UNIVERSITÀ DEGLI STUDI DI TRIESTE

XXXVII CICLO DEL DOTTORATO DI RICERCA IN CIRCULAR ECONOMY

The digitalization era in the post-COVID-19 world: essays on challenges and disruptions for management accountants and budgetary controls

Settore scientifico-disciplinare: **ECON-06/A**

DOTTORANDO / A

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ANNO ACCADEMICO 2023/2024

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Introduction

Conventional economic and accounting systems have been exposed by the limitations of market-driven mechanisms, where public services, education and health care have been subordinated to profit, exacerbating the inequalities between people and countries. Italy was one of the earliest countries to be affected by the COVID-19 pandemic and also one of the hardest hit. The successes and failures of the Italian response provide a blueprint for the factors determining the ability of institutions to meet these challenges (Costa et al, 2024). In the same times, the advanced technology that processes accounting information to speed up work has seen tremendous improvement over history. Undoubtedly, technology has come to solve a greater percentage of challenges humans face both at the workplace and in other parts of life. Accountants have also received a fair share of the essence of technology in their day-to-day work activities.

In this dynamic scenario, this research project is grounded. It is also structured considering that the context of an executive PhD, since it is financed by the private company, Ligabue Group, based in Venice. Thus, also the purposes of this study are double: on one hand, to contribute to the existing literature by providing new studies and evidence, and on the other to contribute through a practitioner perspective to directly respond to a wider understanding of phenomena that are characterizing the company's environment.

In particular, the research carried out during the PhD aims to focus on the changes in management accounting in current times, with a special focus on the disruptions faced by organizations and their impact on management accounting practices. In the first step, the research aims to scout and highlight the relevant issues in the selected field of study. Indeed, two main themes of disruption are identified: digitalization and crises. More specifically, these main phenomena considered for the analysis are environmental changes, crises related to health issues (firstly, the Covid-19 pandemic), war-related issues, digitalization and new technologies.

Both the papers included in this research adopt a similar methodology, both of them are classified as case studies, and the research context is the same (the company Ligabue Group). In both cases, after a preliminary exploration of the sector and the company context, internal documentation (e.g. budget, internal presentations) was collected. Subsequently, different levels of management (middle and top management), and the finance department employees were interviewed through semi-structured interviews. Once all the interviews were completed and transcribed, researchers analysed textual patterns.

The findings provide an empirical contribution to the role of management accounting practices and tools and the impact on the accountability of the organisational work undertaken adopted at organizational level to identify and manage digitalization and crisis risk.

The thesis is structured as follows. After this brief introduction, both papers are presented. As first, the paper "*A Case Study on the Impact of Real Time Digitalization in Management Accounting: Interplay between Different*" is reported. It reports how digitalization impacts management accounting practices and the process of accountability across an organization. In this research the beneficial effects of real time digitalization for internal management accounting practices and the internal process of accountability were unanimously acknowledged by all organizational levels. Its main contribution is in terms of unaccounted effects, which are tangible but not formally reported in any document. Furthermore, the unaccounted effects of digitalization were perceived differently by the top-level management and by the controllers we interviewed.

Secondly, the paper "*The post-COVID-19 world: Unprecedented challenges and disruptions for management accountants and budgetary controls*", whose main contribution is related to the fact that not all new management accounting practices and tools (initiated in response to the COVID-19 pandemic) were implemented during each subsequent crisis. Some of these practices do not seem common to all these subsequent crises and are specifically driven by those that are more recurring in the business over recent years.

Each paper is reported with its specific references and appendix at the end.

Currently, both papers are submitted or under revision with two different A-ranked journals for the field of study.

A Case Study on the Impact of Real Time Digitalization in Management Accounting: Interplay between Different Levels of Personnel.

Abstract

Purpose: This exploratory research study seeks to investigate how the impact of digitalization is monitored and perceived among different levels of organizational management. We aim to provide deep insights into real time digitalization and its impacts within an organisation at different levels.

Design/Methodology/Approach: The researchers adopt the theoretical lens of Rom and Rohde's (2007) framework and select as the research context the Ligabue Group, an Italian company, which is a historical player in the food services sector for the maritime and energy industry markets. The study involved twenty-one (21) semi-structured interviews with managers and executives from the one company.

Findings: Both expected and unaccounted for consequences of digitalization emerged from our investigation. The beneficial effects of real time digitalization for internal management accounting practices and the internal process of accountability were unanimously acknowledged by all organizational levels. However, the unaccounted effects of digitalization were perceived differently by the top-level management and by the controllers we interviewed.

Originality/value: The contribution of the study is twofold. We report how digitalization impacts management accounting practices and the process of accountability across an organization. We further provide insights on the interplay between different organizational levels when dealing with the various consequences of real time digitalization.

Keywords: Digitalization, Management accounting, Case study, Accountability.

Classification: Research paper.

Introduction

The invention of advanced computers and technology that process accounting information to speed up work has seen tremendous improvement over history. Undoubtedly, technology has come to solve a greater percentage of challenges humans face both at the workplace and in other parts of life. Accountants have also received a fair share of the essence of technology in their day-to-day work activities. In this respect, the distance between the manager and his/her accounting staff within an organization is becoming larger and larger (Knudsen, 2020). With multiple layers and sources of accounting information, overlaid applications, and conflicted financial reports, this has all led to a need for greater understanding and more verification of accounting processes. A key disruptor of modern technological systems is the multiple information components and how they are processed, understood, and then communicated throughout different levels within an organization. Digitalization is making perhaps the most pervasive impact globally on business activities and organisational life ever witnessed (Knudsen, 2020). "Digitalization lies somewhere between digitization and digital transformation. It involves more than a mere technical process (e.g., digitization), but it does not necessarily entail a reconfiguration of strategy or profound changes in the conduct of business (e.g., digital transformation)" (Knudsen, 2020, p. 2). However, digitalization is associated with important changes related to socio-technical structures (Knudsen, 2020). Following this path, more academic research on the nature and effects of various digital technologies has begun to emerge. Many studies have described the latest developments, identified emerging issues, and outlined a research agenda (e.g., Flyverbom, 2022; Garanina, et al., 2022; Kellogg et al., 2020; Raisch and Krakowski, 2020). Some have discussed the changes and opportunities digital technologies create for management accounting and control mechanisms at different organizational levels (e.g., Bhimani and Willcocks, 2014; Buhmann et al., 2019; Tyma, et al., 2022), as well as provided a more critical note on potential problems such developments it may cause (Bhimani, 2021; Martin et al., 2016; Zuboff, 2015). Indeed, viable real time technologies may foster, restrict, or otherwise transform the capabilities of accounting professionals; however, they do not always diffuse across society (Austin, et al., 2021). More research is needed to investigate the impact of digitalization to explore how in real time it is measured and monitored within organizations and how the process of accountability is evolving amongst different levels of personnel. There is now a literature on accounting and digitalization that focuses on ERP systems which deals with similar issues and the more recent literature on digitalization that focuses on specific technologies such as artificial intelligence, internet-of-things and cloud computing. Newman & Westrup (2005) and the technology power loop, Quattrone & Hopper (2005) and their discussion about real-time information flows to different actors are starting points as motivation for our present study that considers interactions between different levels of personnel. Our focus is about the (changing) relationships between the controllers and the company's management, which in our case study is related to the interaction between digital technologies and humans. Firstly, we learn more about the benefits and barriers to digitalization, and then discover more about internal accountability processes within the company, before conveying the findings about the main focus, which is the (changing) relationships between the controllers and the company's management, which is moderated by digital technologies.

Our exploratory study investigates the internal accountability processes at the Ligabue Group, an Italian company in the food services sector and specialised in services for the maritime and energy industry markets, with subsidiaries operating in Europe, Africa, and Asia. About seven years ago, the Ligabue Group started its digitalization process. Through 21 semi-structured interviews and participant observations, we investigate: (i) the barriers to real time digitalization and how they are perceived within the Ligabue Group at different levels, (ii) what decisional aspects for accountants are affected by new digital technologies at Ligabue Group and (iii) how control and performance evaluation mechanisms have changed due to digitalization. The company introduced various digital systems (i.e., SAP and BI systems) and these systems are at the core of digitalization at the Ligabue Group.

We conducted semi-structured interviews with top management, including the Chairman & CEO, the Group General Manager, and the directors; to personnel that oversaw the digitalization, such as the Enterprise Resource Planning (ERP) Manager and the Business Intelligence (BI) Manager; and with all the controllers involved in the management accounting side of the business. Thus, we are covering several organizational levels which aligns with the study's focus. Most participants have over 15 years of relevant experience, and most of them are based in Italy. By examining the consequences of digitalization within the Ligabue Group, our findings illustrate both accounted and unaccounted effects deriving from the digitalization process. More specifically, the initial barriers to the implementation of the digitalization process, and the benefits of the internal process of accountability, deriving from digitalization, were almost unanimously recognized at all organizational levels. Yet, the unaccounted effects of digitalization were perceived differently between top level management and the controllers[i]. The rationale behind this apparent misalignment between top level management and the controllers seems related to the strategic role covered at the organizational level by the first group and the operative, division-focused, of the latter. Also, this has occurred due to the communication and interaction styles observed within the case study.

Management accounting is divided into techniques, tasks, organisation and behaviour as well as use and perceptions (Knudsen, 2020). The relationship between digitalization and management accounting is bidirectional (Rom and Rohde, 2007; Knudsen, 2020). Several variables mediate or moderate the relationship between digitalization and management accounting. In this framework performance is considered an explanatory variable rather than an outcome variable. Under Rom and Rohde's (2007) original framework and Knudsen's (2020) modified framework, the digitalization is a tool for capitalism to strengthen control over employees and resources. "When studying design and use of the digitalization in relation to management accounting, the case study method holds potential for helping inform future research" (Rom and Rohde, 2007, p. 63). Using this method, the many aspects of design and use reveal themselves, and thus this leads to our main motivation for pursuing the case study of the Ligabue Group. Using a case study approach is our main contribution when applying the modified framework of Rom and Rohde (2007) that Knudsen (2020) proposed. We aim through the case study methodology to understand how real time digitalization has profound social and technical implications for accounting and management accountants. We report that digitalization can create elusive boundaries of accounting, and can change power relations within an organization like Ligabue Group. Taking this framework as the lens for the case study, we focus only on the explanatory variables (i.e., barriers, interactions and performance), and report our findings.

To investigate our research aims, the present study explores the following two research questions:

> *RQ1: Are barriers for management accounting processes created through digitalization within an organization and how does that then impact the interactions between the various levels of personnel (the management and the accountants)?*

RQ2: How are the accounted for and unaccounted for effects of digitalization perceived by both the management and the accountants?

Related to management accounting processes at Ligabue Group, we specifically consider: (i) carry out performance management and control; (ii) the design of balanced scorecard; and (iii) conducting cost analyses, forecasting and budgeting activities. In the next section, we provide a review of prior research on digitalization and technology's impact on organizations and accounting. In section 3 we then explain the methodology and sample statistics, followed by the findings in section 4. Finally, in section 5 we provide the conclusions and the study's limitations.

Relevant Literature

The emerging overall importance of Enterprise Resource Planning (ERP) systems, automation and advanced analytics to the accounting profession cannot be ignored (Appelbaum et al., 2017). Digital technologies can disrupt organizations of every type, size, and level, leaving decision-makers with a considerable challenge: finding the right digital technology to boost system efficiencies (Hinings et al., 2018). "Digitalization", in several cases marked as the third wave of technological advancements (Knudsen, 2020), that is currently creating an upheaval in organizational reality (Horlach et al., 2016; Porter and Heppelmann, 2014), especially in the accounting and finance functions (Bhimani and Willcocks, 2014).

During the past years, accounting researchers have produced studies oriented to deepening implications connected to digital technologies on organizations. These implications should be contextualized in a society where the need for control is strong. As it has been well documented by numerous scholars (Miller and Rose, 2008; Munro and Mouritsen, 1996, Netland and Woolgar, 2002; Pentland, 2000; Power, 1994, 1996, 1997; Strathern, 200) the recent decades have witnessed an explosion in demands for transparency and accountability and the emergence of what Power (1997) calls the "audit society" (Scott and Orlikowski, 2012).

These implications primarily pose on the quantity of managed data. As Bhimani (2020) explains, digitalisation within firms has created very large quantities of data which are continuing to grow at an accelerating pace whilst also becoming more diverse in form making big data forever bigger, wider and more rapidly growing. A blend of business transformations and personal interactions in the digital space leads to the production of an increased amount of data and information to be handled by decision-makers (Busco and Quattrone, 2015; Quattrone, 2016; Kornberger et al., 2017). Therefore, as stated by Quattrone (2016), the digital revolution poses to management accounting a paradox: it increases the belief in the possibility of giving better visibility to organizational actions. This is connected to a dream of full control where distance is cancelled, where databases and statistical models know individuals better than individuals themselves and can predict their wishes for future actions. Big data and novel modes of analysis associated with the rise of digital technologies present organisational participants opportunities to utilise both structured and unstructured information for control purposes (Bhimani, 2020). For instance, as Scott et al. (2012) conveyed, evaluative measures and performance indicators can make organizations more accountable to their constituencies by rendering information about operations available and accessible. On the other hand, it augments uncertainty since spurious correlations and the need to select from among the ocean of data and options by which one will be flooded will augment, not diminish (Quattrone, 2016). Thus, one of the challenges for management accountants concerns the fact that big data is not self-explanatory (Arkhipova et al., 2024). Indeed, the diffusion to ERP systems and, in general, access to a larger amount of data reconfigurable will also incidentally allow multiple loci of controls and, therefore, the diffusion of power (Quattrone and Hopper, 2005).The data relevant for management accountants is often unstructured, since it is coming from multiple sources, which generate a continuous stream of real-time data in various formats (Arkhipova et al., 2024). Thus, regarding performance measurement and control, new types of data and information have resulted, among others, in the emergence of new key performance indicators (Knudsen, 2020).

Even though an extensive stream of relevant literature examines technology’s impact on management accounting (e.g., Rom and Rohde, 2007) and their opportunities, extant research focuses on outdated technologies or is too narrow from an accounting perspective (Knudsen, 2020). Dougherty´s classical 1992 article “Interpretive barriers to successful product innovation in large firms” talks about the importance of acknowledging different thought worlds. Critics argue that more research on technology’s impact on accounting is needed, as technology is a dynamic organism (Prasad and Green, 2015). This present study is oriented to respond to this demand, addressing this extant research for this journal. Indeed, harnessing the power of connected technologies and capturing their potential benefits comes at a price, which tends to remain largely unaccounted for. Therefore, the role of management accountants can be challenged by digitalization that requires new accountability tools (Arnaboldi et al., 2017; Bhimani and Willcocks, 2014; Brivot et al., 2017; Scott and Orlikowski, 2012).

Research Methods

To investigate the research questions above, the researchers conducted a total of 21 semi-structured interviews with directors, managers, and controllers working for the Ligabue Group. Appendix 1 provides the interview questions for the semi-structured interviews with the Ligabue Group. This company was selected because of their digitalization strategy undertaken within the last 6 years and because one of the researchers has connections within the Ligabue Group due to his employment status there, hence enabling a deeper understanding of the organizational environment and providing an additional source of evidence resulting from the daily, direct participant observation. Triangulated with the 21 semi-structured interviews, this technique permits access to organizational events that may be otherwise inaccessible to external researchers, and it integrates their viewpoint with the one of someone inside the case (Yin, 2018). The data set for the 21 semi-structured interviews comprises different groups of interviewees in charge of different divisions and functions at Ligabue Group and operating in different countries. Table 1 provides the list of the interviewees, listed by role within the company, and reports the length (time) of the interview.

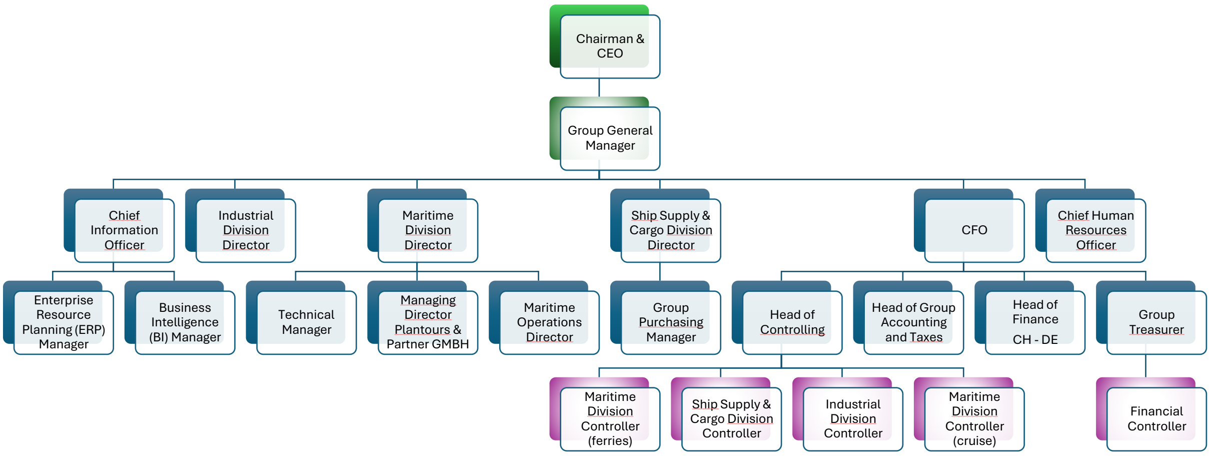
Table 1 – List of documentary sources

List of Sources	Notes on the source	Length
Interview	Chairman & CEO	16:29 min
Interview	Group General Manager	01 h. 01:45 min
Interview	Maritime Division Director	51:51 min
Interview	Industrial Division Director	29:06 min
Interview	Ship Supply & Cargo Division Director	32:20 min
Interview	Chief Information Officer	30:03 min
Interview	Chief Human Resources Officer	21:08 min
Interview	Enterprise Resource Planning (ERP) Manager	38:07 min
Interview	Business Intelligence (BI) Manager	52:06 min
Interview	Head of Group Accounting and Taxes	29:53 min
Interview	Head of Controlling	24:13 min
Interview	Head of Finance – Switzerland and Germany	52:57 min
Interview	Group Purchasing Manager	31:02 min

Interview	Technical Manager	17:28 min
Interview	Maritime Operations Director	41:28 min
Interview	Managing Director Plantours & Partner GMBH	22:44 min
Interview	Maritime Division Controller (ferries)	59:05 min
Interview	Ship Supply & Cargo Division Controller	42:04 min
Interview	Industrial Division Controller	40:49 min
Interview	Maritime Division Controller (cruise)	47:10 min
Interview	Financial Controller	49:26 min

The first group of interviewees comprises the Chief Officers and Directors that represent the first line of management. For this group, we interviewed: The Chairman and Chief Executive Officer (CEO); General Manager; the Chief Information Officer (CIO); the Industrial Division Director; the Ship Supply & Cargo Division Director; the Maritime Division Director; the Chief Human Resources Officer. The second group of interviewees comprises the Managers that represent the second line of management. For this second group, we interviewed: the Group Purchasing Manager; the Head of Group Accounting & Tax; the Head of Controlling; the Head of Finance for the subsidiaries in Switzerland and Germany; the ERP Manager; the BI Manager; the Managing Director of the subsidiary Plantours & Partners; the Maritime Division Technical Manager; the Maritime Division Operations Director. The third group of interviewees comprises the Controllers of the Ligabue Group, that are part of the Controlling Department and Finance Department. This group, which was used as a control group, comprises The Controlling BP Cruise; the Controlling BP Maritime; the Controlling BP Ship Supply & Cargo; the Controlling BP Industrial; the Financial Controller. Figure 1 provides the organizational chart of the Ligabue Group. Two newer employees were not interviewed due to their short experience within the company. They are the Group Treasurer and the CFO, and their position is highlighted in grey in the organizational chart below (Figure 2).

Figure 2 – Organizational chart.



The 21 semi-structured interviews were conducted online, in English, and were all audio recorded to ensure capturing the detail of the discourses. The length of the interviews was on average, between 40 to 45 minutes in duration. Few interviews were shorter in length due to time constraints in managers' availability; other ones were longer since the interviewees added detailed perspectives and connected very well some elements in their responses. The interviews were manually and separately coded by the researchers through a bottom-up approach to thematic analysis (Braun and Clarke, 2006). The aim was to identify the core themes emerging from the audio recordings that were relevant and helped answer these research questions. During the data collection and analysis, the themes that emerged from the separate coding were compared, reviewed, analyzed, and discussed among the researchers, searching for homogeneous patterns of meaning (Braun and Clarke, 2006). Hence the techniques of coding and memo-writing were employed simultaneously throughout the process of data collection in the fieldwork involving the Ligabue Group. Such an approach to coding enables the researchers to remain in tune or very connected with the participant's perception of their reality (Charmaz, 2000), and this process reduces the chance of missing important patterns or themes (Miles, 1979). The abductive approach was iterative and allowed codes to emerge directly from the dataset. The work involved listing themes emerging from the interviews and identifying patterns that relate to each of these themes. Adding evidence to confirm a pattern from the data or being open to evidence that contradicts a given pattern helped us to protect against providing fragile or unreliable evidence (Miles, 1979). Accordingly, given the triangulation of the 21 semi-structured interviews with the daily, direct participant observation by one of the researchers, the explicit meaning of the data, which emerged through the thematic analysis, was discussed, and interpreted considering the organizational context. In the findings section, the interviewees are referred to using their roles within the company while omitting their names.

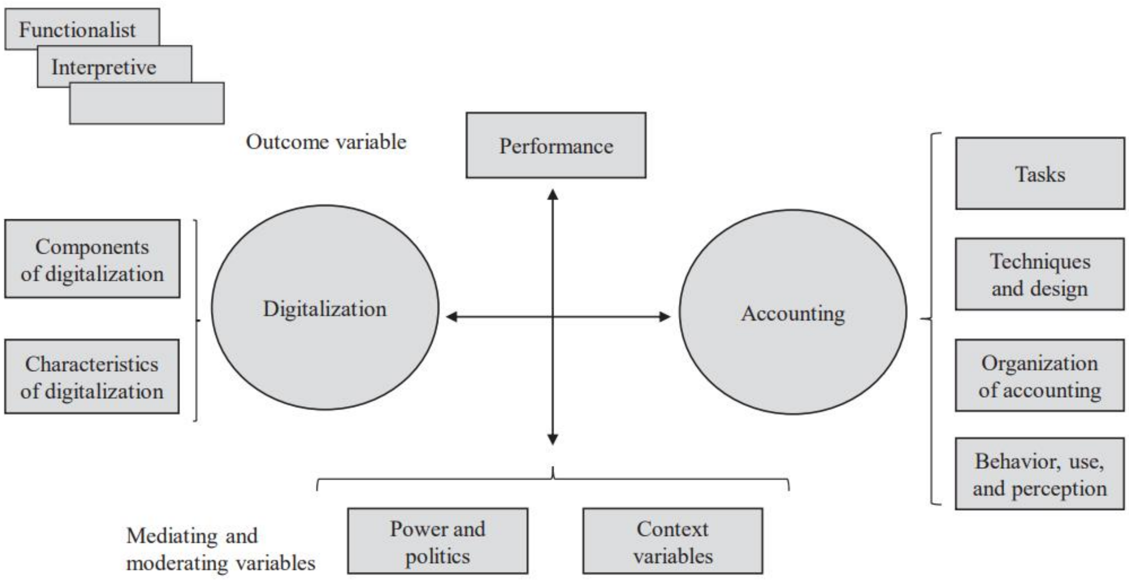
The company selected for the analysis is the Ligabue Group. Founded in 1919 by Anacleto Ligabue, the company initially offered onboard supervision to kitchen staff and ship supplies. Over the years, Mr. Ligabue expanded his business to different countries and sectors, moving from offering catering services for vessels, oil, and airline business, to expanding into the cruise market during the 1990s. This long experience makes the Ligabue Group a historical player in the Food Service sector, and it is specialized in services for the maritime and energy industry markets. Nowadays, the Ligabue Group provides procurement, catering, and facility management services (including various integrated solutions, such as housekeeping and maintenance), and operates primarily in the Maritime Sector for cruise ships, ferries, and cargo ships and in the Oil & Gas, Mining and Construction Sectors, on offshore platforms and at onshore fields in remote areas. While the Ligabue Group's headquarters is in Venice, Italy, it holds subsidiaries in several countries all over the world, in Europe, Asia, the Middle East, and Africa. About seven years ago, the Ligabue Group started its digitalization process, which started from the headquarters, located in Venice, and progressively was implemented in the subsidiaries. At the time of the data collection and analysis, the digitalization process is still taking place. Indeed, as stated in the company's strategic plan for 2021-2026, digital technology and the necessity of operating changes in the IT paradigm are set as priorities for the Ligabue Group. Thus, digitalization is still producing changes within the organization and its work routines. Given that the company is moving from a client-server architecture model to a hybrid cloud model, within which external data, internal data, applications, and tools co-exist, thus creating the so-called "data lake". In doing so, the Ligabue Group is carrying forward the implementation of new systems and tools that are faster and more capable of adapting to changes. In this context, the company is also finishing the development of new digital tools for its operations and a new ERP system, specifically SAP, that some subsidiaries are still not currently using.

Theoretical framework

As discussed so far, viable technologies may foster, restrict, or otherwise transform the capabilities of accounting professionals, however they do not always diffuse across the society (Austin, et al., 2021). As we stated, based on prior research, little is known about the impact of these interactions on technological diffusion, including the potential conflicts that arise between accountants, and their managers. In our study, the terms accountants and controllers are used inter-changeably.

As Knudsen (2020) argued, digitalization will not change the components of accounting (the components in the framework; see Figure 1) but rather its inner workings (the dynamics within the framework's general components). Firstly, there are two core elements in the framework, management acccounting and digitalization. Second, digitalization is decomposed into components and characteristics. The most relevant example of components is the ERP system (Knudsen, 2020). Next, Rom and Rohde (2007) divide management accounting into four subparts: tasks (Booth et al., 2000); techniques and design (Granlund and Malmi, 2002); organization of management accounting (Quattrone and Hopper, 2005); and behavior, use, and perceptions (Dechow and Mouritsen, 2005). Fourth, Rom and Rohde (2007) and Knudsen (2020) explain the relationship between management accounting and digitalization. They ascertain that the two elements stand in a bidirectional relationship: digitalization might affect or enable management accounting (Granlund and Malmi, 2002), while management accounting might have an influence on digitalization. Hence, there is a bidirectional arrow between the two core elements of the framework (Knudsen, 2020). Fifth, Rom and Rohde (2007) and Knudsen (2020) introduce both mediating and moderating variables in the relationship between management accounting and digitalization. Our focus on barriers, interactions and performance relate to what we consider mediating and moderation variables. In this regard, we point to context variables as well as power and politics as possible examples of 'interactions' (Knudsen 2020). Finally, they include performance as an outcome variable. In sum, this modified framework serves as a useful tool for examining the relationship between digitalization and management accounting, using a case study methodology.

Figure 1: Rom and Rohde's (2007) Framework



Original sources: Rom & Rohde (2007) and Knudsen (2020)

Findings

The 21 semi-structured interviews canvased a pattern of themes common to the three groups of interviewees within the same organization. Some of these themes were addressed from different perspectives when comparing the first two lines of management (groups 1 and 2) with the third group comprising of only the controllers. Table 2 illustrates the pattern of themes that emerged during the interviews.

Table 2 – List of themes

		List of themes											
GROUP	Role	Increase in digitalization	Technical barriers	Human barriers	Time savings	Quicker information	Quantity of information	Quality of information	Reliability of information	Increased complexity	Increased communication	Are these information accounted?	Are there unaccounted information?
FIRST	Chairman & CEO	X		X	X	X	X	X	X	X		NO	YES
FIRST	Group General Manager	X			X	X	X	X	X	X	X	YES, but not shared	YES
FIRST	Maritime Division Director	X	X		X	X	X	X		X		YES, but not shared	YES
FIRST	Industrial Division Director	X	X			X	X	X	X	X		NO	YES
FIRST	Ship Supply & Cargo Division Director	X			X	X						NO	YES
FIRST	Chief Information Officier	X	X	X	X	X	X	X	X	X	X	NO	YES
FIRST	Chief Human Resources Officer	X		X	X	X	X	X	X		X	YES, but not shared	YES
SECOND	ERP manager	X	X	X	X	X	X	X	X		X	NO	YES
SECOND	BI manager	X		X	X	X		X	X			NO	YES
SECOND	Head of Group Accounting & Taxes	X		X	X	X	X	X	X		X	NO, only more reports	YES
SECOND	Head of controlling	X	X	X	X	X	X	X	X			NO	YES
SECOND	Head of finance - Switzerland and Germany	X		X	X	X	X	X	X			NO, only for specific projects	YES
SECOND	Group purchasing manager	X	X	X	X	X	X	X	X			NO	YES
SECOND	Technical manager	X	X	X	X	X	X	X	X			NO	YES
SECOND	Maritime operations director	X	X									NO	YES
SECOND	Managing director Plantours & Partner GMBH	X	X	X	X	X	X	X	X			NO	YES
CONTROL	Maritime division controller (ferries)	X	X	X	X	X	X	X	X			NO, only longer reports	YES
CONTROL	Ship Supply & Cargo & Division controller	X			X	X	X	X	X			NO	YES
CONTROL	Industrial division controller	X			X	X	X	X	X			NO	YES
CONTROL	Maritime division controller (cruise)	X	X	X	X	X	X	X	X			NO	YES
CONTROL	Financial controller	X		X	X	X		X	X		X	NO	YES

As mentioned above, the Ligabue Group started the digitalization process about seven years ago in 2017. The main changes pertained to the implementation of the Enterprise Resource Planning (ERP) tools: Systems, Applications, and Products (SAP) and business intelligence (BI) systems. Initially, these systems were implemented in the headquarters, and during the years that followed, they were introduced into other subsidiaries. Interviewees specifically referred to budgeting, sales and industrial controlling activities and related digital implementations. In detail, among others, they particularly provided similar examples of the changed activities carried on in the deviation versus budget analyses, the daily and period sales monitoring, and the adoption of new KPI cockpits to monitor performance.

From the interviews emerged the awareness of the benefits attained, the result achieved through digital technologies and the demand for continuing in this direction through the process of digitalization within the organization. In this regard, interviewees described the benefits of digitalization as (i) reducing the length of time needed to prepare the reporting (saving time to work on other tasks such as budgeting and forecasting); (ii) providing an augmented ability to provide the data on time (or on-request); and (iii) assisting in collecting more data of a higher quality because it is now collected more homogeneously (over time and from different connected sources). This augmented quality and quantity of information related to higher reliability of the information itself (Scott et al. 2012).

> **Managing Director of the subsidiary Plantours & Partner GMBH:** *"Deeper and quicker both!" "Let's say if you also take historical data to see what the price was last year, what was the average price, as compared to this year. So, this is much easier to extract and […] to align more the historical figures with the new ones […]. You can use more data to analyse the past in a quicker time to create, for example, new prices, or whatever."*

Our interviews conveyed how the digitalization process was meticulously planned by the management. After considering the company's digitalization needs and after acknowledging the inefficiencies related to variety and the obsolescence of the different tools and programs place, standardized processes were developed through SAP adoption. Initially, the IT Department was working also with the support of external consultants, but progressively, with the increased need for expert technical support, more experienced personnel were hired to undertake and further develop the digitalization process. While the IT Department is continuously implementing ad hoc features to respond to the different divisional activities, they underlined the relevance of internal ad hoc training courses for their personnel when using digital tools.

> **ERP Manager:** *“Because we can have the most beautiful and positive tool, but if we don't use it in the correct way or only partially, in the end, we cannot have the big results or less than what it could be”.*

Hence, the training of SAP users and the continuous dialogue among IT experts and the other departments emerged as essential conditions to get the highest benefits from digitalization. In this regard, controllers evidenced the strict collaboration with the ERP Manager and with the BI Manager and the core role, of these IT experts, in listening and translating the departments' needs into effective digital tools. Controllers also stated the importance of training and correcting people regardless of time constraints. Many times, it reveals easier to correct mistakes without informing people of these ones or to further explain the purposes of specific instruments.

> **Financial controller:** *“For example, if some people from Egypt send me a file that is wrong for me, it's easy to change that number in one second and then put it right in my database. It's an easy way, but it's not the best way because a month later they will make the mistake another time and so the process will not change. [...] But it's not because they are not able to send me the right number, but because there is a problem to understand what I need. So, I think that everybody has to take more time to explain what it's wrong and what we need in order to make the right analysis and in order to use 100% of our technologies. So, in my opinion, the way we can change and prevent these human biases is by speaking with people and explaining our needs.”.*

Thus, investments in training consent to the company to reduce the risk that access to more data within enterprises “will make people take wrong decision much more quickly than before” (Quattrone, 2020). All three groups are unified in their perceptions related to training and collaboration.

1. Barriers to real time digitalization

While acknowledging the benefits deriving from digitalization, interviewees revealed also the barriers faced while implementing ERP, SAP and BI systems that risk undermining the benefits derived from digitalization or impeding the full benefits of their implementation. Barriers were not perceived homogeneously at the organizational level, being tackled in an ad hoc manner by each division of the Ligabue Group. The barriers encountered were of two main types: technical and human barriers. While both themes emerged during the interviews, the main barriers that emerged seemed to be of a technical nature, as conveyed by the following interview excerpts:

> **Chief Information Officer:** *"I would say that most of them [referring to the issues], at least since the beginning, was more technical than human because there was really a lack of technology in the company, and the architectural model was not built in the right way to get it."*

In this regard, a technical issue experienced at the time of the implementation of SAP by a division with subsidiaries located in Africa was related to the obsolescence of the computers and to the unstable internet connections available, thus slowing down, or impeding, SAP's performance.

> **Industrial Division Director:** *"[...] It has been very challenging in many aspects because we were not structured, not organized, and not having the procedures to implement a tool like SAP that is extremely structured. And, of course, the implementation of SAP is a headache for lots of our colleagues".*

Another technical barrier threatening the reduced benefits of the digitalization was related to the progressive implementation of SAP from the headquarters to the various branches, that at the time of the interviews, was a process that was still in progress. The progressive implementation of digitalization resulted in a temporary inhomogeneous cross-country implementation of SAP.

> **Managing Director of the subsidiary Plantours & Partner GMBH:** *"if you have more than one system, if you're connecting different systems, different technologies, different data, to put it together, you'll always face problems with, let's say, the real value or the real data. And it is logical".*

For instance, some interviewees, and the Controllers specifically, explained that given that the implementation of SAP was not homogeneous at the group level. The consequent discrepancies in the practices of data collection, provision, and the periodical preparation of the reporting among departments and countries were visible both to the management (who was receiving the data) and to the Controllers' team (who had to ensure the reliability and homogenization of the data). The impact of the organization's technological advancements thus appears to be more determined by technical barriers than the human actors themselves (the accountants). Thus, it is these technical barriers that contribute significantly to the interplay between the accountants and the management at the implementation stage. While management will face cost constraints implementing the system due to technological barriers, the accountant's expectations need to be managed; otherwise, strategic interactions will not occur, raising tensions over expectations that will then fail to promote progress.

With respect to the human barriers, interviewees conveyed concerns, mainly focused on how some employees were adopting the new digital system. These employees presented an initial resistance because they were preoccupied with how the digitalization process would change their own work routines. On the other hand, the adoption of a new digital system meant, for most employees, dealing with the need to develop new skills, new technical knowledge, and a new digital language.

> **ERP Manager:** *"Not all people want to change, sometimes they have their comfort zone, and they prefer to do everyday things they had the day before in the same way [...]".*

Yet, from the interviews, it emerged that these human-related issues had been tackled by the organization by supporting the personnel in dealing with the digitalization process through training courses and ad hoc technical support. The acquisition of the new digital knowledge for staff was achieved, initially with the support of external expertise and then later through inter-departmental collaboration. Still, with respect to the technical and human barriers, as emerges from above, controllers seemed focused on the current and putative outcomes deriving from the real time digitalization process. Hence, when they named human and technical factors, their attention was placed on how to make the system more effective in responding to specific needs. We identified consensus between the three groups of interviewees related to these tangible barriers they had identified.

2 Interactions between different levels of personnel

From the interviewees, it emerged that there is an augmented communication resulting from the real time digitalization process. The augmented communication regards both increased opportunities and needs for horizontal and vertical interactions (among different organizational functions and roles) within the firm (Martinez, 2011). The increased opportunities for internal interactions derive from the vanishing of "physical" barriers, enabling a different concept of teamwork. In this regard, the CIO shared that the adoption of digitally integrated information systems allows the members of the same company to have access simultaneously to the same set of information, enhancing collaboration during shared projects.

> **Chief Information Officer:** *"And this is a big revolution because it means that all the people that have rights or will be part of the whole group, they will have direct and automatic access and credential to bring up all the fees and information needed from the daily job. And this is the big advantage of digitalization."*

To communicate these advantages and to reduce the risk to face barriers in the digitalization, managers have a primary role in bringing people on board the project. In these terms, the Head of Finance for subsidiaries in Switzerland and Germany states the importance of sharing goals.

> **Head of Finance – CH-DE:** *"Point number one is: "share the goals with all the departments involved!". Don't keep the goal for yourselves, but share. Make people part of the project. […] If you do this, the commitment will be higher."*

In addition to the augmented intra-department communication, from the interviewees, it also emerged that an increased need for interaction among different organizational levels and functions (directors, managers, controllers, the IT department) was required. In this regard, the interviewees reported that after the implementation of ERP, SAP, and BI, the augmented quality and quantity of information at the disposition of the management also implied an augmented complexity in decision-making related to the risks of choosing the key relevant data among a much larger portfolio of choices. In this regard, it seems confirmed the implication that management accountants should support managers in interpreting the suggestions provided by the algorithm and make sure that such feedback is translated into company value (Arkhipova et al., 2024). As a result, the increased level of systemic complexity has been tackled by improving the dialogue among different organizational levels (from the top-down to the bottom-up and vice versa). The augmented dialogic communication was perceived as useful for discussing the scenarios through different technical capabilities.

> **ERP Manager:** *"[...] Let's think about the purchasing order approval process. Normally the purchasing need is created on a basic level, but the approval must be done on a high level. So, with the digitalization of this process, in the end, we have communication between the top manager and the operator. [...] I think about how the digitalization can also improve the communication that is maybe not a direct communication, but it is a communication between them."*

Through the purchasing order process, controllers can also get benefits for budgeting and forecasting processing, since they can get detailed information in advance and with a standardized format. It was clear from the interviews that the CIO was responsible for lessening any tensions by improving the dialogue among the different organizational levels but also by enhancing the collaboration benefits created through digitization by helping with managing the technological barriers we have discussed. With respect to the controllers' narratives, the augmented communication among the different organisational levels, resulting from digitalization, was considered from an operational perspective. In other words, controllers' attention was focused on the enhanced possibilities for timelier provision of more reliable reports to the managers in charge of making critical decisions.

3. Performance measures and recognition

When we asked if and how the benefits (timesaving for accomplishing a task; provision of faster and more reliable information; a larger amount of data collected and analysed) resulting from the implementation of the digitalization systems are acknowledged, recorded, and accounted for within the company and if they are measured, the answers are all almost unanimous. The benefits deriving from the new digital tools are visible and tangible daily at all organizational levels:

> **Chief Information Officer:** *"[...] take homogeneity, is something strictly connected to this digitalization, and thanks to these data, that are certified and available, you have a solid base on which you can build up automatic controls, you can put key indicators that immediately can highlight if there are some problems in the process, or to check the situation because you don't need any more to go for a search in data, but you will have immediately the indication about what is going on directly on the cockpit."*

> **Industrial Division Director:** *"[...] And you have a database, meaning that you are able to do some statistics to in a very easy way refer to previous years, same occurrence, same you can do some comparison very easily while before it was not impossible, but you will have to go and find all your Excel sheets that you did at that time trying to identify".*

> **Maritime Division Controller***: "I think with this implementation, we are able to have complete evidence of all the information about the business that before was not available."*

Yet these benefits are not formally recorded in any internal reporting, nor are they accounted for through a specific set of KPIs. In other words, the benefit of digitalization, such as the increased number of KPIs provided through the periodic budget, the faster provision of accounting information provided to the management team, and the time spared for the preparation of this documentation, are demonstrable if the management compares the evolution of the documentation itself, but there is no specific record for systematically keeping track of the increased benefits (e.g., costs saved) for the organization.

> **Chief Information Officer***: "[...] we can say the effectiveness, productivity and cost reduction." [...] "(but) It is not represented, I would say, as an official document."*

> **Ship Supply & Cargo Division Director:** *"So I cannot give you a KPI in terms of saving time."*

While different interviewees among the second and the controller group regarded the lack of internal systematic formal monitoring as a potential risk of missing a formal acknowledgement or a recognition of the achievements of employees or departments, the first group explained the reasons for the apparent unaccounted effects of the digitalization process.

In this regard, CIO observed that this lack of internal reporting is related to a lack of a systematic and automatic internal process of recording. Our interviewees suggest that management is reluctant to creatively interpret and report recognition of achievements because of digitization due to the costs of accounting for or formally acknowledging these achievements. All three groups of interviewees seem to recognize potential risks and, to a lesser extent, a lack of formal acknowledgement. However, this latter issue is not formally represented by the responses of the first group, which includes company directors. Instead, another reason for leaving formally unaccounted for the effects of the digitalization process lies in the richness and data sensitivity of the continuously evolving information that should be otherwise disclosed. In other words, as underlined by the Group General Manager, the unaccounted effects of digitalization do not solely reside inside the company boundaries but also exist to enhance accountability with the external stakeholders.

> **Group General Manager:** *"we are quite confident that things are under control, and we are quite confident that what we have planned to transform the company from 1.0 to 4.0 is with the minimal consequences in terms of social impact and with the maximum consequences possible in terms of increase of performances. So, if you think about the non-accounted consequences, they are accounted for, but they are not releasable. But they are accounted".*

Overall findings evidence the unanimous acknowledgement of the benefits deriving from the digitalization process, but an interplay of different perspectives about the rationales behind the unaccounted effects of digitalization. Concerning the accounted effects of digitalization, all management levels reported enhanced internal accountability enabled by the elimination of physical barriers to communication, higher availability and reliability of data, and improved efficiency in data collection and analysis.

Concerning the unaccounted effects of accountability, all three groups agreed about the fact that the benefits of digitalization were visible and retractable through internal recordings but not formally accounted for through ad hoc KPIs. But, as stated by the Chairman & CEO, digitalization is a “change of ideas, a change of cultural approach”, and KPIs are providing the “feeling” of this change. Thus, their lack of not formal accounting for the benefits of digitalization could represent a missed opportunity for measuring change.

Yet different visions between the top management, the personnel that oversaw the digitalization, and the controllers (involved in the accounting side of the business) emerged when discussing the rationale behind it. The different visions seem related to the specifics of their jobs within the firm. In this regard, the controllers (focused on the periodic budgeting and the management reporting preparation) reported as an unaccounted effect of the digitalization process the provision of specific KPIs to keep track of the benefits of digitalization formally and internally. The personnel that oversaw the digitalization focused on the possible provision of an internal account for keeping track of the benefits deriving from the augmented internal connectivity. Opposed from the second and the third group, the top-level management conveyed additional unaccounted effects deriving from digitalization and various reasons for continuing to not formally account for these effects. Among the unaccounted effects related to the digitalization process, this first group also listed: (i) the augmented connectivity with external stakeholders, (ii) the increased complexity in sorting out the relevant data among a much larger amount of information available, (iii) the augmented internal and external connectivity with stakeholders (shareholders, suppliers, the surrounding community), and (iv) the increased need to further develop the digitalization process to compete on the market. The reason for the lack of internal formal accountability is related to the cost that the company should face to make formally “visible” something that is only apparently “invisible” and to the willingness to keep this positive yet confidential information retractable only to the internal users. All in all, the findings convey how the effective real time digitalization process in the Ligabue Group was the result of an interplay of different managerial experiences united by the acknowledgement of enhanced, solely apparently, unaccounted accountability and connectivity.

Conclusion: the future possibilities

This present study was motivated by the call for more in-depth and nuanced research on the various consequences of emerging technologies in the professions by the academic literature (Gepp et al., 2018; Kend and Nguyen, 2020). The organizational practices within the accounting profession continue to attract research attention, as the accounting profession appears to be resistant to change (or slow) related to digitalization (Gepp et al., 2018; Kend and Nguyen, 2020). We queried how digitalization impacts control mechanisms within an organizational setting and how this may create unaccounted effects on both the interplay between personnel and accounting processes. We aim to share new knowledge about the issues that arise and the impacts of real time digitalization within a single organization. Although we focus on a group of controllers that deal with management accounting matters within the Ligabue Group, their concerns transcend beyond just accounting and accountability matters. We report that the interplay and communication between that group ('the controllers') and the various levels of management, are indeed key to successful digitalization. In this regard, it also supported the insight from the literature that a combination of human judgment and business acumen with the extensive use of data and technology are critical competences for management accountants (Arkhipova et al., 2024). We reported that while human barriers are created, it is the technical barriers that impede progress the most.

With the aim of responding to the demand for new research on digitalization's impacts on accounting, this case study provides some initial answers about its effects on an organization and its management accounting. According to the visions and perceptions of all the interviewed groups, the impacts on internal control mechanisms and reporting are tangible and often measurable in terms of quantity, quality, timeliness, and reliability. However, all 21 interviewees convey that this information is not represented in any report, and the detailed explanations for these non-disclosures are only provided by the first group (top-level management). In this regard, the first group explains that the lack of accountability is dictated by the secrecy of this information and, in some cases, the cost (i.e., in terms of time to produce it). Drawing from our findings, we believe that future research directions might involve quantitative studies on the cost (and the profitability) of producing this management accounting information when analysing multiple organizations.

Generally, we find little, if any, differentiation between the views of the controllers and the two levels of management that participated. This suggests that top-level management feels the informal accountability toward digitalization is enough, without the need for implementing a formal system for these achievements. Accountants play a role in demanding that connectivity, more so from an internal perspective. Our study makes two contributions to the accounting literature. Firstly, we adopt both the original and modified framework that Rom and Rohde (2007) and later Knudsen (2020) propose, and apply it to a case study setting. We find that although mediating and moderating variables such as human and technological barriers imped the bidirectional relationship between accounting and digitalization, the human actors are most concerned about the outcome variable: performance. The lack of not formally accounting for the benefits of digitalization represent a missed opportunity for measuring change, and recognising the outcomes of real time digitalization. This concern is not formally represented by the responses of the first group, which includes company directors, thus we report differences between the three groups of participants. Secondly, we contribute to the relevant literature by clarifying the concept of digitalization, by using applied research that provides practical implications for management accountants. This missed disclosure could represent an opportunity to improve internal procedures since, when organizational practices are unaccounted for, their impacts tend to remain invisible or unacknowledged. Given the literature on digitalization in accounting is still immature (Knudsen 2020) and that there still are a number of possible avenues for future research, our study represents the type of empirical research that is required to understand the impact of real time digitalization on accounting, to further make contributions in this space.

As with all qualitative research of this type, several limitations exist. The judgements made by the authors as to what is included and what is omitted in the present study from the interview data are somewhat subjective. Another limitation is that the reported findings are based on the perceptions of participants mainly from one specific country, Italy; thus, the results may not be generalizable to other countries. However, the organization does operate in multiple European countries, Asia, and Africa, and not all participants were based in Italy, as a small number work in Switzerland and Germany.

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Appendix 1

Semi-structured interview to Ligabue Group

Questions

1st Question: Given the need for improving the internal control mechanisms, what type of digital technologies were introduced during the last five years in your working area?

2nd Question: What were the main constraints (or issues) you faced in implementing these new technologies? Human or technical?

3rd Question: How have these technologies impacted internal control mechanisms?

4th Question: Technologies such as business analytics, automation, machine learning and artificial intelligence can reflect human biases. Control mechanisms have implications for the use of these technologies that require continuous assessment, monitoring, or evaluation. Explain how these control mechanisms work within your organization, and if they help prevent increases in human biases?

5th Question: Given you have explained how these control mechanisms operate, please now further explain how the effectiveness of these controls is measured in your organization related to this technology?

6th Question: Technologies should not be proxies for professional expertise, professional judgements, and professional communication (it is extracted from the literature). Explain through the digital transformation process how these technologies have been used in your organization in conjunction with professional judgement and communication between senior managers, middle managers, and other employees?

7th Question: Given you have explained the use of these technologies in conjunction with human judgement and communication, explain how the effectiveness of the digital transformation is measured in your organization by improving the interactions between the various levels of personnel (senior managers, middle managers, and other employees)?

The post-COVID-19 world: Unprecedented challenges and disruptions for management accountants and budgetary controls

Abstract

Purpose: This exploratory research study seeks to investigate how the impact of successive crises impacted supply chain risk and changed management accounting practices at the Ligabue Group, through the lens of the Hayne (2022) framework. Despite adopting the Hayne (2022) framework, we theoretically contribute further to it by exploring different typologies of crises.

Design/methodology/approach: We analyzed the perceptions of 13 personnel, from the Ligabue Group after undertaking semi structured office interviews and refer to several internally sourced documents from the company.

Findings: We find not all new management accounting practices and tools (initiated in response to the COVID-19 pandemic) were implemented during each subsequent crisis. Some concepts like provisioning for crises and specific analyses to cover crisis and supply chain risks were adopted in the Ligabue Group and introduced in the budget post COVID-19. However, we report these practices do not seem common to all these subsequent crises and are specifically driven by those that are more recurring in the business over recent years (e.g., like environmental-climate related issues).

Originality: The findings of this research may benefit various interested stakeholders such as regulators, company management and academic researchers. The impacts of crises on management accounting practices, supply chains and the process of accountability across an organization are revealed through this case study approach we have adopted.

Key words: Crisis management, Supply chains, Management accounting, Budgets.

Introduction

In recent years many crises have been attributable to external events that lie outside the control of international or local companies, such as the COVID-19 pandemic, the invasion of Ukraine and the conflict in the Middle East involving Israel and groups designated as terrorists, such as Hamas, the Houthis and Hezbollah. Coombs (1999) suggests that most organisations will face a crisis that impacts them directly at one point or another. A crisis represents an unstable time for a region or the globe, when a decisive change may be impending (Fink, 1986) and has the potential to seriously undermine the organisation's financial standing, image and personnel (Rhee & Haunschild, 2006; Shrivastava & Mitroff, 1987). A crisis potentially interrupts regular business transactions and can sometimes threaten the viability of the organisation (Fearn-Banks, 2002). Therefore, a timely and appropriate response will be "critical in reducing, offsetting and containing harm" (Seeger et al., 1998, p. 234).

For an organisation the consequences of mishandling a crisis or not adapting in a responsive and timely way could be severe (Pangarkar, 2016). An organisation could face financial losses, financial penalties, legal costs, or reputational damage. The crises management literature has reported that organisations with specific crisis management plans and adequate resources are likely to face lower levels of damage or losses when faced with a crisis (Cloudman & Hallahan, 2006; Penrose, 2000). This literature also highlights that effective communication strategies are extremely important for containing the damage or losses caused by a crisis (Berge, 1990). The availability of resources and top management commitment are equally, if not more, important (Pangarkar, 2016). Our exploratory case study investigates the Ligabue Group, an Italian company in the food services sector and specialised in services for the maritime and energy industry markets, with subsidiaries operating in Europe, Africa, and Asia. During the COVID-19 pandemic (2020-2021) the organisation made several changes to management accounting processes, risk management procedures and governance structures. Like many similar organisations, their cruise shipping business was severely impacted by lockdowns and travel restrictions imposed by governments during the COVID-19 pandemic. Importantly, in response, new management accounting tools and practices were adopted for the first time, and Ligabue Group put in place new metrics that potentially could remain resilient during future (continuous or discontinuous) unpredictable events. Facing several crises after 2021, the Ligabue Group have had their cruise and river shipping businesses impacted recently by the Ukraine and Middle East conflicts, and various environmental and climate change issues, particularly impacting water levels in European rivers. This exploratory study aims to investigate the resilience and effectiveness of the initial organizational changes developed by the Ligabue Group in response to the COVID-19 pandemic, when faced with subsequent crises (after 2021) as mentioned above. We specifically adopt the Hayne (2022) framework relevant to discontinuous (or continuous) and unpredictable changes leading to crisis. Using that framework, we draw on conceptual and empirical insights from the literature, internal source documents and our interview participants (from Ligabue Group) to better understand the decision facilitating role of informal management accounting to examine how Ligabue Group adapted or developed new management accounting tools and practices to manage various crises we mentioned above. To investigate our research aim, the present study explores the following research question:

> **RQ:** *Did Ligabue Group's new management accounting processes, risk management and governance structures, developed in response to the COVID-19 pandemic (2020-2021), remain resilient and effective during the subsequent (continuous) crises the organisation faced after 2021?*

We believe that the case study approach to understanding management control mechanisms designed/used to make organisations more resilient and sustainable during a time of crisis, will contribute to the relevant literature on the role of accounting in ensuring better readiness for future disruptions by organisations. "When studying design and use of management accounting processes, the case study method holds potential for helping inform future research" (Rom and Rohde, 2007, p. 63). Using this method, the many aspects of design and use reveal themselves, and thus this leads to our main motivation for pursuing the case study of the Ligabue Group. Using a case study approach is our main methodological contribution when applying the framework of Hayne (2022) to the changes at the Ligabue Group, in response to the COVID-19 pandemic and the subsequent crises mentioned above. Despite adopting the Hayne (2022) framework, we theoretically contribute further to it by exploring different typologies of crises. Hence, in this study we observed the Ligabue Group management's actions for: (i) the first time that a specific crisis occurred (disrupting and creating an external shock to the normal management accounting activities) and, (ii) in the continuous (yet unpredictable) occurrence over time of further crises.

We report over the last five years (2020-2024) Ligabue Group had to deal with various typologies of crises, whose frequency increased over time. Firstly, we find not all new management accounting practices and tools (initiated in response to the COVID-19 pandemic) were implemented during each subsequent crisis. However, some of the changes implemented during the COVID-19 pandemic seem to recur among all the subsequent crises. For example, scenario analyses, was useful to overcome and drive the exit from each disruption or help with mitigation plans drawn up to keep the variances versus budget under control. Secondly, we found, some concepts like provisioning for crises and specific analyses to cover crisis risks were adopted in the Ligabue Group and introduced in the budget post COVID-19. However, we report these practices do not seem common to all these subsequent crises and are specifically driven by those that are more recurring in the business over recent years (e.g., like environmental-climate related issues).

In the next section, we provide a review of prior research on crisis management and impacts on organisations and their management accounting processes. We introduce the Hayne (2022) framework and provide more background on the Ligabue Group and the impacts of each crisis on their shipping and cruise operations. In section 3 we then explain the methodology and sample statistics, followed by the findings in section 4. Finally, in section 5 we provide the conclusions and the study's limitations.

Company Background

As mentioned, the company investigated in this case study is the Ligabue Group. Based in Venice (Italy) and with 16 subsidiaries in several countries around the world, the Ligabue Group is a historical player in the food service sector, specialised in services for maritime and energy industry markets. Founded in 1919 by Anacleto Ligabue, the company initially offered onboard supervision to kitchen staff and ship supplies. Over the years, Mr. Ligabue expanded his business to different countries and sectors, moving from offering catering services for vessels, oil, and airline business, to expanding into the cruise market during the 1990s. The cruise business, part of the company's maritime division, is the focus of this longitudinal case study, given its relevant exposure to exogenous crises. The company entered the business several years ago providing catering services. Progressively, the company extended its business model to tour operating, sales and technical management. From 2020 the company is also ship owner and is structured as a cruise company. Furthermore, the cruise business presents two different segments: the river cruises, usually operated in European rivers like Main, Rhein, Danube; the seagoing, with cruises mainly dedicated to the German market but operated worldwide. The river cruises are operated with a fleet of ships with a capacity of no more than 172 passengers. Given their dimensions, they can navigate into several rivers and reach different cities and lands. On the other side, seagoing ships are dedicated to a *"soft expedition"* market, with a variety of cruises in remote areas like Greenland, North Europe, Antarctic, and South Africa, among others.

Ligabue Group was selected for two different reasons. First, to respond to the research question, there was a need for an in-depth exploration using the case study methodology. This was possible thanks to the fact that one of the authors, being part of the company, had unique access to documentary information and the interviewees. Second, the cruise business deals with different activities that go from the organization of catering to the tour operating and technical issues, typical of the maritime industry. In this regard, in the last five years, the business was exposed to several different global and region crises.

Literature review

The impact of the COVID-19 pandemic has progressively led to new research on the post-COVID-19 period. In this regard, accounting research is still producing insights into how accounting, accountability and management practices have played a multifaceted role during and after the COVID-19 pandemic (Mitchell et al., 2021; Ahrens and Ferry, 2021; Ahmad et al., 2021; Ahn and Wickramasinghe, 2021). More specifically, one of the emerging themes is the use of accounting, numbers and calculative practices by businesses to navigate the COVID-19 pandemic (Carungu et al., 2021; Velayutham et al., 2021; Delfino and van der Kolk, 2021; Passetti et al., 2021; Sargiacomo et al., 2021; Kober and Thamber, 2021; Huber et al., 2021; Leoni et al, 2022).

Over the past years, the post-COVID-19 world has experienced unprecedented challenges and disruptions from many sources, such as geopolitical tensions or climate change, and the growing demand for transparency and accountability over social and environmental impacts. Recent research in accounting has extended its focus on the role of accounting in the context of natural disasters, accidents or risks that affect individuals, organizations and industries (Sargiacomo, 2014; Lai et al., 2014; Sargiacomo et al., 2014; Perkiss and Moerman, 2017; Matilal and Adhikari, 2019). However, what is evident from this research is that organisations, businesses, governments, and communities are mostly unprepared to deal with significant large-scale disruptions. Their responses are reactive and adaptive, rather than anticipatory or transformational (Leoni et al, 2021). As suggested by Sargiacomo and Walker (2022), during extraordinary events, administrative procedures are homogenised among diverse experts using technologies of government. Accounting practices have a fundamental duty to provide a correct and transparent service of accountability in offering data (Costa et al, 2024).

In this regard, the open questions raised by Leoni et al (2022) shed light on the need for future research on what will be the role of accounting, accountability and management practices in the world after COVID-19 and what the lessons were learnt from the global COVID-19 crisis. More specifically, open questions remain, such as what new accounting processes and structures now exist: (i) such as scenario planning which organisations developed to identify and monitor supplier-related risks and culture and (ii) accounting and management practices that should be ready in case of another emergency.

Conceptual framework

As stated by various authors, research in management accounting has “little or no guidance on the modes of organisational response to economic crises” (Hopwood, 2009; Cameron, et al, 1987). The calls for empirical and theoretical evidence in this stream of studies (Hopwood, 2009; Van der Stede, 2011) have progressively focused on the financial crises, specifically on the global one that began in 2008 (Al Mahameed et al, 2021; Barbera et al., 2020; Becker et al, 2016; Bracci et al., 2015; Chabrak and Gendron, 2015). To address the questions like: “What new accounting processes and structures like scenario planning have organisations developed to identify and monitor supplier-related risks and culture, and how do they work?” and to actively contribute to this special issue, we develop a longitudinal case study (Yin, 2018).

A contribution to this research stream is provided by Hayne (2022) whose study conceptualizes and theorizes informal management accounting tools and practices as a mechanism that facilitates response to crisis (Hayne, 2022). Specifically, the focus of this study is on organizations experiencing crisis due to an external shift in their environment, distinguishing whether those external influences are continuous and predictable or discontinuous and unpredictable. Hayne (2022) offers a theory-based explanation for whether some organizations revise accounting during a crisis while others do not. Organizations revise their management accounting practices when a crisis is perceived to be due to discontinuous and unpredictable change. In contrast, organizations in crisis perceived by their executives to be due to continuous and predictable change did not receive information contradicting their existing beliefs and behaviours. This contribution provides insights into the limited understanding of organizational response to crisis in management accounting research (Hopwood 2009; Van der Stede 2011). However, it remains unexplored what are the management accounting tools that remain in use after being introduced during crises and what a distinction between what crises are managed and how.

The framework introduced in Hayne (2022) is useful for the analysis as she provides a distinction between two patterns of change: "discontinuous and unpredictable environmental change leading to crisis" and "continuous and unpredictable environmental change leading to crisis". For the first pattern of change, Hayne (2022) provides a list of management accounting tools and connected examples, which are aggregated into four different categories of change that drive the executives' actions. For the second pattern, Hayne (2022) explains that executives do not change their management accounting tools and practices to manage crises. Comparing and discussing Hayne's (2022) framework with the themes that emerged from the internal analysis, allowed us to consider the findings considering continuous and discontinuous, predictable and unpredictable crises (Hayne, 2022). Thus, the researchers of this present study applied a longitudinal approach to the evolution of the management accounting decisions and tools.

Research Methodology

After a preliminary exploration of the sector and of the company context, which was led by one of the authors, this was defined the document collection. To this regard, initially, the authors collected internal documentation (e.g. budget, internal presentations) produced by the company during ad hoc meetings to tackle the crises, or during the budget and revised budget presentations.

Subsequently, the authors interviewed different levels of management (middle and top management), and the finance department directly involved in the crisis resolution and budgeting processes. The list of the interview details is provided in Appendix 1. The semi-structured interviews were aimed at letting emerge what types of crises the management was tackled during the five years considered, what management actions and management accounting tools were implemented, and, among these tools, what major changes affected the management accounting processes. The content of the interviews is also provided in Appendix 1.

Once all the interviews were completed and transcribed, researchers analysed textual patterns for insights on crisis matters related to management accounting tools. At this stage of the analysis, the authors sought answers to the following questions: what crises has the company faced over the last five years? For each crisis, which management accounting tools and practices have the company implemented or revised to tackle the crisis? This process was iterative, with the researchers moving from the interviews to the internal documentation and back again, to verify the findings. In this regard, when needed, they asked for further documentation to corroborate the relevant findings. Triangulating the interviews with the documentary data led to emerging patterns of different typologies of unpredictable crises and the related management decision tools to tackle each of them.

The 13 semi-structured interviews were conducted online, in English, and were all audio recorded to ensure capturing the detail of the discourses. The length of the interviews was, on average, between 40 to 50 minutes in duration. Few interviews were shorter in length due to time constraints in managers' availability; other ones were longer since the interviewees added detailed perspectives and connected very well some elements in their responses. The interviews were manually and separately coded by the researchers through a bottom-up approach to thematic analysis (Braun and Clarke, 2006). The aim was to identify the core themes emerging from the audio recordings that were relevant and helped answer the research question. During the data collection and analysis, the themes that emerged from the separate coding were compared, reviewed, analyzed, and discussed among the researchers, searching for homogeneous patterns of meaning (Braun and Clarke, 2006). Hence the techniques of coding and memo-writing were employed simultaneously throughout the process of data collection in the fieldwork involving the Ligabue Group. Such an approach to coding enables the researchers to remain in tune or very connected with the participant's perception of their reality (Charmaz, 2000), and this process reduces the chance of missing important patterns or themes (Miles, 1979). The abductive approach was iterative and allowed codes to emerge directly from the dataset. The work involved listing themes emerging from the interviews and identifying patterns that relate to each of these themes. Adding evidence to confirm a pattern from the data or being open to evidence that contradicts a given pattern helped us to protect against providing fragile or unreliable evidence (Miles, 1979). Accordingly, given the triangulation of the 13 semi-structured interviews with the daily, direct participant observation by one of the researchers, the explicit meaning of the data, which emerged through the thematic analysis, was discussed, and interpreted considering the organizational context. In the findings section, the interviewees are referred to using their roles within the company while omitting their names.

Once the patterns of crises and related management accounting tools were defined, the researchers compared and discussed the findings of the internal analysis through Hayne's (2022) framework. In the following section, the crises and related management accounting tools adopted by Ligabue Group are firstly analysed and discussed. Subsequently, they are compared for each crisis through the lens of Hayne's (2022) framework.

Findings: Management accounting tools implemented by Ligabue in response to each crisis

From the triangulation of the interviews, the relevant literature and with the internal documentation from Ligabue group, three main types of crises have emerged: environmental, war-risk-connected, and health-related. Each typology of crisis emerged as unpredictable and, after the first occurrence, recurring. The three typologies of crises aggregate similar issues that the company faced. Some of them are specific to the business (e.g. high and low waters in the rivers), while others impact all businesses worldwide (e.g., the COVID-19 pandemic).

More specifically, firstly, the typology "environmental" incorporates all the disruptions managed by the company because of environmental issues and climate change. Concerning the Ligabue Group, since the company is also operating river cruises, during the period of observation, it had mainly issues connected to heavy storms and rain or drought, leading to extremely high or low levels of water in the European Rivers (e.g. Main, Rhein, Danube). The issues impeded the ships from operating the originally scheduled cruises, determining disruptions like a change of schedules, entire or partial cancellations, and rapid transfer arrangements.

Secondly, the typology “war-risk-connected” refers to all the crises connected to armed conflicts or local rebellions, which generate the impossibility of carrying on ordinary business. Referring to this case study, the main issues that emerged were the conflict that started in 2022 when Russia invaded Ukraine and, from 2023, with the instability in the Middle East and the Red Sea shipping attacks. In both cases disruptions affected the cruise business: in the first case, given the impossibility of doing business in Russia by European companies, activities had stopped; in the second one, all the cruise itineraries near Israel and the Red Sea were rescheduled or cancelled. Indeed, the company faced the consequences of the Houthis that, starting in 2023, threatened to intervene on behalf of the Palestinians against Israel and other Western allies. It created several implications for the maritime industry since the navigation in the Red Sea and, more specifically, in the Gulf of Aden was considered unsafe. Thus, cruises were cancelled, rescheduled or redirected. As some cruises and shipping were redirected around the southern tip of Africa to access Asia, this meant significant delays in the supply chain for various products manufactured in Asia.

Third, the typology “health-related” refers to crises connected to the spread of viruses which impede ordinary operations. Concerning this issue, the main reference is to the COVID-19 pandemic that, in the case of Ligabue Group, forced the company to stop its ships for several months. Although less relevant than the pandemic, this typology of crises can also include the spread of other diseases (e.g. Norovirus) that, despite all cautions taken, can outbreak onboard. Thus, also in this case the risk of entire or partial cancellation is likely.

From the several internal documents extrapolated emerged that for the seagoing segment of cruises two relevant business interruptions occurred. One is related to the COVID-19 pandemic; the other is related to the war in the Middle East which also caused instability in the Red Sea area. For what concern the river segment, in addition to the health-related disruption, also the environmental crises were recurrent over the last five years.

Table 1 conveys the number of disruptions that occurred during the last five years for the river ships. The content of Table 1 is extrapolated from different internal documentation. In this regard, given the secrecy of the information provided, the names of the ships have been substituted with ad hoc labels. Table 1 illustrates how the disruptions due to the previously mentioned crises are becoming increasingly frequent in the sector. In this regard, this typology of crises is now manifesting in a continuous way, progressively becoming an ordinary element of the business, but a regular disruption to the supply chain.

Table 1 – Disruptions occurred during the last years for the river ships.

Health-related	2019	2020	2021	2022	2023	2024*
Ship 1	n/a	24	15	0	0	0
Ship 2	n/a	n/a	n/a	n/a	0	0
Ship 3	0	12	13	0	0	0
Ship 4	0	20	12	0	0	0
Ship 5	0	24	14	0	0	0
Total	**0**	**80**	**54**	**0**	**0**	**0**

Environmental-related	2019	2020	2021	2022	2023	2024*
Ship 1	n/a	0	0	0	0	0
Ship 2	n/a	n/a	n/a	n/a	2	2
Ship 3	0	0	0	0	2	8
Ship 4	0	0	2	3	1	1
Ship 5	0	0	1	6	0	1
Total	**0**	**0**	**3**	**9**	**5**	**12**

While Table 1 above gives the reader an understanding of the increasing impact of the different crises on the ordinary ships' activity, the next paragraph discusses the management perception of the typology of crises that more impacted the business during the last five years. Table 2 provides the results of how the management responded to the question *"What type of crises has the company faced over the last five years, that impacted management accounting practices directly? Please explain"*. Interviewees mainly claimed the COVID-19 pandemic (from 2020), the Russian invasion of Ukraine (from 2022), the war in the Middle East and the related instability in the Red Sea area (from 2023), and the high and low water levels in European rivers all significantly impacted supply chains.

Table 2 – Responses provided to the question "What type of crises has the company faced over the last five years, that impacted management accounting practices directly? Please explain".

		Type of crises				
Department	Role	**Covid-19 Crisis**	**War in Ukraine**	**War in Israel / Red Sea crisis**	**High / Low waters in European Rivers**	**Cyber attacks**
Top Management	Chairman & CEO	X	X	X	X	X
Top Management	Group General Manager	X	X	X		
Maritime Division	Maritime Division Director	X		X	X	
Maritime Division	Technical Manager	X	X	X	X	
Maritime Division	Sales Director	X	X	X	X	
Maritime Division	Planning, Revenue Management & sustainability Manager	X	X	X	X	
Maritime Division	Port & Fleet Practices Manager	X		X	X	
Maritime Division	Operations Manager	X		X		
Finance Department	Chief Financial Officier			X		
Finance Department	Head of controlling	X	X	X	X	
Finance Department	Maritime division controller	X	X	X	X	
Finance Department	Financial controller	X	X		X	
Finance Department	Head of finance - Switzerland and Germany	X		X	X	

It should be noted that, while the COVID-19 pandemic is perceived at all the management levels and by all the departments, other typologies of crises (e.g. the Russia invasion of Ukraine) are significantly stressed only by those employees whose management activity is directly affected, driving management accounting changes. Accordingly, the top management perceives global crises as relevant, like the COVID-19 pandemic and the war in the Middle East. This is due to the massive impact that these global crises had at the company level and related supply chains. For instance, in the case of Ligabue, the three Divisions at global level and five business units were affected. As explained during the interview with the Group General Manager:

> *"What the company has faced in the period 2020-2021, and I would also add the 2022, is the pandemic; and fundamentally the management was all about making sure that the people were safe and making sure that health was managed with all the precaution that was considered necessary, including, but not limited to the science."*

Lastly, the crises and risks connected to cyber-attacks are mentioned only by the CEO and Chairman, but they have never touched the company, except in one case with a minimal impact.

In its more than 100 years of history, the company Ligabue Group faced several extraordinary events and different times, which lead to different new implementation in the management accounting. As stated in the monography published for the centenary of the company (2019), between the 1960s and '70s the company faced *"the advent of budgeting and business forecast in the short and medium term"*. Then, starting from the late 1980s the company faced that *"extraordinary events became unpredictable everyday occurrences, affecting businesses [...], at times severely undermining their foundations"*.

With a specific focus on the last five years, each of the three identified typologies of crises brought with it the adoption of new management accounting practices and tools. Table 3 illustrates the practices and tools adopted or reframed in Ligabue during the observation period, distinguishing by typology of crisis. Not all management accounting practices and tools were implemented during each crisis. For instance, several implementations seem to recur among all the crises, and it is the case of the scenario analyses that are useful to overcome and drive the exit from each disruption or the mitigation plan drawn up to keep the variances versus budget under control. In this regard, the role of KPIs is crucial, since they increase the knowledge and facilitate the decision-making. As stated by the CEO and Chairman:

> *"Obviously the information and the evaluation and the analysis of every single KPI fact led you to a better knowledge of your business."*

Also introducing and then tracking some new cockpits of KPIs serve for managing and monitoring crises in a more effective way. The role of already existing KPIs, after the external shock of a crisis changed their role and relevance. Cases in point are for instance, the indicator of "Net Financial Position" and the KPI "EBITDA on Net Financial Position". As stated by the Financial Controller, they are considered crucial in tackling crises:

> [referring to the monitoring of the KPIs] *"the net financial position and the covenants like EBITDA on net financial position are for sure examples of a changed way and a different way to tackle the crises."*

In turn, the adoption of a new set of ad hoc KPI to tackle the crises has an impact on the management accounting approach at top level. As explained by the Financial Controller, the development of new KPIs served not only the purpose of monitoring the development of specific management accounting aspects, but also have the side effect to change the mindset towards the crises at management level.

> *"So, from my point of view, there was a change in the mindset of the company at higher level."* [referring to the rising importance to this KPI] *"is a consequence of the change of mindset towards the crises"*

In this regard, the top management defined a new set of targets for the year-end bonuses of 'Middle Management' with specific objectives to ensure that more attention is dedicated to the management and consequences of crises. As stated by the Financial Controller:

> [referring to the monitoring of indicator of Net Financial Position] *"from 2022, one of the key targets that the directors are asked to achieve."*

Table 3 also illustrates how, especially in recent years, some concepts like provisioning for crises and specific analyses to cover crisis risks were adopted in the company and introduced in the budget. In this regard, the interview with the Chief Financial Officer confirms the new approach:

> *"You need to cap your profitability with some cost inside you have because anything can happen in each itinerary. So, we started in the last 12 - 24 months to evaluate parachutes, what we used to call contingency to insert in the profit and loss of the business line. […] After what happened in the Gulf of Aden, we realised that that was the moment to change the paradigm of the business model. So, when you have a so high-risk business, you need to be protected in terms of cost."*

This practice seems not common to all crises but is specifically driven by those more recurring in the business over recent years (e.g., environmental ones). Indeed, they were not adopted due to the COVID-19 pandemic. The mitigation plan is a management accounting practice that has become increasingly common in tackling all typologies of crisis. In Ligabue Group the mitigation plan was adopted to find all the potential financial upsides useful to recover the impact on profit and loss because of an external shock. This systematic tool becomes recurring to tackle each crisis. As explained during the interview with the Group General Manager:

> *"Therefore, being able to put in place a mitigation action where possible"*

To properly analyse variances, the company introduced a new tool that compares actual with budget figures by adding a column in which the actual figures are deconstructed and reframed in a without crisis scenario. In doing so, the management accounting tools provide managers with a clear situation with variances due to disruption related to crises and those are due to the ordinary business.

Based on the interviews, the frequent crises that occurred after the pandemic pushed the shift to a different management accounting approach. The frequent zero-variance analysis to budget, or the request to deepen various alternatives, increases and changes the workload of the controlling department. As stated by the Maritime Division Controller:

> *"For the comparison between actual and budget, we start from the budget to create and elaborate the scenarios. Then we make some sensitivity analysis to see how this original budget will change if we take one decision or another. But it became a daily and frequent process that the Board asked (the controlling team) to understand day by day and all the impacts of the choice that the company decided to take. So, we can say that it is an unusual management accounting process, the sensitivity analysis, but introduced for an unusual time for the company."*

As a result of the increased number of activities, in 2022 Ligabue Group hired an additional senior resource in the controlling department. This employee must support the management accounting practices connected to the increased number of business planning and scenario planning analyses. Indeed, the augmented accountability connected to crises also impacts the management accounting approach in general. Therefore, the new resource is not just needed to prevent and trace the crises, but it is the result of a changed approach towards management accounting. Thus, the management accounting for crises also impacts ordinary management accounting: thanks to crises, the company acquires a better understanding of the importance of these activities.

As a result, this know-how is transferred to different activities. As explained during the interview with the Sales Director, referring to the necessary changes in the ships' itinerary because of disruptions:

> *"We are better prepared than in the past to do calculations with the team if it's the case to go or not to go."*

This changed approach also depends on the quantity of managed data. As explained during the interview with the Port & Fleet Practices Manager, the company implemented new procedures to trace and manage port costs, including qualitative information like costs connected to penalties for cancellations (e.g. due to bad weather) or long stay (e.g. ships docked for two days). This increased quantity of managed information produced consequences in terms of accuracy, as she states:

> *"Now we are doing more business plans than in the past. And I think that now, since we are creating a database, but also some historical information, of course, now business plan is more accurate than before."*

This increased quantity of data can also be reconducted to the digitalization process, started by the company in 2017 with the change in the ERP system and Business Intelligence tools, and boosted by the COVID-19 pandemic. This change also produced effects on the quality and reliability of information, ensuring the higher accuracy mentioned.

Table 3 – Management Accounting practices and tools adopted or reframed in Ligabue during the observation period, distinguishing by typology of crisis.

MANAGEMENT ACCOUNTING TOOLS / TYPOLOGY OF CRISIS EMERGED	Health-related	War-related	Environmental	Source
Business planning, sensitivity and scenario planning implemented with higher frequency	X	X	X	Interview/internal data/participant observation
Introduced a new controlling position in 2022 dedicated to business planning and scenario analysis	X	X	X	Internal data
Revision of cost allocations and assignments, profit center	X	X	X	Interview/internal data/participant observation
Introduced new categories in the internal orders	X	X	X	Internal data/participant observation
Increase in the quantity of reports	X	X	X	Interview/internal data
Some reports (e.g. Monthly Closings) have been restructured	X	X	X	Interview/internal data
Introduced Purchasing Orders (PO) in all operational areas	X	X	X	Interview/internal data
New metrics implemented: cost per operating day (fuel, port costs, food, among others).	X	X	X	Interview/internal data
Introduction of Mitigation Plan vs BDG/Revised BDG	X	X	X	Internal data/participant observation
Benchmarking to competitors (e.g.: what kind of decisions were taken by competitors to tackle the crises, for instance in the Red Sea). From 2024 introduced a new position dedicated to market competition analysis.		X	X	Interview/internal data/participant observation
Introduced BDG session for risk management and to evaluate single insurance coverages.			X	Interview/internal data
New concepts introduced: parachute and provisioning for crises		X	X	Interview/internal data/participant observation
Implementation of guidelines and operational communications	X		X	Interview/internal data
Adoption of new governance forms since 2020 . Introduction of Monthly Operation Reviews, conducted among the single divisions. They are structured in three parts: update on business development/issues, updates on financial and rolling forecast. A view on the future strategy and P&L (through the forecast	X	X	X	Interview/internal data

reshuffling with the rolling forecast) becomes crucial.				
Crucial role of people and ad hoc training	X	X	X	Interview
Reviewed Business Intelligence (BI) systems and tools.		X	X	Interview/internal data
Adoption of crisis committee and decision making teams for each crisis (Boost to video call after covid-19 pandemic)	X	X	X	Interview/internal data
Increased parties involved thanks to the boost in digitalization	X	X	X	Interview/internal data
Increased teams meeting to take decisions: one meeting, one decision, more parties involved	X	X	X	Interview

Ligabue's management accounting processes explained through the Hayne (2022) framework

According to Hayne (2022), as an external shock, a crisis could also become continuous (recurrent), despite its essence as unpredictable or predictable. Based on the previous findings above, the authors investigated how the company faced over the last five years three categories of crises: health-related, war-related and environmental-related. In addition, some of them occurred with a higher frequency over the last two years, and it's the case of the environmental ones, as presented in Table 1. Thus, also in this case study the recurrency or non-recurrency of crises is an observed element.

Therefore, the authors tried to compare the findings with those illustrated by the Hayne (2022) study. More specifically, Hayne (2022) distinguishes between predictable and continuous environmental change leading to crisis and unpredictable and discontinuous. While for the first category Hayne (2022) illustrates how executives are not changing their management accounting, for the second one the changes are summarized through a detailed framework.

Inconsistent with Hayne (2022), continuous and recurring crises (e.g. the environmental related in the river segment) produced in the observed company changes in the management accounting tools. Indeed, based on the collected evidence, on one hand, the unpredictable and discontinuous crisis connected to the COVID-19 pandemic pushed executives to the adoption of new forms of accountability. This was the case with the Monthly Operations Reviews (MOR), conducted among the three different company divisions. They are structured in three parts: updates on business development/issues, updates on financials, and rolling forecasts. As stated by the Group General Manager:

> *"In terms of governance, let's say since the very beginning, since the beginning of 2020, months of March and April, we started with monthly operational reviews which were not present before in the organisation. They were conducted for each division, for each business unit, and they provided a monthly overview of the financials both in terms of P&L and cash flow."*

On the other hand, accountants assisted at the same time with changes to the management accounting practices and to the organization because of crises characterized by being continuous, as the environmental ones. For instance, it's the case of the different budgeting approaches generated to provide more accurate forecasts from a risk management perspective. Indeed, having faced the rising frequency and relevance of these crises, the company adopted a change in the budgeting and forecasting processes.

Thus, Table 4 compares with Hayne's (2022) theoretical framework considering the unpredictable and discontinuous environmental changes leading to crisis. Here the effects into the management accounting are considered independently from the typology of crisis but considering if the crisis became recurrent or it just occurred once. The purpose of this table is to compare each specific management accounting issue independently with the three emerged crisis themes: war-related, health-related and environmental-related.

Table 4 – Comparison between Hayne's (2022) framework and elements emerged from Ligabue case study.

Executives change management accounting to:	***Elements emerged from Hayne Theoretical Framework:***	***Elements emerged from Ligabue Case Study:***	***control check***

1. Cleanse their accounting systems and reports	Reviewed cost allocations and assignments	Reviewed cost allocations and assignments, introduced new internal orders	
	Reviewed number of cost centers	Operated a new distinction between "running" and not ordinary activities (new cost center)	
	Confirmed data ties into reports correctly (e.g., variances must be properly sum)	Check of formulas and structure of reports	As per Hayne
	Compared line-by-line spending to budget	Adoption of Mitigation Plan	
	Reduced the number of reports	Number of reports increased: more crises, more reports. Periodic reports: the same.	Opposite than Hayne
	Reintroduced reports with key insights	Restructured reports, In particular, the monthly closings in three pillars: business review, financials and forecast	
	Updated or designed new forms (e.g., capital approvals, project approvals)	Introduced Purchasing Orders (PO) in all operational areas	
	Implemented quality assurance process for reports	Introduced a new controlling position dedicated to scenario analysis to better ensure the quality and timing.	
	Provided training (e.g., on cost assignment, meaning of reports)	Provided training to new management accounting tools.	As per Hayne
	Reviewed and updated quoting and billing systems	Reviewed Business Intelligence (BI) systems and tools.	
2. Make sense of the past	Deconstructed prior year financial statements	Retrospective and deconstruction of prior financial statements (from 2017)	Similar to Hayne
	Analyzed performance according to subsidiary financial statements	Financials first, but also business planning culture: one new employee dedicated since 2022 to business plans and scenario analyses.	
	Benchmarked to competitors' performance	Benchmarking to competitors (e.g.: what kind of decisions were taken by competitors to tackle the crises, for instance in the Red Sea). From 2024 introduced a new position dedicated to market competition analysis.	
	Analyzed changes in detail	Introduced BDG session for risk management and to evaluate single insurance coverages.	

	Removed effects of uncontrollables (e.g., exchange rates)	Reclassified P&L and business strategies excluding not-operative accounts (e.g. financial, non-core and taxes)	
3. Create digestible, easy-to-understand metrics	Reframed difficult metrics/concepts (e.g., labor efficiency became the number of employees paid to drink margaritas)	New metrics introduced in the management accounting: parachute and provisioning for crises	Different from Hayne
	Made key concepts personally relatable (e.g., link debt/interest to credit cards)	Implementation of new databases and registries: from the ports to the excursions. This guarantees a wider range of data, and the opportunity to develop more accurate forecasts or scenarios.	
	Emphasized operational KPIs instead of uninterpretable financial ratios	No issues with existing KPIs. Implementation of guidelines and operational communications. This action make faster than in the past also the operational process	Different from Hayne
	Simplified the basis/denominator of ratios (e.g., cost/employee instead of cost/revenue)	New metrics implemented: cost per operating day (fuel, port costs, food, among others). They were implemented in 2023 to better trace differences between ordinary and “not-ordinary” business	Different from Hayne
	Introduced visible signals of progress (e.g., green, yellow, or red color-coded metrics; “Closing the Gap” thermometer)	Adoption of a project management approach (gantt) to tackle each crisis	
4. Implement various forms of accountability	Increased meetings (e.g., “Daily Accountability”)	Adoption of new governance forms since 2020. Introduction of Monthly Operation Reviews, conducted among the single divisions. They are structured in three parts: updates on business development/issues, and updates on financial and rolling forecasts. A view of the future strategy and P&L (through the forecast reshuffling with the rolling forecast) becomes crucial.	
	Created large-scale performance scoreboards (e.g., “Accountability Room")	Adoption of crisis committee and decision-making teams for each crisis (Boost to video call after COVID-19 pandemic)	
	Shared information widely so all employees could enact accountability (e.g., town-all videos)	Increased team meetings to take decisions: one meeting, one decision, more parties involved	

	Increased parties involved (e.g., patients)	Increased parties involved thanks to the boost in digitalization	As per Hayne

The comparison with Hayne's (2022) theoretical framework confirms several findings, even though some have different facets. The cleansing process generated because of a discontinuous and unpredictable crisis brings to revise cost allocation and assignments, formulas, and structure of reports, introduce new forms, and train people. As stated by the Head of the Controlling Department:

> *"During the crises, the importance and the need for this kind of reporting was created, re-phased, and adjusted. And now trying to digitalize this way to report in the way that for the next crisis, you will be quicker in the decision making."*

Also making sense of the past process presents similarities, as the previous element of framework. On the contrary, most differences are highlighted regarding the third element of Hayne's (2022) theoretical framework. Indeed, while Hayne (2022) illustrates the importance of creating digestible and easy-to-understand metrics, in this case study the triangulation of data supports the opposite: crises increase the need to develop accurate scenarios and analyses. In doing so, executives indirectly require more data, KPIs and specific tools to trace differences between "ordinary" businesses and the crisis times. In this regard, it emerges the importance of continuous improvement and to adapt the management accounting procedure in presence of disruptive crises, but also because of recurring and continuous ones (e.g. environmental crises). The importance of adopting a dynamic approach is stated also by the CEO and Chairman at the end of his interview:

> *"If you're not applying to a dynamic approach, you are losing the contact with the business and, ok, you're going to survive some years,*

but then you're going to lose marginality, you're going to lose focus, you're going to lose competitive, you're going to lose."

Five years ago, before the occurrence of the COVID-19 and other typologies crises, the monography edited for the centenary of the company was exactly stating the importance of this wide, dynamic and proactive approach:

"To evaluate and control the thousand variables the entrepreneur's dashboard became multidisciplinary and multifactorial."

In sum, our empirical and theoretical contributions have focused on the role of accounting and the impact on the accountability of the organisational work undertaken to identify and manage supply chain risk and manage crises. We have focused on new accounting processes and structures like scenario planning that were developed to identify and monitor supplier-related risks and how they work; the limitations in conventional performance measurement systems, and what innovations have been developed by Ligabue and used to ensure readiness for more disruptions; and finally, we observed how management control mechanisms were better designed/used to make the supply chains more resilient.

Conclusions

This paper aims to contribute to the AAAJ special issue by providing an empirical contribution on the role of management accounting practices and tools and the impact on the accountability of the organisational work undertaken adopted at organizational level to identify and manage crisis risk. To this aim was developed an in-depth, longitudinal case study based on an international company Ligabue Group, operating in the cruise sector. Through triangulating interviews, the participant-observation and internal documentation produced during the last five years a set of paths in the management practices and tools adopted emerged.

From the exploratory case study emerged that in the last five years Ligabue Group had to deal with various typologies of crises, whose frequency increased over time. Given the high frequency of the crises, researchers had the opportunity to observe the different actions, strategies and tools implemented by the management to solve each specific issue. Furthermore, given that after the first external shock (related to the first time a specific crisis occurred) some elements of the crises became recurrent. The researchers could also observe if and how the management accounting tools, and the practices adopted the first time were implemented and still adopted or otherwise dismissed. Our paper contributes to Hayne (2022) framework into different ways. First, despite adopting the framework, we contribute to it, by exploring different typologies of crises. In doing so, we provide further classification and evidence regarding an important characteristic of extraordinary events (Sargiacomo, 2015; Sargiacomo and Walker, 2022) is their multidimensional nature. Second, observing the management actions both the first time that specific crisis occurred (so disrupting and creating an external shock to the normal management accounting activities) and in its continuous (yet unpredictable) occurrence over time.

In this regard, the first distinction between our findings and those of Hayne (2022) is that when the crisis becomes continuous the management accounting practices and tools are adapted to solve the most efficiently and effectively the issue. Second, to manage crises executives progressively require more data, more analyses and specific metrics, which is opposite to the simplification described by Hayne (2022). In addition, the paper aims to contribute to responding to the question of what will be the role of accounting, accountability and management practices in the world after COVID-19 and what are the lessons learnt from this global crisis (Leoni et al., 2022).

As it emerges from our study, it is very important that people, who are responsible for essential decisions, have the support of management accountants, being aware that accounting in exceptional circumstances might change, because accounting figures and budgets are finalised to an accountability duty that has very different characteristics (Mazzolo et al., 2024). Management accounting practices help to make sense of the event by defining, through calculative practices, the different dimensions the event has. In extraordinary events, such as a crisis, the needs differ. The process through which decision-making occurs and decisions are implemented (or not) might involve delegating authority to specific individuals or teams or establishing emergency committees (as has happened in many companies during the COVID-19 pandemic outbreak, e.g. including at Ligabue Group). For this reason, it is accepted that temporary, and sometimes new, governance structures are put in place by companies (Mazzolo et al., 2024). In this sense, it is possible to observe the emergence of specific governing arenas—that is, “spaces” and “domains” of discussion/confrontation that usually differ from the ordinary ones (Contrafatto et al., 2019).

All in all, the paper contributes to the practitioners’ field by describing the management tools and practices implemented to tackle different unexpected crises, and by shedding light on the rationales behind their dismiss once the crisis had become recurrent. The paper contributes to the previous literature about management accounting during crisis by providing a comprehensive exploration that, going beyond the COVID-19 pandemic (because exploring different typologies of crises) and the single first external shock (because embracing a longitudinal perspective) provides an understanding of how and why some management tools and practices adopted during crises remain in use, while other after a first introduction are dismissed.

While the in-depth longitudinal case study, on an international company, allowed to shed light on how management accounting tools and practices are shaped by different typologies of crises, and how these practices evolve overtime, still limitations some exists. A main limitation is related to the firm sector. In this regard, in spite the fact that the management tools (that a company may or may not adopt) does not change with respect to the sector, the management practices may indeed be related to the specificities of the context. Accordingly, as this paper describes management accounting practise tools adjust overtime, when the crisis became recurrent, it should be interesting to corroborate these findings with further investigations on the matter.

Therefore, further studies may start from these findings to investigate if, considering the same crises within a different sector, other specific management accounting practices occur in other sectors, and which tools and practices are adjusted once a crisis became recurrent.

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Appendix 1.1 – List of documentary sources

Department	Role	Length
Top Management	Chairman & CEO	32:43 min
Top Management	Group General Manager	58:03 min
Maritime Division	Maritime Division Director	40:00 min
Maritime Division	Technical Manager	32:55 min
Maritime Division	Sales Director	50:37 min
Maritime Division	Planning, Revenue Management & sustainability Manager	49:55 min
Maritime Division	Port & Fleet Practices Manager	41:49 min
Maritime Division	Operations Manager	40:57 min
Finance Department	Chief Financial Officier	01 h. 04:52 min
Finance Department	Head of controlling	42:58 min
Finance Department	Maritime division controller	46:03 min
Finance Department	Financial controller	43:40 min
Finance Department	Head of finance - Switzerland and Germany	43:15 min

Appendix 1.2

Semi-structured interview with Ligabue Group

Date: __ / __ / _____

Name of the interviewer: ________

Name of the interviewee: ____________ Position: ____________________

Questions

Q1a. What type of crises has the company faced over the last five years, that impacted management accounting practices directly? Please explain.

Q1b. Looking back at this recent past how did you make sense out of the crisis? Explain please.

Q2a. What management accounting processes were changed to respond to the previously mentioned crises? Please explain.

Q2b. Looking back at this recent past how did you make sense out of the changes the company had to make to respond to the crisis? Explain please.

Q3. What metrics/concepts were created or reframed to manage and solve the crises? Please provide examples. (Note: the interviewees will be asked to provide the number of documents in support).

Q4. What various forms of accountability were implemented in response to the crisis? Explain with examples please. (Further prompting: such as the number of emails, KPIs, meetings and documents, etc).

Q5. For each type of crisis described so far was the value of management accounting tools questioned by any level of management? Please explain.

Q6a. Do you have an idea of the economic and non-economic impacts that the company faced during these crises? Please explain.

Q6b. Can you please provide us or direct us to any empirical evidence in this regard? Please provide suggestions.

Conclusions

At the end of this research, the first acknowledgment regards how the Executive PhD represented a challenging opportunity to meet the Academic and the practitioners' perspectives. In particular, the in-depth analyses inside the organisation, through documents and interviews, allowed to let emerge specific issues, providing further knowledge and to provide a scientific perspective, grounded on previous literature on the matter. It has been significantly stimulating to see colleagues making considerations and providing comments like "You are right, I had never thought this before".

At the same time, the main aim of the PhD is contributing to extant literature, specifically filling the emerged gaps. More specifically, and as stated in previous sections, the findings of both papers contribute in different ways to the extant literature. Their contributions have in common the fact that management accounting practices help to make sense of the event by defining, through calculative practices, the different dimensions the event has. Accountants play a role in demanding that connectivity, more so from an internal perspective. This issue emerges in both pieces of research: firstly illustrating that when organizational practices are unaccounted for, their impacts tend to remain invisible or unacknowledged. Thus, the need to disclose this missed information to increase internal connectivity. Secondly, in the other paper, by illustrating how management accounting practices help to make sense of the event by defining, through calculative practices, the different dimensions the event has.

Against a very small amount of Executive PhD in total, I hope that this particular structure will meet further development in future, contributing to the new interrelation between companies and Universities.

Last but not least, a special thanks to all those made possible and supported this Executive PhD program: from University to the company Ligabue Group, my supervisors, colleagues, and my family.

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[i] In this study, the terms accountants and controllers are used interchangeably.