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Accounting in a Social Context

Orla Feeney

Abstract

Accounting permeates all of society. Accounting information is not homogenous and varies not just from company to company but from user to user, meaning that the use of such accounting information is actually a social phenomenon within an organization. Accounting cannot therefore be understood simply in terms of its functional properties but more as a socially constructed set of actions taking place within the organization, the landscape of which is constantly transforming. Digital technologies in the form of big data and artificial intelligence (AI) are expanding the organization's data eco-system forcing the accountant to develop their digital technology skillset and forge links with the data scientist, the incumbent custodian of these growing data streams. Meanwhile, a rapidly expanding sustainability agenda is broadening the organization's biophysical landscape leading to even more data flows and creating the need for management accounting and control systems which will help organizations to behave in an environmentally sustainable and socially responsible manner. This chapter explores each of these issues and calls for a deeper understanding of the relationship between accounting and big data, AI and sustainability.

Keywords: management accounting, big data, data analytics, artificial intelligence, environmental management accounting, sustainability accounting, critical research, multidisciplinary research

1. Introduction

Accountants operate within a complex web of business practices involving a wide range of actors and clusters of actors performing a variety of activities. Accounting itself is not as prescriptive or normative as conventional wisdom would suggest. It is embedded in the every-day interactions taking place throughout the organization [1] and is best understood by taking a broad view over the organization's social system in order to develop a complete picture of the clusters of actors involved. Exploring the work of the accountant as a social phenomenon reveals it to have a complex relationship with those who use it. Critical, multidisciplinary research facilitates a depth of insight into the sociological implications of accounting information use, and in turn the role of the accountant.

Accounting and the practice of accounting permeates all of society. It influences how people behave, it is used to exert power, legitimize action and signify intent. Sociologically informed research helps us to understand why accounting is practiced in the way that it is and how these practices might evolve. Accounting research, and we are focusing here on management accounting research, was not always viewed through this broad, societal lens. Section 2 in this chapter sets out how management accounting research has evolved over the past three decades

enroute to its current pluralistic 'boundaryless' management accounting research landscape. Sections 3 and 4 examines the increasing scope and complexity of the accountant's role resulting from Big Data and Artificial Intelligence (AI) respectively, while the growing sustainability agenda is discussed in Section 5. Section 6 concludes the chapter by exploring opportunities for future research in management accounting.

2. The road to a sociological research agenda

Johnson and Kaplan [2] initiated concerns in their seminal text 'Relevance Lost: The Rise and Fall of Management Accounting' as to the continued relevance of management accounting techniques in light of then changes in the business environment. This was followed by a decade of criticisms of the management accounting discipline coupled with suggestions for improvement in the form of new and improved techniques such as Activity Based Costing [ABC] and the Balanced Scorecard [3–7]. Subsequent, empirical research suggested that traditional techniques such as budgets, variance analysis and standard costing were as popular as ever, while more contemporary tools were enjoying only modest application [8, 9]. Changes occurring in the accounting profession were not necessarily in the tools and techniques which the accountants were using but more in who was performing these tasks and how they were being performed [10]. Accountants were being required to provide non-financial data [11] and 'softer', more strategically relevant information [12]. The 1990s also witnessed vast improvements in field-based research methods, resulting in more studies being conducted, addressing issues not previously focused on in the management accounting literature [13]. Topics such as the accountant's skills and competencies, management accounting practices and the impact of change on the accountant all became key areas for analysis [14–16]. Increasingly the literature was presenting an accountant who interpreted information so as to facilitate control in a contemporary business environment and contribute to decision-making in a more useful manner. The term 'hybrid accountant' [17] was coined to encapsulate this dual role of the modern accountant.

A large body of literature emerged which explored this evolution of the accountant's role from a bean-counter to a type of business advisor [18, 19]. Developments in advanced manufacturing technology [20], information technology [21] and Enterprise Resource Planning (ERP) [22] facilitated the decentralization of accounting information which discharged the accountant of much of their traditional scorekeeping duties [23], and the proliferation of an array of contemporary strategic management accounting (SMA) techniques enabled the accountant to play a key role in the development and execution of organizational strategy [24]. This 'business partner' placed greater emphasis on communication, people skills and general business acumen [25]. Their expanding role incorporated newer and wider dimensions such as consultant, advisor and change agent, but alongside the traditional function of financial monitoring and scorekeeping. Here we begin to observe the accountant influencing organizational behavior. As opposed to just retrospectively reporting results, accounting is being used to exert power, legitimize action and signify intent [26].

In unearthing an accountant who supports the organization in responding to changes in technology, product innovation, organizational structures and consumer markets we began examining accounting in a social and institutional context [27–30] and it is through this critical, multi-disciplinary lens we must look to the future of accounting. Technology substantially changed the nature of work for accountants intensifying the evolution of the accountant's role from a bean-counter to a type of business advisor [19]. Today, digital technology is impacting how organizations

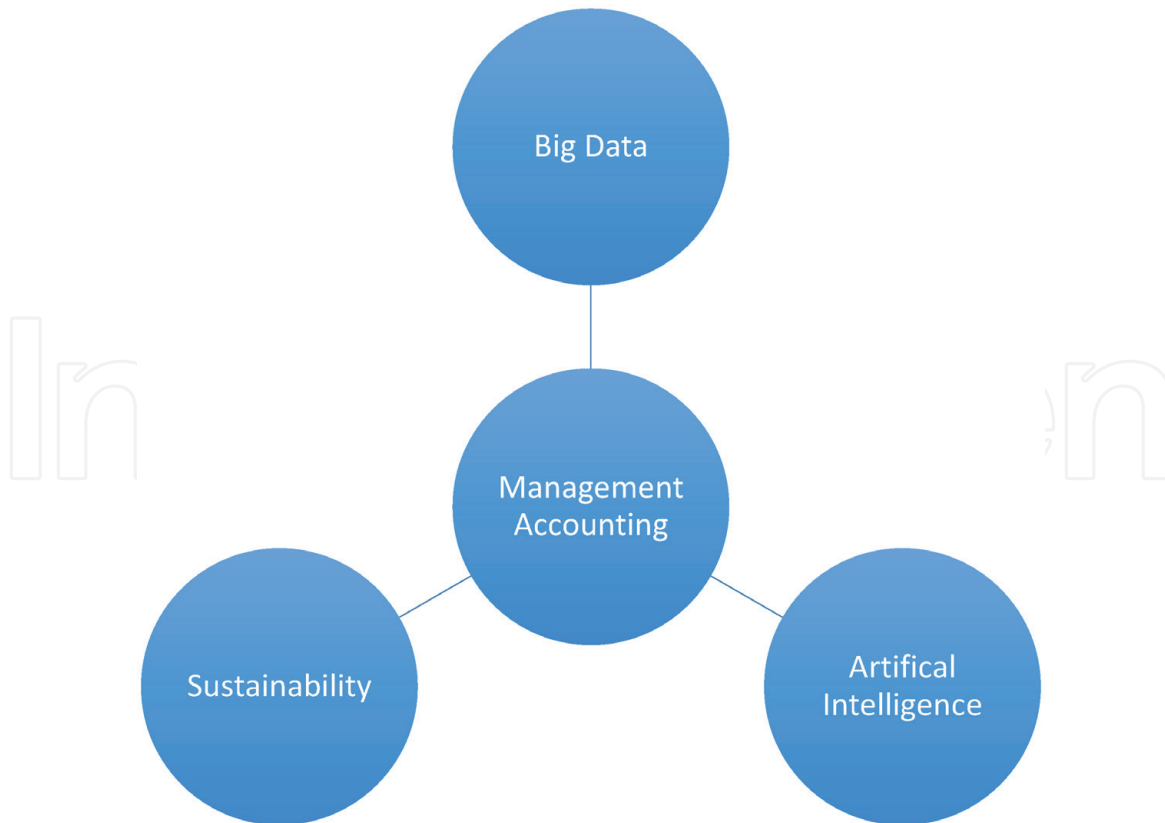


Figure 1.
Management accounting data flows.

process information, make decisions and formulate strategy. Digital technology blurs the boundary between inside and outside the organization, reshaping organizational relationships through enhanced connectivity and ever-growing interactions. The sociological map surrounding the accountant is growing. It has never been more important to explore the sociological implications of these organizational changes so as to understand the existing and potential relationships between individuals, groups and organizations in the context of accounting information use.

The work of accountants will undergo major changes in the future as a result of technological advancement. Some roles and tasks will remain under the remit of the accountant but will evolve in nature, some will not be performed by humans at all and new roles will emerge as accountants increasingly collaborate with digital technologies. The next two sections examine the changing role of accounting in this complex and evolving business environment as it transforms in the wake of data and AI. In addition, as the growing research agenda around sustainability accounting acknowledges the increasing interaction between accounting and the society around them, section five looks at some of the information flows emerging from organizations' interactions with their physical and social environment and how this too has implications for the future role of accountants (**Figure 1**).

3. Big data

Data plays a central role in all aspect of society, from business to government to individuals' everyday lives. Data is behind everything we see, hear and do in the world. The term Big Data reflects the voluminous information flows emerging from today's data driven environment. It provides new ways of 'making sense of, doing work in, managing, or imposing control upon different aspects of the social world ([31], p. 1)'

The term itself is difficult to define but it is best understood in terms of the four Vs- huge volume, high velocity, broad variety and uncertain veracity [32]. The volume, velocity, and variety of this data simply means that vast amounts of transactions are quickly created and captured from a wide variety of sources [33]. Veracity refers to the accuracy and reliability of the data [34]. Ultimately, big data refers to enormous data sets which cannot be managed or analyzed using traditional software programs [35]. Automatic sensor devices, machine to machine communication, web site traffic, email and social media postings are continuously generating data [36]. This creates various technical challenges in terms of data access, storage and processing but the real challenge is in determining how to effectively use this data to make organizations better. Data is a corporate asset now [37] and effectively managing data has become critical to establishing and maintaining competitive advantage [38]. Organizations have been forced to expand the scope of their information system from traditional internal data processing to automated data capture connecting businesses to suppliers, affiliates and consumers on a real time basis. Critically, the organizations's data ecosystem is expanding [32] and this significantly affects how data are accumulated and recorded, how reports are processed and assembled and ultimately how management uses data to achieve its objectives. As a result, in addition to being more commercially focused and strategically aware, the accountant's scope of analysis has broadened.

Let us be clear, accumulating data is relatively easy. For it to be useful in a management accounting context it must be understood, mined, analyzed and incorporated into control and decision-making. Accounting, in a broad sense, provides a set of techniques, rationales and practices for doing this kind of work relatively efficiently. And indeed several scholars have suggested how big data ought to be successfully integrated into accounting and control systems [32, 36], decision-making processes [39, 40]; operational and strategic planning [41, 42] and management control [32]. For instance, traditional budgeting has been criticized for its inward focus, preventing rapid reactions to changes in the business environment and stifling creativity and innovation [43–48]. The Beyond Budgeting model developed in response to these criticisms reflects a more agile and people oriented organization which ties organizational goals to peers, competitors and global benchmarks [49]. Big Data is poised to enhance Beyond Budgeting methodologies by incorporating a broad array of data streams enabling the development of new and alternative ways of analyzing and controlling organizational performance.

We are, however, lacking empirical insight as to whether this is actually happening, and if it is, how. Big data can offer accountants opportunity for further re-invention. They are experienced at gathering and analyzing financial data and this experience can be applied to a variety of non-financial and other data sets, but for this data to have a management accounting application, the accountant will need to upskill- to bridge the gap between themselves and the IT department, specifically, the data scientist who traditionally manages data [50]. Again, accumulating data is easy. Arguably, analyzing data is also relatively easy. But effectively incorporating this data into management accounting procedures and practices requires a proactive effort on the part of the management accountant and this requires education at a professional level- developing a stronger skillset in the techniques and technologies of big data in combination with the accountant's natural analytical skills [51].

A consistent feature of the literature relating to management accounting and big data is its prevalence of largely normative assertions suggesting how big data ought to enhance accounting processes and information and the role the accountant ought to play in facilitating this. Empirical reviews testing these assertions are scarce and so we are left with a limited understanding of where the accountant sits in this new organizational map. Future research in this area must explore how big data and

accounting interact within a social and institutional context. A critical view should be used to explore how the varying motivations and objectives of different users and groups of users are implicated in this evolving relationship. Big data is more than a technical phenomena and to understand it in an accounting context requires an exploration of its social origins.

4. Artificial Intelligence

Artificial Intelligence [AI] and related technologies were initially prevalent in more process-oriented activities but have now progressed into the knowledge sector, creating a unique opportunity for professionals to rethink how they engage with their role in an organizational context [52]. While some suggest that a variety of accounting roles will be replaced by AI-related technologies [53] there is a growing recognition that accounting can in fact harness AI's potential to add value to organizations [54, 55].

AI systemizes activities which are associated with human intelligence including planning, learning, reasoning, problem solving, knowledge representation, perception, manipulation, and to a lesser extent, social intelligence and creativity [56–58]. The key difference between an AI and a non AI application is that AI tools learn to do their job and advance based on experience without being explicitly programmed [59].

AI methods such as data mining and machine learning extract knowledge and learn how to act and interact with their environments. Data mining extracts knowledge from large volumes of data using techniques such as regression, classification, association rules, pattern recognition, outlier detection, anomaly detection, and clustering [60]. Data mining techniques used in machine learning predict future outcomes by identifying patterns in clusters of data and building models of what is happening in the data. Machine learning is an application of AI that enables systems to learn and advance based on experience. Deep learning is a specialized form of machine learning that emulates the way the human brain works by processing information and building patterns for making decisions. It uses computational models involving several processing layers to learn representations and patterns of data with multiple levels of abstraction [61]. Essentially computers are teaching themselves to write software to solve problems and make decisions [62].

While AI presents a number of opportunities and challenges for the discipline, it is not an entirely new phenomenon in an accounting context. First generation artificial intelligence in the form of expert systems, knowledge based systems and intelligent systems have existed for decades. Expert systems developed in the 1980s attempted to replicate human expertise and transform it into rules to perform accounting tasks [63]. They arguably did not live up to their potential [64], probably because they were based on 'if-then' rules and decision-trees which frequently codified flawed logic facilitating the same mistakes to be made over and over again [65]. However, with artificial intelligence supporting these knowledge-based systems, together with more emphasis on data analytics and the associated use of machine learning techniques, increased use of artificial intelligence in accounting seems inevitable [66].

The ability of AI technology to automate work, combined with the availability of big data as discussed earlier [32] together with the use of smart big data analytics [67, 68] elevate the true potential of AI to replace human endeavor [69]. With AI-based technologies, as people use and communicate with these tools, they are creating new routines while simultaneously facilitating the programming of autonomous working tools to take over certain areas of activity [70].

This raises questions as to which aspects of human work in accounting will be transferred to AI software. Prior research has focused on accounting and the automation of data processing and transaction based activities [71–73]. However, the digitisation of the accounting function using AI and big data analytics appears only to increase the network of people and software, both within and outside the organization, creating more data pools and, dare we say, more decisions [74]. It is as though the accounting function will be responsible for handling and using even more data [75] and the real value of digital technology will be in enhanced planning, control and forecasting in this significantly broader information ecosystem [76, 77].

It has been suggested that, societally, tasks requiring medium qualification levels are more likely to be digitized, meaning that individuals with low, or indeed high, qualification levels will still be required in the workforce [56]. In accounting, we have seen how the automation of more procedural tasks have freed the accountant up for more complex work [75, 78]. It is expected that digital technologies will continue this trend. AI and data analytics will increase the quantity and complexity of data and information flows increasing the demand for well qualified accounting professionals to use this information to good effect [79]. This suggests that the qualification level demanded of accounting professionals will continue to increase even when accounting systems increasingly incorporate AI technologies [74, 75]. Accountants themselves can play a key role in the implementation and operation of digital technologies in increasingly complex organizational settings. However, to achieve what is characterized in the literature as a ‘human-machine symbioses’ accountants must develop competencies in digital technologies and analytics [80].

Again, research in this area, despite our enlightened sociological research agenda, is largely normative consisting mainly of assertions as to how accountants can engage with AI, or more alarmingly, how accountants will ultimately be replaced by AI! The reality is much more nuanced. The role of the accountant will indeed be subject to major change in the coming ten years in keeping with the broader digital transformation of society. Key accounting roles and tasks are set to stay- some will not be performed by humans but by AI. New accounting roles and tasks will emerge and will perhaps be performed by humans in collaboration with AI. It is clear that organizational structures, networks and boundaries are likely to shift as AI and human accounting functions interact with the similarly mixed accounting functions of external partners and third parties. This is where we see a real expansion in the sociological map surrounding the accountant. Understanding these phenomena in a social context will allow us to understand why accounting is evolving in response to AI in the way that it is and how things might be done differently.

5. Accounting and sustainability

In 1987, the United Nations (UN) World Commission on Environment and Development described sustainable development as meeting ‘the needs of the present without compromising the ability of future generations to meet their own needs’ [81]. The UN’s agenda for sustainable development centers around 17 sustainable development goals (SDGs) which have a variety of objectives including eradicating poverty and hunger, encouraging well-being, education and gender equality and promoting responsible consumption, climate change and environmental sustainability (see **Figure 2**). In 2019, Heads of State and Government gathered at the United Nations Headquarters in New York to comprehensively review progress in the agenda for sustainable development. This resulted in world leaders



SUSTAINABLE DEVELOPMENT GOALS



Figure 2.
The United Nation's 17 SDGs [82].

and leading sustainability activists collectively calling on governments, economies and the business sector to gear up for a decade of action and delivery on issues of sustainable development [83].

Businesses are becoming increasingly compelled to manage their social and environmental performance alongside their financial performance. The extent to which they do this will depend on the organization's core values, business strategy, external stakeholders, and regulatory environment but it is important to recognize that companies do not need to be 'in the business of sustainability' to ensure that sustainability objectives are integrated into their management accounting systems. A lot of what organisations do in their day to day activities and operations, is already subscribing to a sustainability agenda but there is now a growing recognition that prioritizing sustainability in areas like supply chain transparency, staff health and well-being and climate resilience creates organisational value, through brand recognition, conscious consumerism and even government support.

'Sustainability' has grown in prominence within the accounting literature [80, 84–87]. Research in the area covers broad territory, e.g. linking sustainability initiatives to company strategy [88], examining the efficacy of sustainability control systems [89], exploring accounting and sustainable development goals [90], examining carbon accounting [91] and investigating how management accounting can improve the organization's environmental performance [92] – but ultimately it recognizes that organizational decision making must be based on a combination of financial, ecological, and social data. Accounting, as a discipline, has leadership potential in this area. Accountants can help managers to understand the environmental and social impacts of business operations and benchmark their corporate, social and environmental performance. This requires further expansion of their role and some adaption of their management accounting toolkit, but accountants have proven adept at evolving in response to changes both within and around the organization – this simply represents the next stage in that evolution.

When discussing big data and AI we acknowledged the organization's expanding data eco-system. The growing sustainability accounting agenda reveals how organizations are also operating within a larger biophysical and social environment than

ever before [88]. Accounting in this context is complex – crossing organizational boundaries, impacting a broadening range of stakeholders resulting in a variety of implications for different aspects of the accounting sphere. However, academics have a moral imperative to move this topic even higher up the research agenda. We need to better understand what motivates corporations to pursue different sustainability strategies, and how managers implement effective management accounting and control systems to achieve improved sustainability outcomes.

6. Conclusions: future directions for management accounting research

It is clear that the continued development of accounting will be subject to technological change in the form of big data and AI which will place new demands on the accountant. The lack of necessary skills and competencies to handle these technologies is still a major barrier to a fully successful partnership between digital technology and accounting. The accounting profession has traditionally lagged general business adoption of emerging technologies [93] so the professional bodies as well as educators at university level have a role to play in improving the technical preparedness of future generations of accountants. As well as an upgrading of qualifications, these technologies demand new forms of collaborations and interactions. Accountants must play a key role in bridging the gap between the business functions and the data scientist, the current custodian of the big data treasure chest [32]. With all of this in mind it is not possible to fully assess the effect these technologies will have on the role of accounting as a whole, but it is clear that some form of human–machine symbiosis is on the horizon and this requires critical and continuous attention from researchers [94, 95].

Accounting and the practice of accounting permeates society and nowhere is this more evident than in the continued quest to incorporate management accounting and calculative mechanisms into societal and environmental matters [96]. Organizations are under increasing pressure to behave in an environmentally sustainable and socially responsible manner whilst still maintaining profitability. Big data and AI facilitate the expansion of the organizations data ecosystem, the growing sustainability imperative broadens the organizations biophysical landscape creating even more data flows.

Let us be clear, the goal of management accounting remains unchanged. Its primary function is to support planning, control and decision-making, but accounting cannot simply be understood in terms of its functional properties. Yes, accounting is about measuring, calculating and reporting but, ultimately, it is a socially constructed set of actions in which organizational individuals construct, reconstruct, and interpret accounting information depending on how they personally interact with the management accounting system as well as their exposure to other systems throughout these interactions [97]. Management accounting has proven its capacity to adapt and evolve in response to an increasingly unpredictable and innovative environment [98], and accountants have already demonstrated their ability to mediate between internal and external parties with regard to expectations and deliverables [99]. But this chapter demonstrates the extent to which future developments in accounting, and the research which explores these phenomena, must have big data, AI and sustainability at its core.

This chapter calls for a deeper understanding of the relationship between accounting and big data, AI and sustainability, which moves beyond normative assertions and suggestions of how things ought to be. Future research in accounting must acknowledge that boundaries shift and alter in time and space [100]. According to Quattrone ([101], p. 120) ‘the realm of the measurable’ is expanding

with the result that research approaches characterized by epistemological diversity, framed in psychology, sociology or organizational theory will provide a fresh perspective in examining the evolution of accounting in a less static way.

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