that management accounting has not changed over the past few decades, losing its relevance, has influenced studies on management accounting. Since then, accounting researchers have increasingly focused their efforts on identifying innovative techniques (Kaplan & Norton, 1996; Kasurinen, 2002; Liu & Pan, 2007; Lukka, 2007; Busco & Scapens, 2011; de Araujo Wanderley et al., 2022) and factors driving management accounting change (Scapens, 1994; de Araujo Wanderley et al., 2011).

Management accounting evolves due to internal (*intra-organisational*) and external (*extra-organisational*) influences. On the side of internal factors, the foremost factors affecting management accounting practices are organizational structure (Bruns & Waterhouse, 1975; Ouchi, 1977; Chenhall, 2003) and human-related elements (Markus & Pfeffer, 1983; Scapens & Roberts, 1993; Burns, 2000; Chenhall, 2003; Abernethy et al., 2010; Busco & Scapens, 2011; Jansen, 2011). Bruns & Waterhouse (1975) show that budgetary-related behaviours vary depending on the structuring of activities and the concentration of authority (i.e., centralization/autonomy) within the organization. Accordingly, high-structured organizations are associated with high involvement in management practices (budget planning) and an increase in perceived control. Also, Haldma & Laats (2002) find a positive association between cost accounting practices and organizational structure.

More human-oriented studies describe management accounting changes by looking at power (Markus & Pfeffer, 1983; Scapens & Roberts, 1993; Burns, 2000; Tsamenyi et al., 2006; Nor-Aziah & Scapens, 2007), culture (Chenhall, 2003; Busco et al., 2006; Busco & Scapens, 2011), and management accountants' behaviour (Scapens & Jazayeri, 2003; Yazdifar & Tsamenyi, 2005; Abernethy et al., 2010; Jansen, 2011; Seo et al., 2012; Bassani et al., 2021). Particularly, prior literature argues that the role of management accountants has evolved from a traditional to a more future-oriented one. In more recent times, emphasis is placed on forward-looking information (Avallone et al., 2015; Chenhall & Morris 1986; Mia & Chenhall 1994;

Granlund & Lukka, 1998a, 1998b; Atkinson et al., 2004; Cadez & Guilding, 2008; Goretzki et al., 2013; Taipaleenmäki & Ikäheimo, 2013) that enables managers to make informed strategic decisions and to monitor and control the results. Hence, management accountants have been involved in more forward-looking analysis (Granlund & Lukka, 1998b; Baldvinsdottir et al., 2009), incorporating risk monitoring into their activities (Culasso et al., 2016).

On the side of external factors, the main drivers of change in management accounting include market competition (Burns & Vaivio, 2001), technology (Liu & Pan, 2007), and external institutional constraints (Di Maggio & Powell, 1983; Carmona & Macias, 2001; Jarvinen, 2006). Through a case-study analysis, Carmona and Macias (2001) show that external pressures are likely to affect the implementation of cost accounting systems within the tobacco monopoly industry. Similarly, Jarvinen (2006) examines cost accounting changes in Finnish hospitals. Focusing on the Italian healthcare industry, Leotta and Ruggeri (2012) analyse changes in performance measurement systems as a response to normative pressure to increase efficiency.

Relatively there is little research that studies management accounting changes in public utilities such as electric and gas companies (Conrad, 2005; Tillema, 2005; Tsamenyi et al., 2006; Nor-Aziah & Scapens, 2007; Culasso et al., 2016; Quinn & Warren, 2017). Moreover, most of the studies cited above use a single company case study. For instance, Tsamenyi et al. (2006) point out that the accounting and financial information systems of one of the major electric Spanish companies are affected by the interplay of the regulatory environment, market forces, and intra-organizational power relations. Similarly, Conrad (2005) analyses organizational changes due to the privatization processes in the largest gas company in the UK.

Through an institutional lens (DiMaggio & Powell, 1983; Meyer & Scott, 1983; Dillard et al., 2004; Scott, 2014), this paper explores the influence of external institutional forces on internal accounting practices, focusing on a sample of thirty-three electric and gas companies. In particular, the paper examines the influence of regulatory information requirements on management accounting systems by responding to the following research question:

RQ2: How do regulatory requirements influence management accounting systems?

4. Theoretical framework

This paper uses the theoretical lens of institutional theory (DiMaggio & Powell, 1983; Meyer & Scott, 1983; Scott, 2014), to explore the influence of external institutional forces (i.e., regulatory authority) on management accounting systems, focusing on a sample of Italian electric and gas companies. The institutional approach is lately adopted in accounting literature to describe fraud (Gabbioneta et al., 2013; Hartmann et al., 2018), IFRS enforcement (Quagli et al., 2021), and management accounting changes (Carmona & Macias, 2001; Jarvinen, 2006; Leotta & Ruggeri, 2012), and it is particularly appropriate for exploring extra-organizational influences.

In particular, the current study lies on the concept that organizations pursue legitimacy by conforming to isomorphic pressures (DiMaggio & Powell, 1983; Ashworth et al., 2007). According to DiMaggio and Powell (1983), changes in organizational practices are subject to three isomorphic institutional mechanisms: coercive, mimetic, and normative. Organizations adopt institutional practices (e.g., accounting practices) by following laws, rules, and regulations imposed by the state and other external regulatory agencies (*coercive isomorphism*), by copying the most successful and legitimate organization (*mimetic isomorphism*), or as a response to pressures coming from professional training institutions and associations (*normative isomorphism*). Ashworth et al. (2007) extend the institutional theory by separating compliance and convergence as components of conformity. Accordingly, organizations go in the direction imposed by institutional pressures (*compliance*) or naturally behave similarly over time (*convergence*).

The concept of coercive isomorphism is of particular interest for this study since the Italian electric and gas utilities are impacted by the energy regulatory authority (i.e., ARERA)'s regulations, which influence utility firms' behaviour to comply with a number of policies and procedures. Thus, ARERA exerts pressure on utility firms to adopt specific practices and structures, attempting to standardize/ harmonize policy requirements between the different public utilities it supervises and regulates (electricity, gas, water, waste).

The institutional literature also shows that institutional practices change due to relationships between actors within the organization and institutions (Burns & Scapens, 2000). Burns & Scapens (2000) mainly focus on the role played by rules and routines, and more specifically, they argue that new accounting practices generate rules, then rules turn into routines, and finally, routines become institutionalized.

5. Research method

5.1. Data collection and survey implementation

Data for this paper is gathered through an online survey and complementary interviews. The survey method is particularly suitable since the focus of this study is exploratory (Zikmund et al., 2013) and based on a single-country setting (Ittner et al., 2003). The questionnaire is developed drawing upon the information available on the ARERA website. Survey findings are complemented by ex-post in-depth interviews among the survey respondents in order to explore the research topic further. The use of interviews as a follow-up to the survey questionnaire ensures completeness.

The questionnaire includes dichotomic, multiple-choice, closed, and open-ended questions. It is organized to primarily collect information regarding (i) the use of regulatory information for internal management purposes and (ii) the influence of ARERA requirements on management accounting systems (see Appendix A for the survey questions). In addition, the questionnaire includes some general questions related to firms' main characteristics. Respondents are also asked to indicate the name of their company on a voluntary basis.

The length of the questionnaire sections is carefully considered, placing the easiest questions at the start and the end of the questionnaire in order to eliminate the effects of measurement errors (Andrews, 1984). Moreover, each possible answer is distributed randomly throughout the questionnaire to avoid possible biases. For some of the questions, respondents can choose multiple answers and add extra elements in order to include all the important information related to the study. The questionnaire is evaluated and pilot-tested with two experienced academics to obtain suggestions and improve its face validity.

The target survey participants are management accountants of large and middle-sized Italian energy utilities, who have the greatest management accounting knowledge. Management accountants are the leading providers and interpreters of management accounting information (Wagenhofer, 2006). An initial list of 396 electric and gas utilities was obtained from the AIDA database (Bureau Van Dijk)². I used this database to map the Italian companies and obtained a list of the individual websites. Then, I went on each firm's website and hand-collected their mailing addresses. Out of the 396 utility firms, 324 have an available mailing address. On 12 April 2022, an email was sent to these firms containing a link to the online survey and asking them to address the email to the management control office. The respondents

² I identified active Italian companies (1st April 2022) belonging to the electricity and gas industry classification (ATECO 2007 code 3511-3513-3514-3521-3522-3523) with annual revenue greater than 10 million EUR. A total of 396 companies were identified on the AIDA database that meet the sample selection criteria.

were encouraged to participate in the survey and informed that their responses would be anonymous, though they could receive a summary of the results if they wished. An invitation with a link to the survey was also posted on LinkedIn.

Survey responses are collected from 12 April to 30 June 2022, with an email invitation sent on 12 April 2022, and two reminders sent on 21 April and 6 June 2022, as a follow-up procedure (Dillman, 2011). Of the 324 emails sent, 33 returned with delivery problems due to invalid email addresses. As a result, 291 valid invitations were sent. In total, 40 questionnaires (13.75%) returned correctly completed, with 29 email respondents and 11 LinkedIn respondents. Out of these, only 33 questionnaires (11.34%) are useable.³ The final response rate compares well with those reported in previous management accounting studies (Robinson et al., 2010; Abernethy et al., 2017; Nowotny et al., 2022). In addition, four in-depth interviews are undertaken between May and July 2022 to verify and complement the survey results.

5.2. Main constructs definition

Regulatory information requirements: the identification of regulatory information requirements relies on the information available on the ARERA website at the time of the investigation. For regulatory purposes, ARERA requires utilities to systematically measure and disclose numerous information regarding their operating business activities. The disclosure requirements include both financial and non-financial performance measures. The questionnaire refers to the main reporting requirements that electric and gas utilities must produce for ARERA. Thus, it focuses particularly on Accounting Unbundling, operating costs, investments, and price data. The Accounting Unbundling is one of the few disclosures required by ARERA that substantially concerns all utilities in the same way, irrespective of their specific field of activity (generation, distribution, transport, trading). Other reporting requirements are much more addressed to the specific activity carried out by every utility firm (i.e., pricing data for free-market operators; operating costs, and investments for rate-regulated firms).

Management accounting systems: here, the term management accounting system is used as a synonym for management control. I follow the broad conceptualization of control provided by the literature on control and financial accountability (Merchant & Otley, 2007; Malmi & Brown, 2008). According to Merchant and Otley (2007), management control encompasses strategic planning, strategic control, and learning processes. Similarly, Malmi and

³ I decided to leave out five questionnaires because of the firm's size (revenue lower than 10 million euros). Further, I received three responses from the same firm. I thus decided to consider only the questionnaire filled out by the Group controller of the firm and exclude the other two compiled by expert clerks since they were not the target of the population.

Brown (2008) define management control as ‘systems, rules, practices, values and other activities management put in place in order to direct employee behaviour’. Consistent with these studies, a holistic view of control is adopted in the paper rather than focusing on a single aspect of control.

6. Findings

6.1. Overview of the respondents

Most respondents (61%) operate exclusively in a free market environment - namely energy providers and trading companies - with a light-handed regulation. In comparison, 39% provide services both in a free market and a rate-regulated environment - namely rate-regulated firms - with a high regulation. More than 57% of respondents are large-sized, with annual revenues exceeding 50 million Euros, whereas the remaining respondents have 10-50 million Euros of annual revenues. For only two firms, information about the size is not available. The sample includes eight top-ranking electricity and gas players listed on Borsa Italiana, which are also among the major contributors to the Italian gross domestic product (ARERA, 2021 Annual Report). Multi-utilities account for most (73%) of our 33 respondents.

Table 2 Respondents characteristics.

	<i>No</i>	<i>%</i>
Panel A: Industry		
Electricity	7	21.21
Gas	2	6.06
Electricity and gas	24	72.73
Total	33	100.00
Panel B: Operating activity		
Production of energy	3	9.09
Distribution of energy	4	12.12
Trade of energy	13	39.39
Production and distribution of energy	2	6.06
Production and trade of energy	4	12.12
Production, distribution, and trade of energy	7	21.21
Total	33	100.00
Panel C: Market		
Free	20	60.61
Free and rate-regulated	13	39.39
Total	33	100.00
Panel D: Firm size (sales revenues)		
10-50 million	12	36.36
> 50 million	19	57.58
Not available	2	6.06
Total	33	100.00

6.2. Use of regulatory information for internal management purposes

This section deals with the internal use of regulatory reporting requirements by electric and gas utilities. The survey findings reveal that responses from utility firms are distributed equally between those that employ regulatory information for internal management purposes, those that employ only part of the information, and those that do not use internally the information disclosed for ARERA. Among the thirty-three respondents, eleven (33%) use regulatory information for internal management purposes, while twelve firms (36%) use only part of it. In contrast, ten firms, representing 30%, declare that they do not use internally the information produced for ARERA, adopting merely a “tick box” approach to comply with the requests. However, findings show a more varied picture of the use of regulatory information according to firms’ size and the extent of regulatory pressure.

As it is possible to observe from Table 3, regulatory information is predominantly employed by large-sized firms. Looking at firms that use regulatory information internally, differences in size appear evident (8 large-sized versus one middle-sized). By contrast, the number of firms that do not use regulatory information internally is similar between large and middle-sized firms; the same can also be observed for the firms that use only part of regulatory information. Further, findings reveal that the intensity of regulation plays an important role. Indeed, the regulatory information is principally employed by those who are subject to a high degree of regulation, namely rate-regulated companies. Only one rate-regulated firm declares not to use the regulatory information as opposed to nine energy providers and traders.

Table 3 Use of regulatory information for internal management purposes

	Respondents		Size						Regulatory pressure			
	Total		Large		Medium		Not available		High		Low	
	<i>No</i>	%	<i>No</i>	%	<i>No</i>	%	<i>No</i>	%	<i>No</i>	%	<i>No</i>	%
Full use	11	33.33	8	24.24	1	3.03	2	6.06	7	21.21	4	12.12
Partial use	12	36.36	6	18.18	6	18.18	0	0.00	5	15.15	7	21.21
No use	10	30.30	5	15.15	5	15.15	0	0.00	1	3.03	9	27.27
Total	33	100.00	19	57.57	12	36.36	2	6.06	13	39.39	20	60.61

Respondents are classified according to the size and regulatory pressure, as follows. ‘Large’ includes companies with more than fifty million euros of annual sales revenue. ‘Medium’ includes firms having ten to fifty million of annual sales revenue. ‘Not available’ includes companies that have not mentioned their company name in the survey, thus it was not possible to get the size from the AIDA database. ‘High’ includes companies that operate in regulated environment, thus are subject to a higher regulatory pressure by ARERA, namely rate-regulated firms. ‘Low’ includes companies that operate in a free market, thus are subject to a lower regulatory pressure by ARERA, namely energy providers and traders.

The survey results indicate that utility firms primarily employ regulatory requirements for decision-making and control. According to survey responses, regulatory requirements are first used to prevent punishments (34.15%). After the liberalization processes, a reward/penalty scheme was implemented by ARERA based on utilities' performance and service quality. The reward/penalty scheme entails firms with good/poor performance and good/poor service quality incurring significant financial profit/losses, thus encouraging compliance among them. The probable punishment and the severity of the consequences of non-compliance (financial losses) lead management to implement monitoring control systems in order to limit the exposure to regulatory risks. Accordingly, regulatory requirements allow utilities "to perform additional internal controls" (Firm 11) and to monitor specific items (i.e., Regulatory Asset Based, RAB) (Firm 7). Also, Firm 19 states "Our goal is being rewarded from the authority. We use regulatory information to critically analyse key performance indicators to understand how to increase virtuous mechanisms that lead to economic rewards."

Additionally, survey findings show that companies employ regulatory reporting requirements for effective cost-based strategies (26.83%) and investment evaluation policies (21.95%), especially the large and high-regulated ones. Only a few (4.88%) use regulatory requirements for pricing decisions; note that they are all energy traders. Others, more generally, point out that regulatory information is "beneficial for the internal analysis of the different activities" (Firm 9), "for monitoring service quality" (Firms 15, 31) and "focusing on specific operational issues" (Firm 17). Supplementary interviews also reveal that regulatory reporting requirements allow firms to make benchmarking comparisons in order to redirect decisions (e.g., prioritization of investments). Indeed:

"Once we disclose information for ARERA, we see how things are going internally and say, 'Oh look, this year we did really bad. We have not invested enough here. Why?' Then we call the responsible and say, 'Here it has deteriorated 100%', and he then calls the manager, and we all have a meeting to discuss and choose the strategy" (Firm 20).

When asked what kind of regulatory reporting requirements is reputed as most beneficial for their decision-making needs, I found that responses vary among utility firms. Differing views about the relevance of ARERA requirements lean on firm's size and regulatory pressure. Larger firms argue that Accounting Unbundling and investments are most relevant, while smaller firms emphasize price data. A similar view is shared by energy providers and traders who emphasize price data. On the contrary, rate-regulated companies affirm that

information about investments and operating costs are crucial for their business activities. Nonetheless, note that, out of twenty, nine energy traders responded that ‘none of the above requirements is considered relevant’; they are the same firms that declare not to use regulatory information other than for compliance with ARERA requirements.

Another issue relates to the time spent collecting, processing, and analyzing regulatory information. The survey findings reveal that the time spent varies depending on the type of firm (for details, see Appendix B). Generally, energy traders spend less than two weeks producing accounting information for ARERA. In contrast, the documentation takes more than one month for rate-regulated firms, which are more vulnerable to regulatory restrictions. A number of firms declare that “time is difficult to quantify because ARERA requires many types of information, thus different departments are engaged in the collection of data” (Firms 6, 19). The department that is commonly responsible for disclosing information required by ARERA is, for most firms, Regulatory Affairs (39.39%), followed by Planning and Control (30.30%), and Financial Reporting (9.09%). Nonetheless, some argue that Planning and Control and Financial Reporting normally work together to provide the information needed.

Overall, the results show divergence between firms according to the size and the intensity of regulatory pressure. High-regulated and large-sized companies appear to be more likely to disclose more detailed information. Furthermore, survey findings and supplementary interviews reveal different behaviours, ranging from a tendency to take a passive tick-box approach compliance reporting to a more proactive and thoughtful approach. In this respect, three typical behaviours were found: (i) no use of regulatory information, (ii) partial use of it, and (iii) full employment of external requirements for internal decision-making and control. Below, I provide examples of each behaviour according to the respondents’ claims.

“For us, it is pure compliance. We do not use that information for internal analyses. Our analyses are focused on other aspects. We have organized ourselves to produce the information requested, but, internally, they are not used” (Firm 13).

“It is not always information that we use because we use even more detailed information for internal purposes. Regulatory requirements are all useful information, just that they are requested with different detail and level of aggregation. We use more analytical information and different clusters because we are interested in customer profitability” (Firm 12).

“We see how much better/ worse we perform on certain indicators that the authority deems important. So, we internally make some reflections and say, ‘If ARERA is asking that indicator is because it wants to change that aspect. Thus, maybe let us focus more on that aspect than on this other’. By doing so, we readdress our internal decisions, trying to fall in line or beat ARERA’s expectations” (Firm 20).

6.3. Influence of ARERA information requirements on management accounting systems

Overall, the survey responses show that the main factors driving change in management accounting systems in the last ten years are awareness and forward-looking culture, followed by regulatory pressure and technology advancement. Only a few (two firms out of thirty-three) attribute changes in management accounting to the competitive environment. This section focuses on how regulatory requirements influence change in management accounting systems.

Table 4 shows the influence of ARERA requirements in the last five years. Among thirty-three respondents, the majority (twenty-seven firms representing 81.82%) declare that increasing regulatory requirements have affected their accounting systems, bringing significant changes in slightly more than 27% of electric and gas utilities. By contrast, almost 18% of respondents affirm that ARERA requests have not influenced their management accounting systems at all. Others add that improvements in accounting systems have been more material with the introduction of certain disclosure requirements (i.e., Accounting Unbundling), leading to the implementation of specific software tools (Firms 12, 14, 17).

Table 4 The influence of ARERA requirements on management accounting systems

Influence	Respondents		Size						Regulatory pressure			
	Total		Large		Medium		Not available		High		Low	
	No	%	No	%	No	%	No	%	No	%	No	%
Significant	9	27.27	7	21.21	1	3.03	1	3.03	6	18.18	3	9.09
Marginal	18	54.55	10	30.30	7	21.21	1	3.03	5	15.15	13	39.39
No influence	6	18.18	2	6.06	4	12.12	0	0.00	2	6.06	4	12.12
Total	33	100.00	19	57.57	12	36.36	2	6.06	13	39.39	20	60.61

Respondents are classified according to the size and regulatory pressure, as follows. ‘Large’ includes companies with more than fifty million euros of annual sales revenue. ‘Medium’ includes firms having ten to fifty million of annual sales revenue. ‘Not available’ includes companies that have not mentioned their company name in the survey, thus it was not possible to get the size from the AIDA database. ‘High’ includes companies that operate in regulated environment, thus are subject to a higher regulatory pressure by ARERA, namely rate-regulated firms. ‘Low’ includes companies that operate in a free market, thus are subject to a lower regulatory pressure by ARERA, namely energy providers and traders.

The impact on management accounting differs depending on firms’ size and the extent of regulatory pressure. It is worth noting that ARERA affects the management accounting of larger firms both in a radical and incremental way. By contrast, smaller firms are only affected

marginally. Likewise, changes in management accounting systems are predominately marginal for low-regulated firms, namely energy providers and traders.

When asked how ARERA requirements have influenced utilities' management accounting systems, respondents reported that they had to modify their chart of accounts to satisfy the regulator's needs. Therefore, cost accounting systems are modified (radically/incrementally) as utility firms need more sophisticated software and algorithms to respond to regulatory requests. For instance, the main changes mentioned are the segmentation of costs at a company level and "periodic adjustments of cost center allocations" (Firm 12). Indeed, pressure is put on a more detailed classification (passing from the segmentation of costs into activities to smaller business segments). Respondents state that their cost accounting systems, which embed cost control and techniques capable of supporting strategic decisions, "go hand in hand with ARERA requirements" (Firm 2). Therefore, utility firms implement cost accounting systems with enough flexibility to accommodate variations in requirements. Indeed:

"We have to constantly adapt our cost accounting systems to the requirements of regulatory accounting" (Firm 2).

"We modified our cost accounting systems by setting up changes in accounting attributes and inserting detailed items to comply with ARERA restrictions" (Firms 5, 10).

Others, instead, argue that ARERA requirements have brought changes at the organizational level, creating new routines and transferring knowledge in the organization. The general view is that, despite the administrative costs, the fact that ARERA systematically demands new regulatory information has created more efficient ways to collect and process regulatory data.

"It is a fact of internal education. If we did not have to deliver data every year to ARERA, we probably would not have worried about creating structures that know which data to collect and use" (Firm 20).

"The impact is from an organizational point of view; it is extra hours of work. However, much of the information we produce for ARERA is reused from other departments, so knowledge sharing and coordination is essential to complete tasks efficiently" (Firm 12).

Larger companies suggest that regulatory pressure can lead to the development of a loop learning process. An example reported by Firm 20 is given below.

“Service continuity is an important issue in electricity. If there are electric losses, we are penalized financially. Thus, ex-post ARERA requires lots of indicators (i.e., interruption duration during the outage event). Of course, we internally know how that indicator is going. But, the fact that ARERA monitors these events through a reward/penalty scheme internally encourages us to monitor continuously; it is a loop.”

Overall, survey findings and supplementary interviews show a different degree of influence of ARERA on utility firms depending on the size, spanning from a light-handed regulation to a more pressing one. This is associated with the fact that large-sized companies, as opposed to smaller ones, operate in natural monopolies and have more power to impose their will on customers. Thus, regulatory reporting requirements are more intensified than those for the smaller companies.

Furthermore, as observed from Fig. 1, the majority of respondents are positioned in the middle: these are firms that are incrementally influenced by ARERA requirements since they were already familiar with part of the requests, though the granularity of disclosure imposed by ARERA is richer than those used previously. Note that firms that neither use internal regulatory information nor are affected by ARERA requirements (left lower quadrant) are small-sized and light-handed regulated. In contrast, firms that start employing regulatory information for internal purposes after being radically influenced by ARERA requirements (right upper quadrant) are large-sized and high-regulated.

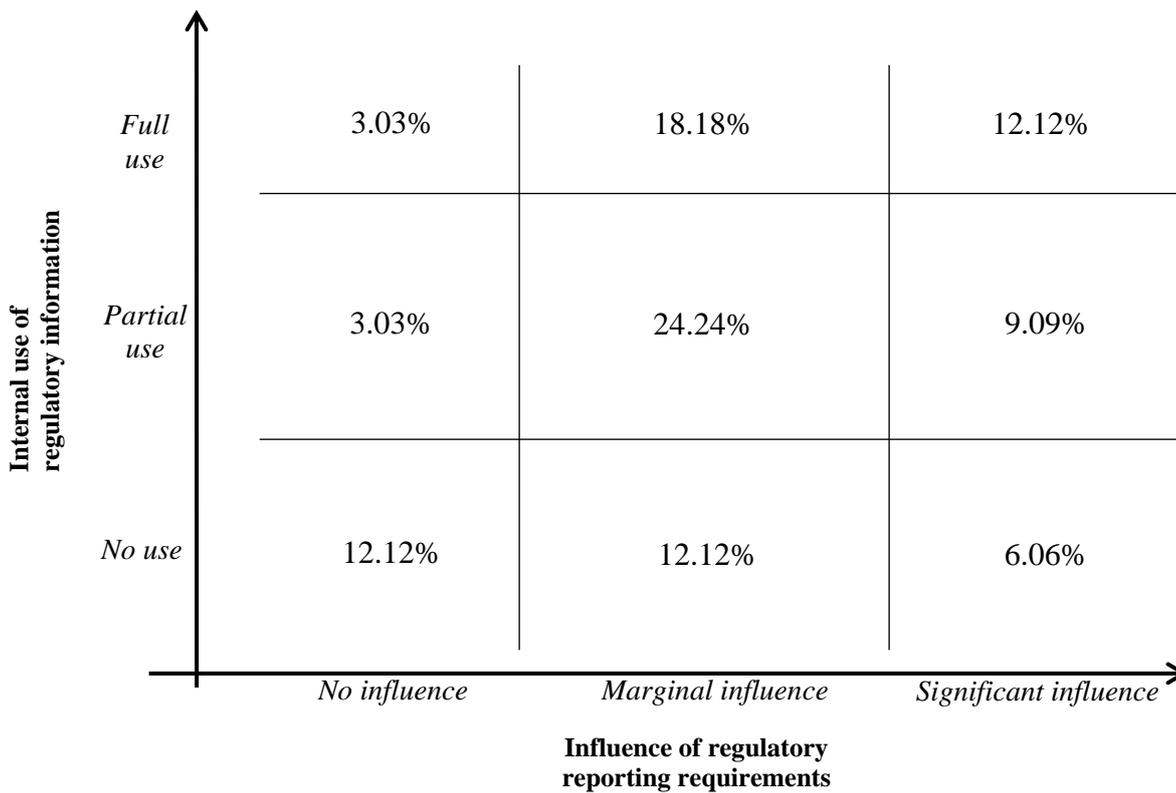


Fig. 1 Use and influence of regulatory requirements

7. Conclusions

This paper has explored the interplay between external and internal reporting in the context of Italian electric and gas utilities. First, it has examined whether management accountants employ regulatory information requirements for internal management purposes. Second, through an institutional lens, this paper has investigated how the regulatory pressure imposed by the Italian energy regulatory authority (ARERA) has influenced utilities' management accounting systems.

Findings based on an online survey and supplementary interviews show that external regulatory requirements are, for the most part, used for internal decision-making and control. Additionally, this exploratory study reveals that regulatory pressure has influenced management accounting systems in a radical or incremental way. Overall, the results show divergence between firms according to the size and the intensity of regulatory pressure.

Concerning the *use* of regulatory information requirements, findings reveal that management accountants use external reporting information for control purposes in order to prevent punishments (financial losses). Management also employs regulatory information that

supports effective cost-based strategies and investment evaluation policies. Only a few use regulatory requirements for pricing decisions; note that they are energy traders. In addition, supplementary interviews indicate that respondents use regulatory requirements for benchmarking purposes in order to readdress internal decisions where necessary, trying to fall in line or beat ARERA's expectations.

Concerning the *influence* of ARERA requirements on management accounting systems, respondents report that cost accounting systems have been impacted in a radical or incremental way due to the pressure for a more detailed segmentation of costs and revenues. Others state that ARERA requirements have influenced the organizational structure, creating new routines and efficient ways to collect and process regulatory data. Thus, sharing and synchronizing knowledge among employees/ departments is becoming more and more important in order to complete tasks efficiently. Consistent with this, larger companies argue that regulatory pressure can lead to the development of a loop learning process.

The results also show differences in the use and influence of regulatory requirements depending on the utility companies' size and the extent of regulatory pressure. The use and influence of regulatory requirements is more intensive in large-sized and high-regulated companies rather than in the smaller and low-regulated ones. According to the size and the regulatory pressure, different behaviours are observed, ranging from a tendency to take a passive tick-box approach compliance reporting to a more proactive and thoughtful approach. Similarly, the degree of influence of ARERA on utilities varies from a light-handed regulation to a more pressing one.

The paper contributes to the literature in two ways. First, it extends prior accounting literature, by exploring the interplay between external and internal reporting in the context of public utilities. To the best of my knowledge, this article is the first to explore the interplay between external regulatory requirements and internal management accounting in the context of Italian electric and gas utilities. Second, this study contributes to the contemporary studies on management accounting change by showing that utilities' management accounting systems are influenced in response to external pressure imposed by ARERA requirements.

This study differs from previous studies that have sought to explain management accounting change in public utilities. A primary difference is that, unlike other studies which use a single company case study, this study surveys 33 Italian electric and gas utilities and conducts supplementary interviews. Secondly, most of the previous studies explain management accounting changes as a response to the privatization processes (Ogden, 1995,

1997; Vamosi, 2000; Uddin & Hopper, 2001; Tsamenyi et al., 2006), whereas this study focuses on the influence of regulatory authorities.

Due to its exploratory nature, this investigation could be of interest to regulators, particularly to ARERA in increasing its understanding of the degree to which regulatory requirements may influence utility behaviours in terms of decision-making and control. Moreover, the regulator should be interested in the role played by the regulatory requirements in fostering appropriate use of information. There are also some opportunities for future research. Future researchers can provide additional evidence on the interplay between the regulatory authorities and the utility firms, investigating whether utilities influence regulatory requirements in this two-way relationship. Additionally, future comparative case studies could be undertaken in the context of public utilities, as well as longitudinal analysis.

The main limitation of the current study lies in the selected research methodology. As with all survey-based studies, the nature of the research method adopted does not permit to test of the positive relationship among the variables of interest (size, intensity of regulation, use, and influence of regulatory information requirements). A second limitation of the study is the generalizability of findings, given that this study focuses on a single country setting and is based on a small number of survey responses and interviews. A small sample size reduces the generalizability of findings and the power of statistical tests. Nonetheless, the confounding factors deriving from large samples and cross-sectional studies are implicitly controlled, and the internal validity of the study increases (Ittner et al., 2003). Moreover, interviews were carried out in addition to the survey to go in-depth on the research topic and complement the survey findings. The interviews were conducted with four of the survey respondents that represent the main categories examined: a large-sized firm, a medium-sized firm, a high regulated firm, and a low-regulated firm. Future research could refine the findings to different contexts.

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Appendixes

Appendix A. Survey questionnaire

Part 1

General Information

Name of the company (voluntarily):

.....

Operating activity:

Answer: Production/distribution/transport/trade; electricity/gas/other

Respondent's role:

.....

Part 2

Management Control

1. How many people work in your company's Management Control?

.....

2. What are the main objectives of Management Control in your company? (Please tick maximum three boxes)

Answer 1: Facilitate the correct calculation of costs within activities/departments; 2: Control cost efficiency; 3: Support strategic and policy choices; 4: Carry out cost-benefit calculations to guide operational choices; 5: Evaluate ex-ante the profitability of investments; 6: Guide tariff decisions; 7: Other (please specify)

3. How has your company's management control system evolved over the last ten years?

.....

4. The following Department covers the documentation produced for ARERA:

Answer 1: Financial Reporting; 2: Planning and Control; 3: Finance; 4: Regulatory Affairs; 5: Other (please specify)

5. How many human resources are involved in producing documentation for ARERA?

.....

6. How much time does it take to produce documentation for ARERA?

.....

Part 3

ARERA information requirements

7. Does management use ARERA information requirements for internal purposes?

Answer 1: Yes; 2: Yes, to some extent; 3: No; 4: Other (please specify)

8. How does management employ the ARERA information requirements internally?

Answer 1: To evaluate productivity-enhancing investments; 2: To make pricing decisions strategically; 3: To improve cost-effectiveness; 4: To prevent penalties; 5: Other (please specify)

9. Which of the information prepared for ARERA is considered most relevant by management?

Answer 1: Accounting Unbundling; 2: Operating costs; 3: Investments; 4: Price data; 5: None of the above; 6: Other (please specify)

10. Please tell the main reasons why management reposes it as the most relevant.

.....

11. To what extent have ARERA information requirements influenced your company's management control system?

Answer 1: Significant influence; 2: Marginal influence; 3: No influence; 4: Other (please specify)

12. What have been the most significant changes to the management control system in the last five years due to requests for information by ARERA?

.....

13. What is your opinion about the influence of ARERA information requirements on internal accounting systems?

Answer 1: Positive opinion; 2: Negative opinion; 3: Neutral; 4: Other (please specify)

14. If you are interested in discussing the questionnaire topics in more detail through a short interview, please enter your e-mail address.

.....

Appendix B Overview of respondents on the preparation of ARERA information requirements

Department responsible of ARERA requirements	Total		Large-sized		Middle-sized		Not available		High regulated		Low regulated	
	No	%	No	%	No	%	No	%	No	%	No	%
Financial Reporting	3	9.09	1	3.03	2	6.06	0	0.00	1	3.03	2	6.06
Planning and Control	10	30.30	5	15.15	5	15.15	0	0.00	4	12.12	6	18.18
Finance	1	3.03	0	0.00	1	3.03	0	0.00	0	0.00	1	3.03
Regulatory Affairs	13	39.39	7	21.21	4	12.12	2	6.06	8	24.24	5	15.15
Other options added by firms:	6	18.18	6	18.18	0	0.00	0	0.00	0	0.00	6	18.18
<i>Both Planning and Control and Regulatory affairs</i>	2	6.06	2	6.06	0	0.00	0	0.00	0	0.00	2	6.06
<i>Department Algo Efficiency</i>	1	3.03	1	3.03	0	0.00	0	0.00	0	0.00	1	3.03
<i>All departments working together</i>	3	9.09	3	9.09	0	0.00	0	0.00	0	0.00	3	9.09
Total	33	100.00	19	57.57	12	36.36	2	6.06	13	39.39	20	60.61
No. Employees engaged in ARERA requirements activity												
Less than 5	18	54.54	7	21.21	11	33.33	0	0.00	3	9.09	15	45.45
From 5 to 10	5	15.15	5	15.15	0	0.00	0	0.00	3	9.09	2	6.06
More than 10	3	9.09	2	6.06	1	3.03	0	0.00	2	6.06	1	3.03
Other options added by firms:	7	21.21	5	15.15	0	0.00	2	6.06	5	15.15	2	6.06
<i>Done by machine</i>	1	3.03	1	3.03	0	0.00	0	0.00	0	0.00	1	3.03
<i>The whole organisation during part of the year</i>	1	3.03	1	3.03	0	0.00	0	0.00	1	3.03	0	0.00
<i>Varying numbers of employees⁴</i>	1	3.03	1	3.03	0	0.00	0	0.00	1	3.03	0	0.00
<i>Not applicable, difficult to quantify</i>	4	12.12	2	6.06	0	0.00	2	6.06	3	9.09	1	3.03
Total	33	100.00	19	57.57	12	36.36	2	6.06	13	39.39	20	60.61
Time dedicated for preparation of ARERA requirements												
Less than one month	12	36.36	1	3.03	11	33.33	0	0.00	1	3.03	11	33.33
1 month	3	9.09	3	9.09	0	0.00	0	0.00	0	0.00	3	9.09
More than one month	6	18.18	6	18.18	0	0.00	0	0.00	4	12.12	2	6.06
Other options added by firms:	12	36.36	9	27.27	1	3.03	2	6.06	8	24.24	4	12.12
<i>Variable work hours</i>	5	15.15	5	15.15	0	0.00	0	0.00	4	12.12	1	3.03
<i>Not applicable, difficult to quantify</i>	7	21.21	4	12.12	1	3.03	2	6.06	4	12.12	3	9.09
Total	33	100.00	19	57.57	12	36.36	2	6.06	13	39.39	20	60.61

Respondents are classified according to the size and regulatory pressure, as follows. 'Large-sized' includes companies with more than fifty million euros of annual sales revenue. 'Middle-sized' includes firms having ten to fifty million of annual sales revenue. 'Not available' includes companies that have not mentioned their company name in the survey, thus it was not possible to get the size from the AIDA database. 'High-regulated' includes companies that operate in regulated environment, thus are subject to a higher regulatory pressure by ARERA, namely rate-regulated firms. 'Low-regulated' includes companies that operate in a free market, thus are subject to a lower regulatory pressure by ARERA, namely energy providers and traders.

⁴ Depending on the circumstances, usually varying from elementary requirements involving few people to more complex requirements where many employees are engaged.

Appendix C Use of ARERA information requirements for internal management purposes

	Total		Large-sized		Middle-sized		Not available		High regulated		Low regulated	
	No	%	No	%	No	%	No	%	No	%	No	%
Management use regulatory information for internal purposes												
Yes	11	33.33	8	24.24	1	3.03	2	6.06	7	21.21	4	12.12
Yes, to some extent	12	36.36	6	18.18	6	18.18	0	0.00	5	15.15	7	21.21
No	10	30.30	5	15.15	5	15.15	0	0.00	1	3.03	9	27.27
Total	33	100.00	19	57.57	12	36.36	2	6.06	13	39.39	20	60.61
<i>Regulatory information are used:</i>												
To improve cost-effectiveness	11	26.83	7	17.07	3	7.32	1	2.44	7	17.07	4	9.76
To evaluate productivity-enhancing investments	9	21.95	5	12.20	2	4.88	2	4.88	7	17.07	2	4.88
To prevent penalties	14	34.15	8	19.51	6	14.63	0	0.00	7	17.07	7	17.07
To make pricing decisions strategically	2	4.88	1	2.44	1	2.44	0	0.00	0	0.00	2	4.88
Other options added by firms	5	12.20	5	12.20	0	0.00	0	0.00	4	9.76	1	2.44
Total	41	100.00	26	63.41	12	29.27	3	7.32	25	60.98	16	39.02
<i>Participants were allowed to choose more than one response.</i>												
<i>Type of information requirements reputed as most relevant</i>												
Operating costs	9	16.36	6	10.91	3	5.45	0	0.00	6	10.91	3	5.45
Accounting Unbundling	11	20.00	7	12.73	2	3.64	2	3.64	7	12.73	4	7.27
Investments	10	18.18	7	12.73	2	3.64	1	1.82	8	14.55	2	3.64
Price data	12	21.82	5	9.09	6	10.91	1	1.82	6	10.91	6	10.91
None of the above	11	20.00	6	10.91	5	9.09	0	0.00	2	3.64	9	16.36
Other options added by firms	2	3.64	2	3.64	0	0.00	0	0.00	0	0.00	2	3.64
Total	55	100.00	33	60.00	18	32.73	4	7.27	29	52.73	26	47.27
<i>Participants were allowed to choose more than one response.</i>												

Respondents are classified according to the size and regulatory pressure, as follows. 'Large-sized' includes companies with more than fifty million euros of annual sales revenue. 'Middle-sized' includes firms having ten to fifty million of annual sales revenue. 'Not available' includes companies that have not mentioned their company name in the survey, thus it was not possible to get the size from the AIDA database. 'High-regulated' includes companies that operate in regulated environment, thus are subject to a higher regulatory pressure by ARERA, namely rate-regulated firms. 'Low-regulated' includes companies that operate in a free market, thus are subject to a lower regulatory pressure by ARERA, namely energy providers and traders.

Appendix D Influence of ARERA information requirements on management accounting

	Total		Large-sized		Middle-sized		Not available		High regulated		Low regulated	
	<i>No</i>	%	<i>No</i>	%	<i>No</i>	%	<i>No</i>	%	<i>No</i>	%	<i>No</i>	%
No. Employees engaged in Planning and Control												
Less than 10	21	63.64	10	30.30	9	27.27	2	6.06	6	18.18	15	45.45
From 10 to 50	7	21.21	5	15.15	2	6.06	0	0.00	4	12.12	3	9.09
More than 50	5	15.15	4	12.12	1	3.03	0	0.00	3	9.09	2	6.06
Total	33	100.00	19	57.57	12	36.36	2	6.06	13	39.39	20	60.61
Influence of ARERA on management accounting systems												
Significant influence	9	27.27	7	21.21	1	3.03	1	3.03	6	18.18	3	9.09
Marginal influence	18	54.55	10	30.30	7	21.21	1	3.03	5	15.15	13	39.39
No influence	6	18.18	2	6.06	4	12.12	0	0.00	2	6.06	4	12.12
Total	33	100.00	19	57.57	12	36.36	2	6.06	13	39.39	20	60.61
Opinion about ARERA's influence												
Positive opinion	13	39.39	8	24.24	4	12.12	1	3.03	8	24.24	5	15.15
Negative opinion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Neutral opinion	20	60.61	11	33.33	8	24.24	1	3.03	5	15.15	15	45.45
Total	33	100.00	19	57.57	12	36.36	2	6.06	13	39.39	20	60.61

Respondents are classified according to the size and regulatory pressure, as follows. 'Large-sized' includes companies with more than fifty million euros of annual sales revenue. 'Middle-sized' includes firms having ten to fifty million of annual sales revenue. 'Not available' includes companies that have not mentioned their company name in the survey, thus it was not possible to get the size from the AIDA database. 'High-regulated' includes companies that operate in regulated environment, thus are subject to a higher regulatory pressure by ARERA, namely rate-regulated firms. 'Low-regulated' includes companies that operate in a free market, thus are subject to a lower regulatory pressure by ARERA, namely energy providers and traders.