

## **Management accounting**

Theory and practice

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### **Overview**

The term ‘management accounting’ lacks a clear, universally accepted definition. This chapter uses the term to encompass the related activities of ‘cost recording, costing, cost accounting, managerial accounting and management accounting’ (Boyns and Edwards 1997: 22). The historical literature discussed in this chapter indicates these activities have not been confined to the work of accountants but have also been undertaken by diverse groups including engineers, managers and entrepreneurs.

Mainstream accounting history journals have been dominated by the Anglo-Saxon world until relatively recently. However, building upon the pioneering efforts of a few individuals, such as Tito Antoni (Antonelli, 2017), and encouragement from leading scholars (e.g. Carmona and Zan 2002; Carmona 2004; Zan 2004b) a new cadre of researcher has widened the geographical scope of the management accounting history literature. For example, the *Handbook of Management Accounting Research* (Chapman *et al.* 2007) includes individual chapters on management accounting history not only in the UK (Boyns and Edwards) and the US (Fleischman and Tyson) but also in France, Italy, Portugal, and Spain (Carmona); China (Chow *et al.*); German-speaking countries (Ewert and Wagenhofer); the Nordic countries (Näsi and Rohde); and Japan (Okano and Suzuki). Some members of the new cadre of researchers have chosen to publish in their native tongues, resulting in a substantial knowledge loss to the traditional mainstream literature. Nevertheless, this chapter seeks to

recognise the wide geographical representation of the history of management accounting practice and, also, a variety of theoretical perspectives, in its examination of management accounting through to contemporary times.

This chapter parallels Garner's (1954) topical approach and it is organised into seven further sections: Theoretical frameworks; Pioneering studies in management accounting history; The search for origins; Debates in management accounting history; Time-honoured themes; Contemporary management accounting history; and Conclusions.

### **Theoretical frameworks**

Loft (1995) noted a range of theoretical frameworks employed by management accounting historians in their studies. Traditionalists tended to base their work on published literature and adopt an evolutionary perspective that saw management accounting in terms of ongoing technical improvement over time (e.g. Edwards 1937). Neoclassical revisionists set their archive-based company and industry case studies within contextual frameworks but continue to work within a paradigm that tends to stress the techniques of management accounting as used in pursuit of organisational efficiency and profit (e.g. Edwards 1989; Fleischman and Parker 1991). Building upon Hopwood's (1987) criticisms of a focus on techniques, Miller et al. (1991) used the term 'new accounting history' to encompass new, critical approaches to the writing of management accounting history, including: the Foucauldian power-knowledge framework that argues that management accounting is a device that makes the workforce visible and calculable, thereby enabling managers to control and discipline labour; and the genealogical approach that focuses on 'the outcomes of the past rather than the origins of the present' (Miller and Napier 1993: 631). Napier (2001) noted that, working from a sociological basis, new historians emphasise theory, generalisation and societal critiques

rather than the particulars of accounting history. There has been extensive debate between neoclassical revisionists and ‘new’ accounting historians (Sanchez-Matamoros and Hidalgo, 2011: 338). In their recent manifesto, Tyson and Oldroyd examined three debates between accounting historians in which they ‘believe certain authors crossed the line between politically committed history and social/political advocacy’ (2017: 35).

The ‘new realist economic rationalism’ (Boyns and Edwards 2013: 4) posits that the drive for efficiency and profit underlies the development of management accounting but it also acknowledges the potential influence of social, institutional and other factors. Setting a wider context, Luft has provided an analysis of ‘theoretical debates in historical research and their relevance to management accounting studies’ (2007: 269; see also Chapter 2)

### **Pioneering studies in management accounting history**

Prior to the late 1980s, academic analysis of the history of management accounting was sporadic, limited and confined largely to the European context. Pioneering studies provided evidence of industrial accounting prior to the publication of Pacioli’s *Summa* in 1494, in, for example, the cloth manufacturing operations of the Medicis, the Florentine ruling family (de Roover 1941) and the accounts of Christopher Plantin, a Flemish printer (Elder 1937). Other Italian textile operations were studied with particular reference to production cost control – the Dantinis in Prato (Brun 1930), the Bracci in Arezzo (Melis 1950), and Francisco del Bene & Co. (Sapori 1932).

Scheuermann (1929) described the accounting for the Fugger mining and smelting operations in Germany between 1548-1655. British industrial costing was explored in relation to decision making and planning in the late seventeenth century Newmills Cloth Manufactory

(Marshall 1980); production planning in the early eighteenth century Crowley ironworks (Flinn 1957, 1962); and in a treatise (Dodson 1759) on a system described (Edwards 1937; Solomons 1952) as an early example of batch costing in shoemaking. Other notable early-mid twentieth century studies of costing history included Littleton (1933), Yamey (1949), and Garner (1954).

Significant developments in the study of management accounting history occurred in the late 1980s. In their book *Relevance Lost*, Johnson and Kaplan (1987) argued that management accounting information was used to enable the management of decentralised American companies of the late nineteenth-early twentieth centuries. Furthermore, they contended that, in the 1980s, a period of economic crisis and rising international competition, American managers operated businesses by using management accounting systems that were outdated and not fit for purpose. This indictment of US managerial accounting was quickly seconded by a chorus of well-known theorists (Berliner and Brimson 1988; Bromwich and Bhimani 1989; Cooper and Kaplan 1988; Sakuri 1989; Shank and Govindajaran 1989). Although the Johnson and Kaplan thesis was subjected to heavy criticism (e.g. Fleischman 2009: 212-4), it had a significant impact in moving 'accounting's history centre-stage' (Ezzamel *et al.*, 1990: 157). Research into management accounting's history was also much aided and stimulated by Hopwood's *The archaeology of accounting systems* (1987) which recognised that most early studies had been technical in nature. Hopwood's call for historical research that probed more deeply into the forces underlying management accounting systems has been answered by subsequent generations of scholars.

Antecedents of management accounting may be found in the ancient worlds of China (Chow *et al.* 2007), Egypt and the Middle East (see Chapter 4 of this *Routledge Companion*), and

classical Greece and Rome (see Chapter 5); given the ongoing academic interest in the matter, particularly when related to practice and theory that have direct links to the present world, this chapter turns next to the search for the origins of management accounting.

## **The search for origins**

### *Iberian roots*

Within recent decades, a rich literature of Spanish management accounting history has developed. Although a particular focus has been placed on costing developments in a number of Spanish royal factories, developments in the estates of ecclesiastical institutions have also been researched by, for example, Fatjó (1991, 2001) and by Llopis *et al.* (2002) who have related how, at the Spanish Monastery of Guadalupe between 1507-1784, an accounting system was devised and employed to aid decision making in the management of lands and other business operations (see also Chapter 25). In their study of large rural estates in Catalonia, 1850-1950, Planas and Saguer (2005) noted the lack of a Spanish literature on agrarian accountancy until the twentieth century. They stated that the accounting records of the secular estates that they studied had few parallels with those of earlier ecclesiastical estates, given changes in administrative methods and social relationships. Moreover, they noted that this secular estate accounting bore little resemblance to modern accounting systems, given its lack of double-entry bookkeeping. Nevertheless, Planas and Saguer (2005: 178) argued that it ‘seems reasonable to associate the existence of accounting records with good estate management practice’, although few examples can be verified.

In industry, the Royal Soap Factory of Seville received a governmental monopoly in the late fourteenth century. The main focus of accounting there, in the sixteenth and seventeenth centuries, was the intricate calculation of production costs in order to determine a ‘just price’

for soap. Performance standards for raw materials and labour went into its determination. Outside experts were called in to observe testing procedures for these standards. Factory costs, including capacity considerations and opportunity costs, were also factored in (Carmona and Donoso 2004; Carmona 2007).

Carmona and Gómez (2002) studied the Royal Textile Mill of Guadalajara, 1717 - 44, and found that cost accounting technology was used to control raw material usage and waste as well as labour and management productivity. In contrast to the findings of Fleischman *et al.* (1995) that material standards typically predate labour standards, evidence at the textile mill suggested the reverse. One interesting feature was the utilisation of standards to compare the efficiency of native Spanish workers with that of imported Dutch labour.

Núñez (2002) wrote of the accounting associated with the gunpowder monopoly plied in the Spanish colony of Mexico (New Spain) during the seventeenth century. Accounting was necessary to track a very sensitive commodity through various stages of production. The system not only regulated the flow of work but provided for rewards and punishments to operatives and managers based on their relative efficiencies.

It is clear that the cost accounting advances in evidence at the royal factories rivalled the British Industrial Revolution (BIR) innovations in sophistication. The showcase for eighteenth century Spanish industrial accounting was the Royal Tobacco Factory of Seville. Gutiérrez (1993) investigated the Factory's archive and its costing practices which included production standards for the control of raw materials and labour (Alvarez *et al.* 2002; Carmona *et al.* 1997, 1998). Gutiérrez and Romero (2007) examined the implication of costing in quality-related decisions at the Factory. Gutiérrez *et al.* (2005) expanded the study

of Spanish industrialisation to encompass 13 large and medium-sized firms for the period 1760-1800, and confirmed the parallel between their Spanish findings and the UK-related findings of Fleischman and Parker (1991, 1997). The authors found that cost accounting methods of these firms varied as a function of product and ownership structure. Factories run by the Spanish government in monopolistic environments tended to be more successful than those operating under certain market conditions (Carmona 2007). By contrast, in later history, Macías (2002a, 2000b) has shown that privatisation had the opposite effect as far as managerial accounting is concerned. For example, when the tobacco monopoly was leased to the Bank of Spain in 1887, the use of cost data for decision making and the monitoring of managerial performance increased. Ultimately, the ‘imposing presence of the Spanish state in all spheres of life kept privately owned firms relatively small and unsophisticated, so there are few surviving records of cost management systems’ (Carmona 2007: 933). However, Guillén (2005) noted that, in an attempt to break the printing monopoly in Castile that was held by Plantin’s Flemish workshop, in 1732 a Spanish printer presented a costing analysis to the King of Spain in order to demonstrate that he could maintain quality standards whilst lowering prices.

Sánchez-Matamoros and Hidalgo (2012) employed a Foucaulian governmentality framework in analysing the roles of accounting in the implementation of the Spanish Ordinances of the Mints in 1730. They found that accounting was used managerially to deal with ‘three main issues: production control, the management of expenses and the registration of official documentation’ (2012: 363). Accounting was an essential element in developing tight control over the production of gold and silver coins and, thus, it supported government monetary policy.

A recent study of the Silk Factory Company in Portugal has seconded the claim made by Spanish scholars that purposeful cost accounting on the Iberian Peninsula predated the BIR and escalated the pace of innovation and the expansion of enterprises in which change took place. Matos Carvalho *et al.* (2007: 83) have pointed out that in the period 1745-7, whilst the Silk Factory Company was still under private ownership, albeit enjoying a governmental monopoly, not only was double-entry bookkeeping and the integration of its costing and financial accounts present, but a job-order costing system was operational that ‘allocated overhead costs to products, allowed for direct materials shrinkage, ... [and evinced] elements of a rudimentary standard raw material costing system’. Nevertheless, unfortunately, studies of Portuguese cost and management accounting history are scarce (Faria 2008).

### *The British experience*

In a significant addition to the literature, *A History of Management Accounting: The British Experience*, Boyns and Edwards (2013) adopted a perspective of ‘new realist economic rationalism’ (2013: 4) in which economic factors predominate but non-economic factors also exert influence over management accounting. They argued that the history of British management accounting should not be seen in terms of a ‘rise and fall’ (Johnson and Kaplan 1987) but in terms of continuity and change (2013: 277).

British management accounting did not begin with the BIR of c.1760-c.1850. Scorgie (1997) discussed the use of standards in pre-industrial England; management accounting may be observed in medieval ecclesiastical management and control (Dobie 2011, 2015), manorial estate management (Oldroyd and Dobie 2009), Crown budgeting in the Tudor era (Bisman, 2012) and in decision making (Freaar 1994) and the measurement and management of human performance (McLean 2009) in early seventeenth century farming (see also Chapter 15).



Merchants adopted double-entry bookkeeping in the seventeenth and eighteenth centuries and contemporary authors thought that a ‘compelling reason for adopting DEB [double-entry bookkeeping] was to enable businessmen to better manage their financial affairs’ (Boyns and Edwards 2013: 95). Pre BIR evidence of industrial accounting has been examined in the contexts of, for example, the copper, iron, charcoal-making and coal mining industries (Edwards *et al.* 1990; Edwards and Boyns 1992; Jones 1985; King 2010; Oldroyd 2007). Such industrial accounting employed ‘techniques designed to enable the businessman to plan for the future, choose between alternatives, control costs and enhance profit’ (Boyns and Edwards 2013: 125).

Mid-twentieth century authors argued that there was a shortfall in management accounting in the BIR (Solomons 1952; Johnson and Kaplan 1987) due to the prevailing high profit margins (Edwards 1937; Hudson 1977; Parker 1986; Pollard 1965) and a lack of accounting infrastructure (Parker 1986; Stacey 1954; Yamey 1960). However, Fleischman and Parker (1991) and Edwards (1989), argued that it was inconceivable that BIR entrepreneurs would fail to appreciate the value of cost accounting to their nascent enterprises. This optimism has been validated by the exposition of a contemporary literature (Boyns and Edwards 2013: 140-142) and a wealth of archive-based studies of BIR enterprises which have found evidence of the implication of management accounting in business planning, control and decision-making in, for example, iron making (Boyns and Edwards, 1997), shipbuilding (McLean, 1995) and coal mining (Brackenborough *et al.* 2001; Fleischman and Macve, 2002; Lloyd Jones, 2010). However, management accounting also played a role in social change. Toms and Shepherd (2017) demonstrated that accounting, and specifically knowledge of cost behaviour, played a part in the struggle to regulate working hours and the use of child labour during the BIR. Richardson illustrated how a ‘cost-based logic’ (2008: 124) was used by Rowland Hill in

1837 to illustrate the potential of postal services reform and Funnell *et al.* (2014) examined the roles of cost accounting in the planning, control, decision making and accountability processes of the voluntary hospital in Newcastle, 1840 – 1888.

The BIR has provided the setting for methodological debate between management accounting historians. Fleischman *et al.* (1996) and Fleischman and Radcliffe (2003) suggested that the insights furnished by researchers representing rival worldviews (see Fleischman *et al.* 1995; Bryer 2005) could contribute additively and synergistically (Fleischman and Macve 2002) to our understanding of vital historical periods such as the BIR. In a notable BIR research project (Bryer *et al.* 2007), Fleischman, an economic-rationalist, was joined by Bryer, a Marxist historian, and Macve, a Foucauldian, in an investigation of the Carron Company archive. Whilst there was consensus that the accounting methodology at Carron was impressive for its time, ultimately, the joint Carron project failed as the team split its findings into separate statements (Bryer 2006; Fleischman and Macve 2007). Ding and McKinstry (2012) extended the methodological range and scope of BIR research by using a systems/contingency model to explore the use of management accounting, including standard costing and budgetary control, in papermaking in Scotland, 1779-1965.

It may be noted that, despite its significance, the BIR ‘did not represent a major discontinuity [in management accounting]. Rather, it signalled an important phase in the evolution of cost calculation practices from the previous era through to developments in the post-1870 period (Boyns and Edwards 2013: 163-166).

*French cost accounting theory and practice*

Whilst the BIR featured a significant volume of costing activity over a wide range of industries and firms in the absence of a theoretical literature, corresponding developments in France were quite the opposite (Boyns *et al.* 1997). Focussed mainly in the 1820s, there was a spate of French theory at a time when French industrial enterprises were relatively small and family owned. Hence, adoptions of the innovations suggested were correspondingly few. Nevertheless, Lemarchand (2016) has examined the actors involved in the development and diffusion of French industrial accounting.

Payen (1817) related accounting systems at a carriage manufactory and a glue factory that resembled job-order and process-costing methods respectively, though he did not label them as such (Garner 1954). Payen is also credited with insights into the areas of transfer pricing, cost allocation, and the integration of cost and financial records (Garner 1954; Holzer and Rogers 1990). De Cazaux (1824), although he dealt primarily with agricultural accounting, had a better sense than Payen of input factors in costing individual transformation processes (Holzer and Rogers 1990) and was an early theorist on budgeting (Solomons 1952). Godard, who embodied both theory and practice, was the owner/manager of the Baccarat Crystalworks and the author of a managerial accounting classic, *Traité Générale et Sommaire de la Comptabilité Commerciale* (1827). Advances at Baccarat (Nikitin 1996) included rigorous quality control procedures, sensitivity analyses, the allocation of acquisition and installation costs over multiple periods, and an awareness of fixed and variable costs. Simon (1830) anticipated Johnson and Kaplan's arguments that there should be no period costs and that expenses such as rent, administrative salaries, and taxes should be allocated as overhead to productive processes (Garner 1954; Holzer and Rogers 1990). Moussalli *et al.* (2009) noted the view stated at the head of this section, that the literature on French cost accounting theory was ahead of French practice, but they argued (2009: 355) that

‘the early French industrial sector may have used the methods described by Payen well before 1817.’

Nikitin (1990) studied a number of other French industrial firms operating at approximately the same time as the theoretical outpouring. Saint-Gobain, a glass works, had implemented double-entry bookkeeping by 1820, and by 1880 had developed a full-costing system that included transfer pricing, depreciation, and the allocation of overhead cost to activity centres. Founded in the 1820s, the Decazeville iron works operated a disciplinary regime to control labour that was sufficiently impressive to cause Hoskin and Macve to link it to the Springfield Armory. Boyns *et al.* (1997) also found evidence that, by the late 1830s, managers of French enterprises were analysing the causes of cost variations.

#### *Italian developments*

Cinquini *et al.* (2008: 15) noted that management accounting ‘developed later in Italy than in Anglo-Saxon countries’ for reasons including late industrial development and protectionist economic policies. Nevertheless, in respect of the nineteenth and early twentieth centuries, researchers such as Antonelli *et al.* (2002) have analysed the rise of cost accounting in Italy; Mussari and Magliacani (2007: 87) have demonstrated ‘the role of accounting in the management control process’ in an agricultural context; and Mura and Emmanuel (2010) have examined scholarly debates on transfer pricing from the first half of the nineteenth century through to the first half of the twentieth century and noted that the ‘Italian scholars [involved] were aware of many of the issues that exist today’ (2010: 380).

Antonelli *et al.* (2017: 278) have examined the industrial accounting system of the Royal Silk Factory of San Leucio (RSFSL) for the period 1802-1826 ‘from a very broad perspective,

covering the social, institutional, organisational and accounting aspects'. The RSFSL was a hybrid organisation, built upon elements of both capitalism and socialism and, *inter alia*, it 'had a threefold form of control on labour' based on social controls within the community, surveillance in the workplace, and a system of labour accounting that 'enabled the General Superintendent to monitor each individual [worker's] performance' (2017: 291-292).

In their study of the development of cost accounting in Italy, c.1800 to c.1940, Antonelli et al. (2009: 465) noted that the relationship between cost accounting theory and practice 'is not well understood. They explored this relationship and, in doing so, shed light on 'diffusionist' and 'multiple origins' theories of costs accounting's genesis. They concluded that the multiple origins thesis may be more relevant to the nineteenth century but diffusion became increasingly important in the twentieth century, given the greater level of contact that existed with other countries and their firms and ideas. More broadly, Maran and Leoni (2018) have provided an analysis of Italian contributions to the accounting history literature.

#### *American events*

Chandler (1977), the noted economic historian, has made a strong case for the US transcontinental railroads of the mid-nineteenth century as the first corporations of a modern type. He argued that railroad accounting signalled the emergence of accounting from bookkeeping. Early US railroad accounting (see chapter 18) has been studied extensively by Heier (e.g., 2000); Flesher, Previts, and Samson (e.g., Flesher *et al.* 2003; Samson *et al.* 2006); and Hoskin and Macve (2007); while for UK railways, Arnold and McCartney (e.g., 2002, 2004) have written prolifically.

The Springfield Armory has provided the setting for contrasting analyses of management accounting history. Foucauldian scholars Hoskin and Macve (1988, 1994, 1996, 2000) dated the genesis of modern management from events that transpired at the Springfield Armory during the 1830s and 1840s. According to Hoskin and Macve, post-1840 productivity improvements were attributable to the ‘invention’ of managerialism, which they defined as managers’ ability to enforce accounting norms and exert discipline over labour. However, Tyson’s (1990, 1993, 2000) examination of the Springfield Armory archives revealed that a comprehensive piece-rate regime was in evidence as early as 1815. As an economic-rationalist, he concluded that economic factors (falling prices, skilled-labour surpluses, technological improvements, etc.) better explain management’s desire and ability to reduce piece rates and significantly increased productivity after 1841. Toms and Fleischman re-examined the cases of both the Springfield Armory and the British firm of Boulton and Watt; in each case, they found that ‘the management of internal-contractual relationships and a preoccupation with efficiency rather than profit or control through surveillance were the dominant explanations of accounting change’ (2015: 19).

Further debate has taken place over another contender for honours as the birth place of sophisticated American cost accounting – the New England textile industry (Johnson 1972). Cost accounting information, broadly interpreted, was first used in the US in a managerial manner in the New England textile industry of the early nineteenth century (Tyson 1992, 1998; Fleischman and Tyson 1998, 2007). Prior to that time, most businesses were small and entrepreneurial, and owners were hands-on managers. Large-scale textile manufacturing in New England reflected the transition from mercantile to industrial accounting. The New England mills were large, integrated and professionally managed. Cost accounting information included comparative costing between different mills, time periods, and product

lines. Comparative cost data were used in a number of managerial ways: make or buy decisions; comparisons of mill efficiency, and price- cost comparisons.

These and other traditional interpretations of early nineteenth century New England mill costing were countered by Hoskin and Macve (1996), who argued that the cost reports were based on arbitrary allocations and were clearly suboptimal, thus lacking managerial utility. Only at Springfield Armory, they countered, could managers discipline workers, hold them accountable to empirically based standards, and improve labour productivity. Tyson (1998) acknowledged that the formal ledger-based cost reports did result from simple averaging and allocations and that labour norms were never established in the New England mills.

Nevertheless, mill owners and managers clearly made do with sub-optimal information to make important and ongoing business decisions. In a recent study of cost accounting practices in US cloth mills in the 1820s, Gervais and Quinn (2016: 191) argued that, whilst ‘these practices were indeed institutionalised . . . a merchant mindset on costs and profits was engrained within them’, indicating the Industrial Revolution was a period of continuity in cost accounting rather than a dramatic break point.

## **Debates in management accounting history**

### *The theory/practice schism*

The schism in management accountancy’s past has featured a dichotomy between the volume and erudition of a period’s managerial accounting literature, on the one hand, and the prevalence of advocated methodologies within industrial enterprises on the other. At least two formative epochs have been misevaluated by historians who have drawn conclusions about management accounting in practice from the theoretical literature.

The first of these epochs concerns the BIR. Pollard's (1965: 248) oft-quoted claim that 'the practice of using accounts as direct aids to management was not one of the achievements of the British industrial revolution' led to a consensus of learned opinion, until c.1990, that cost accounting was in a nascent state during the BIR. However, there were several pre-1980 studies of individual BIR firms that inspired later researchers to look more deeply into the period. Most significant were Roll's book (1930) on Boulton & Watt, McKendick's article (1970) on Wedgwood, and Stone's investigation (1973) of the Chorlton cotton mills. The large-scale rehabilitation of BIR costing was initially undertaken by Edwards, Boyns and Newall (Edwards 1989; Edwards and Newell 1991; Boyns and Edwards 1996a, 1996b, 1997) and, working independently, Fleischman and Parker (1990, 1991, 1992, 1997). Ultimately, Pollard's claim was laid to rest.

The second epoch of theory/practice schism involves the scientific management era of pre-World War I America. By virtue of the vast outpouring of theoretical literature authored by luminaries such as Garcke and Fells (1887), Norton (1889), Church (1901), Taylor (1903, 1911, 1912), Emerson (1914), Gantt (1916), and Harrison (1918-19, 1930), many accounting historians considered this epoch the dawning of modern managerial accounting. However, the query suggested by the schism is, to what degree was this theoretical bonanza reflected in actual practice? Fleischman (2000) compiled a list of US businesses identified (Hoxie 1920; Nelson 1974; Epstein 1978) in the Taylor archives as firms that embraced scientific management. Instead of numbering in the hundreds as one might expect, the result was a rather meagre eighty.

So why is it that accounting historians have been misguided? The venerated cost accounting historians of earlier times, rather than undertaking archival research into BIR records, took it



for granted that since nobody was writing about industrial costing, there was nothing to write about. Even Pollard (1965), who did a substantial amount of archival investigation, tended to ignore the best evidence, examining letter books rather than production reports. It was much the same for the scientific management era but in reverse. Since so much was being written about time-and-motion studies, standard costing, and variance analysis, it was easy to assume that these innovations were embraced into practice. Great names representing each of the prevailing paradigms in managerial accounting history – Johnson and Kaplan (1987) for economic rationalism, Miller and O’Leary (1987) for Foucauldianism, and Hopper and Armstrong (1991) for Marxism – assumed prevalent standard costing in the US although subsequent researchers failed to find wide-spread evidence of its utilisation until after World War II. These scholars, like those who wrote the early BIR histories, had bigger fish to fry in their broad surveys than to concentrate upon a single component.

Of course, schisms between theory and practice do not necessarily last for ever. Lampe and Sharp, (2017: 73) noted that the work of late eighteenth-early nineteenth century German and Danish writers highlighting ‘the use of double-entry accounting for scientific and efficiency purposes [and] the calculation of economic returns’ in agriculture laid the foundations for nineteenth century developments in accounting practice which supported the ‘rapid modernisation and success of Danish agriculture’.

### *Sharing information*

Early cost accounting historians suggested that the dictates of competitive advantage militated against the dissemination of costing innovations during the BIR (Edwards 1937; Garner 1954; Urwick and Brech 1964; Wells 1977, 1978). Secrecy was offered as an explanation for the absence of a theoretical literature: since any public disclosure of costing

and pricing could lead to competitive disadvantage, cost accounting methodology could only have been passed by word of mouth (Garner 1954; Chatfield 1977). The debate continues, as evidenced by the differing views of the co-authors in Bryer *et al.*'s (2007) study of Carron.

Boyns and Edwards (2007) pointed out that the movement of individuals around the country was a catalyst for the dissemination of ideas. Two examples offered as proof were the activities of Smeaton, perhaps the second most famous BIR engineer behind Watt and its most prominent consultant, who seemed to pop up everywhere (Fleischman and Parker 1997), and the coal-mining 'viewers' who went from mine to mine performing a number of managerial functions including cost accounting (Oldroyd 1996; Fleischman and Macve 2002). McKinstry and Ding (2015) examined linkages between quantity surveyors and accountants in the building of Glasgow University during the mid-nineteenth century and the analysed the implications for management accounting change and the development of hybridised financial control. For the period c. 1890-1960, Kininmonth and McKinstry (2007: 387) offered a counter view on secrecy and argued that the British multinational thread-makers J. & P. Coats' [management] accounting systems 'incorporated high levels of secrecy, highly valued in the UK textile industry, probably because of the family orientation of its shareholdings'.

Spraakman and Margret (2005) provided evidence of the dissemination of management accounting practices from London counting houses to the British North American fur trade during the late eighteenth and early nineteenth centuries. Vent and Milne (1997: 77) noted that Australian 'cost accounting practices continued to evolve from and improve upon methods previously developed in Britain'. Vent (1991) also examined the activities of Bewick, Moreing & Co., a British firm of professional mine managers and consulting

engineers, who operated in like fashion to the viewers in Britain a century before. The dissemination of the various costing and measurement techniques that comprise scientific management indicates that secrecy was not a high priority. In 1910, John Jensen, on behalf of the Australian Defence Department, visited a number of leading American and Canadian manufacturers (e.g., Underwood, Colt, Remington, and a number of armouries including Springfield). Foreman (2001: 31) observed that he brought back Taylorite practices that became 'significantly modified' to conform to the control requirements and environment of the Australian government's munitions factories.

Antonelli *et al.* (2008: 62) reported that the Italian firm Ansaldo sent directors to the US and Germany in the 1910s to study scientific management. Destinations included such business giants as Ford, Bethlehem Steel, and Krupp. Agostino Rocca, an engineer who 'had a clear understanding of financial and management accounting, which he had developed abroad' (2008: 72) became Ansaldo's Chief Executive Officer and, in 1935, he established an office, the ONI, which unsuccessfully promoted studies and programs based on Taylorite methods. In the aftermath of World War II (1948), the Anglo-American Council on Productivity was established under the auspices of the Marshall Plan. American experts visited Britain as consultants and British missions to the US were undertaken to learn first-hand of American scientific management techniques. However, no great explosion of scientific management techniques eventuated for a variety of economic, cultural, and political reasons, but also because the methods touted by the Americans were already well known in Britain (Boyns and Edwards 2007; Fleischman *et al.* 2007). In 1954, Palle Hansen, founder of the Copenhagen Business School, was chosen by the Danish Ministry of Trade's Productivity Committee to lead a delegation on a six-week tour of the US (Näsi and Rohde 2007). The next year, the recently founded Japanese Productivity Center organized a similar study tour. Perhaps the

most significant story line here was the participation of Taiichi Ohno, years later the architect of Toyota's meteoric rise to greatness.

Diaz *et al.* (2009) conducted a study of the literature in order to examine the evolution of cost accounting in Spain, 1900-1978. They noted that the official standardization of Spanish cost accounting occurred in 1978 and was much affected by other European influences, particularly French and German, and by American thought. Lemarchand (2016) noted the diffusion of double-entry bookkeeping and industrial accounting between the countries of Europe and the regions of France in the eighteenth and nineteenth centuries. Bessire and Baker (2005) presented a critical analysis of the French *tableau de bord* and the American balanced scorecard, whilst Pezet (2009) questioned the specifically French nature of *tableaux de bord* and noted American influences on their development.

In addressing the 'sharing information' debate, it is useful to look beyond dissemination practices noted above and to consider how information may be shared within companies. Chandar *et al.* (2012) examined the American Telephone and Telegraph Company (AT&T) during the 1920s and noted that firm-wide 'conferences were extensively used to disseminate knowledge about new management accounting techniques and graphical communication throughout the firm' (2012: 56); they concluded that this had the beneficial effect of 'reducing the uncertainty associated with internal informational asymmetries that frequently arise in enterprises of great scale, scope and complexity' (2012: 35).

### *Scientific management*

It was not until the late nineteenth century that a costing literature appeared in significant volume. In particular, the engineering profession and its journal literature on the development

of scientific management launched cost accounting into the modern era. Sowell (1973: 524) wrote how ‘the industrial engineer, rather than the cost accountant, recognised the need for a revolution in the industrial order and initiated ideas that grew into predetermined cost techniques’. The contribution of the engineering profession and a host of individual commentators to the development of scientific management theory in the US is well documented (Garner 1954; Sowell 1973; Epstein 1978; Wells 1978; Fleischman 1996, 2000).

In the discussion that follows, there will appear frequent mention of standard costing as the *sine qua non* of scientific management. However, the term ‘standard’ has been used to signify a wide range of different approaches to costing. Fleischman and Parker (1991), for example, used the term for BIR enterprises that based standards on historical experience, sometimes only the preceding year’s results, and then compared those ‘standards’ to the current period’s actuals. Labour standards at Boulton & Watt were based on time-and-motion study, but were badly rounded and infrequently amended (Fleischman *et al.* 1995). The standard costing theory of the scientific management movement described here was at a much higher level of sophistication and science, with engineers determining optimal work routines and standards of efficiency. What was most innovative at this point in time was the advent of variance analysis techniques.

Early UK theorists (Garcke and Fells 1887; Norton 1889) also had significant insights on the subject. Garcke and Fells’ classic *Factory Accounts, Their Principles and Practice* is often regarded as the first truly authoritative contribution to cost accounting literature, although a case can be made for BIR theorists Hamilton (1777) for his insights on return-on-investment (ROI) and Babbage (1835) for his differentiation between fixed and variable costs. Garcke and Fells suggested the value of establishing norms of cost wherein the person best

acquainted with a particular process should estimate a probable cost in terms of wages and materials. They, as well as Mann (1903a, 1903b), argued for the allocation of overhead based on direct labour (hours or cost) and this became typical practice for decades. Nicholson (1909), meanwhile, made the case for machine hours. Church (1901), although critical of Taylor, did not differ substantively in his discussion of engineered standards and their utilisation in predetermining costs and comparing estimates with actual results (Sowell 1973). He argued that product and period costs (shop and establishment) could be applied to products using a variety of allocation bases, thereby presaging activity-based costing (ABC). He urged the establishment of production centres to facilitate these applications (Fleischman 1996; Johnson and Kaplan 1987). Norton (1889) and Dicksee (1911) spoke to the idea of having each processing department operate as a separate profit centre, with the development of transfer pricing to allow for the flow of costs throughout an enterprise. Solomons (1952) credited Whitmore (1908) with detailing a standard cost system based on the ideas of Taylor and Church, though he made original contributions in his own right in handling idle time and material use variations (Parker 1969; Sowell 1973). Emerson (1914) distinguished a new method of ascertaining costs contemporarily coming into vogue in large plants wherein costs were determined in advance of manufacturing.

Continental European theorists were heard during the Age of Taylor, although not on the subject of scientific management. Holzer and Rogers (1990) cautioned us not to ignore French contributions that were concerned with integrating cost accounting within DEB. Léautey and Guilbault (1889) emphasised the accuracy of the *prix de revient* and its overhead component. Croizé and Croizé (1907) made important distinctions between period and product costs (Holzer and Rogers 1990). In Germany, meanwhile, Ballewski (1877) considered cost behaviours at different output levels, and Tolkmitt (1894) analysed the role of

costing in management decision making (Coenenberg and Schoenfeld 1990). Schmalenbach (1899), early in his illustrious career, wrote of the dichotomy between fixed and variable costs and the appropriate exclusion of the former for purposes of cost estimation and pricing policy (Schweitzer 1992). Fayol, the managing director of a French mining company, has been identified alongside Taylor, as the embodiment of the classical management model Parker and Lewis (1995), although Parker (2016) stresses the diversity of Fayol's ideas along with their international and theoretical influence.

Yet it was Frederick Taylor, as the premier populariser and consultant on scientific management in its early years, who stamped the age with his imprimatur. A concentration on his ideas is not intended in any way to marginalise the systematising efforts of his collaborators or competitors, such as Barth, Emerson, Gantt, Gilbreth, and Thompson, all of whom shared many of the same ideas with nuances of difference. Taylor (1911) generalised scientific management to mean:

1. the deployment of science in management to replace rules of thumb;
2. harmony in industrial relations rather than discord;
3. cooperation in the productive process rather than individualism;
4. maximisation of output rather than restriction ('soldiering'); and
5. the development of each worker to maximum efficiency and, hence, economic well-being.

Taylor's industrial philosophy extended to such issues as machine layout and design, tool standardisation and tool-room reorganization, standard purchasing and stores methodology, and functional foremanship (a proliferation of supervisors each with a specialised expertise). However, method-study, stopwatch-based time study and incentive wage schemes were the

most central features of the emerging theory of scientific management (Taylor 1903, 1911). Taylor believed that the determination of incentive wages, based upon scientific time study and motivational considerations, could provide solutions to many, if not all, labour problems (Nelson 1975). However, in respect of Great Britain, Smith and Boyns noted that scientific management that featured an emphasis on the use of piecework led to ‘seriously problematic outcomes for industrial relations and performance in the manufacturing sector [particularly] in the three decades following the Second World War’ (2005: 210). Edwards (2010) provided a detailed case study of the introduction and use of job analysis on the London, Midland and Scottish Railway.

Other industrial philosophies were germinated that deserve mention as components of the scientific management movement. After 1918, ‘the development of rationalization movements . . . was widespread in Europe’ (Antonelli *et al.*, 2008: 56). Fordism featured mass production techniques and the payment of high wages to labour. Fordism was embraced in post-Revolution Russia, favoured by Lenin and inculcated into the early five-year plans. Bedaux, born in France but an early émigré to the US, functioned as an industrial consultant in the 1920s and 1930s, although his worldwide enterprise was founded pre-World War I. He disagreed with Taylor’s approach to time study and his Bedaux system was founded upon a scientific investigation of the relationship between a prescribed amount of work, the fatigue that it produced, and the time required for recovery. Based on these factors, an optimum rate of work and a standard time for any activity (expressed in Bedaux points) would be established. Bedaux’s system was immensely popular with businessmen and a British study concluded that a 50 per cent increase in productivity could be achieved by companies embracing the method. However, the hatred aroused amongst labour, which saw it as an ultimate ‘speeding’ device, led to numerous violent strikes in Great Britain and the US.



Consequently, Bedauxism suffered an ignominious death (Levant and Nikitin 2006) and the social Utopian concepts attributed to his work have been exposed as a myth (Levant and Nikitin 2009).

*Budgeting: governments and business*

In China, cost accounting had its genesis as a function of government budgeting and control rather than private-sector enterprise (Fu 1971; Guo 1988; Lin 1992, 2003). Similarly, there is ample evidence to suggest that, during the 1920s, budgeting was a lesson conveyed from government to business the US (Chapter 27; Gilman 1922). In 1921, J. O. McKinsey, a Chicago certified public accountant (CPA) published a series of nine articles in *Administration* which provided a cogent rationale for business budgeting, followed by an in-depth development of a master budget. He also described the importance of the budget committee and internal lines of authority and responsibility for effective budgetary control (McKinsey 1922; Marquette and Fleischman 1992). By the early 1930s, production budgeting had become well established. Rudimentary flexible budgets were introduced into the management literature by Maynard (1928) and Drucker (1929). Like government, business had learned that ‘there can be no effective control of...costs unless there is a proper classification of accounts’ (Rogers 1932: 196), with costs recorded by line item linked to the department that incurred them. Financial institutions contributed to the evolutionary process by according superior credit ratings to businesses that had instituted budgeting (Theiss 1937). From these beginnings, budgeting theorists began a decades-long process of formulating the psychological parameters of effective budgeting and the processes by which budgets could be most effectively constructed within business enterprises.

In pre-World War II Japan, “special companies” such as airlines ‘operated mainly in areas critical to the achievement of [the country’s] national policy goals, in particular economic growth and expansion/defence of the empire’ (Noguchi and Boyns 2012). In these companies, budgets served to legitimise ‘receipt of subsidies from the state’ (2012: 444). In 1938, Japan Air Transport was re-organised and became Japan Airways (JA), a semi-nationalised concern. Between 1938 and 1941, ‘the budget system at JA increasingly came to be used as a tool to control and coordinate operations in accordance with a pre-determined business plan [but . . .] when JA came under the direct control of the military with the start of the Pacific War, the role of budgets seem to have been pushed into the background’ (2012: 444-445). Thus, Noguchi and Boyns demonstrate ‘that the coercive power of the state . . . can vary over time’ (2012: 445).

#### *Standard costing and budgeting around the world*

The dissemination of scientific management was significantly aided by an international movement to spread the gospel. The First International Congress in Scientific Management was held in Prague in 1924. This event led to the establishment of national associations in several European nations to popularise and disseminate the new methodologies.

Fleischman *et al.* (2008) found that standard costing followed an evolutionary progression in Great Britain from World War I through the 1940s and 1950s and, as such, was not as much in arrears of US developments as had been popularly believed (Boyns 1998). The British pattern differs from findings in the US where standard costing developed slowly until the end of World War II and then underwent a substantial boom at least in quantitative, if not qualitative, terms. As in America, the literature suggests that knowledge of scientific methods came to Britain earlier than their widespread introduction into practice (Garner 1954).

Standard costing was mentioned frequently in the 1920s in *The Cost Accountant*. Boyns (1998, 2003) studied the archives of the Manchester firm Hans Renold Ltd. and found that standard costing emerged there in the 1910s following a consulting engagement by Church. Likewise, budgetary control was in evidence there as well as at Austin Motors in the 1920s.

In a response to Chandler (1990), Kininmonth and McKinstry researched thread-makers J. and P. Coats Ltd, c. 1890-1960, one of the UK's 'largest and most successful multinational companies' (2007: 367) and one where 'family members remained dominant on the board throughout most of the period studied' (2007: 369). Rather than employing the divisional organisational form, Coats achieved success via a series of subsidiaries and an extensive committee structure backed, *inter alia*, by management accounting controls on capital expenditure and cash, plus, from the 1930s, a formal budgeting system. Furthermore, in the mid-1930s, Coats engaged American expertise to help in the installation of a standard costing system.

In their study of shipbuilding, engineering and metals industries in the west of Scotland, c.1900-1960, Fleming *et al.* (2000) found that scientific management, standard costing and budgetary control were not in use because of factors related to the dominance of engineers over accountants; a difficult labour relations context; and the bespoke nature of contracts undertaken. Mclean and Tyson's (2006) study of the post-world War II Sunderland shipbuilding industry found that, in a major firm, the introduction of new technology, in the form of welding, stimulated modernisation and reorganisation and the consequent adoption of scientific management and standard costs. However, these new techniques were used for the calculation of piece-work rates rather than for management control. McLean and Tyson found that the use of engineering information for planning and control purposes and the

continuing dominance of the craft administration of the ship construction process inhibited the development of scientific management and standard costing in the shipbuilding industry. Although the concept of the governable worker is often linked to the disciplinary practice of standard costing, Edwards demonstrates that, in the British government's military establishments from the 1850s onwards, accounting 'played a key role in the formulation of disciplinary practices designed to construct a governable labour force some decades before' the advent of standard costing (2018: 36). Standard costing and budgeting were important elements in the management accounting systems adopted by newly-nationalised industries in the UK in the 1950s (Boyns and Edwards 2013: 239-240), although 'standard costing was a disaster' in the National Coal Board due mainly to frequent changes in standards (Berry *et al.* 1985).

The pattern in France more closely resembled the American experience. Standard costing was known in the 1920s, albeit not seen much in practice until the late 1950s or early 1960s (Carmona 2007). A few French firms, such as the car maker Renault, were in the vanguard at much earlier points in time (Bhimani 1993, 1994); budgeting had an earlier genesis in France (Berland 1998, 2001; Berland and Boyns 2002).

Antonelli *et al.* (2006) found that, in the 1880s, the Italian pottery giant Manifattura Ginori used comparisons of actual output and pre-determined standards as a basis for bonuses and punishments, although these standards were probably not scientifically determined. An Italian organization, ENIOS, was established in the 1920s to popularise and diffuse scientific management principles. However, the take-up was limited due to 'political and socio-cultural factors' (Antonelli *et al.*, 2008: 73).

Näsi and Rohde (2007) report that scientific management gained a 'foothold' in the Nordic countries from the early in the twentieth century. Ideas on standard and direct costing and budgetary control were introduced from the US in the 1950s and Kari Lukka has made a substantial contribution to the exploration of the behavioural aspects of budgeting (e.g. Lukka 1988).

Japan presents an interesting case. Okano and Suzuki (2007) identified Mitsubishi Electric, Toyobo, and Fukusuke as early developers of scientific management but as a version that was adapted to Japan's cultural environment. Taylorism made substantial inroads during the 1930s as its emphasis on efficiency was viewed as a means to promote recovery from the Great Depression. Standard costing was also promoted during the 1930s amongst governmental suppliers of war materiel as the militarists anticipated the road to war. Okano and Suzuki (2007) also reported that standard costing during the 1930s did not work well because of volatile price fluctuations and the nation's tax laws that did not accept standard costing for inventory valuation.

In the case of Australia, we have seen an example of the very early introduction of scientific management as a result of Jensen's efforts. However, progress was only made in governmentally run factories, so far as we know. Presumably private industry was too small to consider Taylorite innovations worthwhile. This pattern of adoption might also explain the situation in Spain where clear antecedents of scientific management were evident in the royal factories of an earlier time but had passed from the scene by the twentieth century. More perplexing was the absence of discussion of scientific management in German-speaking countries (Ewert and Wagenhofer 2007). Of course, the Germanic industrial scene in the 1930s was totally directed by the Hitlerian regime which did not see standard costing as

relevant to its war preparations. Given the meteoric recovery of German industrial capacity following the war, however, it might be expected that standard costing played a role.

### *Direct vs. absorption costing*

The 1950s and 1960s witnessed a theoretical battle royal between traditionalists defending absorption or full costing and ‘progressives’ advancing the cause of direct (variable/marginal) costing. Direct costing first appeared in popular parlance in a *N.A.C.A. Bulletin* article by Harris (1965), but it was not until the aftermath of World War II that numerous articles began to appear there and in its British counterpart, *The Cost Accountant*, in which the pros and cons of direct costing were argued. The American literature on this topic, which continued for several decades, has been collected in Marple (1965); the British literature has been reviewed by Dugdale and Jones (2003, 2005) and Baxter (2005).

Defenders of the orthodoxy argued that absorption costing was necessary as fixed factory overhead became an increasingly substantial component of product cost and, hence, inventory valuations. They felt that absorption costing provided better information for stockholders and the public at large. Also, it was argued, the analysis of cost into its fixed and variable components was not always a realistic proposition (Greer 1965: 151; Ludwig 1965) and that direct costing would lead to perilously low pricing. Dugdale and Jones identified support from non-academic sources for absorption costing in Great Britain. The Inland Revenue opposed direct costing because it felt that it would result in the loss of short-term tax revenues but, in the *Duple Motor Bodies* case (1961), it was told it could not force a taxpayer to use absorption costing. Nevertheless, the Inland Revenue continued to press its argument strongly. The accounting profession, through Recommendation 10 issued by the Institute of Chartered Accountants in England and Wales, favoured absorption costing for external

reporting purposes for the sake of consistency with past practice. Finally, trade associations, such as the printers, trying to effectuate uniform accounting amongst their memberships (Walker and Mitchell 1997), perceived absorption costing as the path of least resistance.

Given the perceived inaccuracies arising from the apportionment of fixed overheads between products (Luenstroth 1965), advocacy of direct costing was particularly strong amongst academicians. It was argued that, since all costs tend to be variable in the long-term, direct costing was appropriate for long-term pricing and planning policy decisions (Dugdale and Jones 2005; National Association of Accountants 1957). Furthermore, direct costing was perceived as better suited than absorption costing for such control tools as flexible budgeting, standard costing, cost-volume-profit calculations, and breakeven analysis.

In the 1950s and 1960s, the UK and US cost accounting professional organizations took opposite positions in the absorption costing v direct costing debate. The ICWA supported direct costing whilst the National Association of Accountants (1957), successor to the NACA, opted for absorption costing in its Research Series No. 23. In due course, standard-setting bodies on both sides of the Atlantic (the US Committee on Accounting Procedure and the UK Accounting Standards Steering Committee) made absorption costing mandatory for financial reporting.

In the Germanic countries, a system similar to direct costing was developed independently in the mid-1950s and early 1960s by Plaut, a management consultant, and Kilger, an academic. *Grenzplankostenrechnung* (GPK) was a 'widely used cost accounting system for cost planning and control purposes' (Ewert and Wagenhofer 2007: 1065). Its major features were the separation of variable ('relevant') costs from fixed costs for decision-making purposes

and the use of a variety of cost drivers and cost centres in tracking relevant costs through the production process. In many ways it may be seen as a forerunner of ABC. As with so many other cost accounting innovations, the Nordic countries seem to have followed in the footsteps of Germany, although Näsi and Rohde (2007) traced the originating spark of variable costing to the influence of the London School of Economics. As US costing literature began to supplant German as the most influential in the mid-1950s, a full-blown debate between full and variable costing emerged. Näsi and Rohde provided figures reflecting a vastly greater acceptance of variable costing in Norway than anything that occurred in the US or the UK: all Norwegian companies used full costing in 1948, but 45 per cent had adopted variable costing by 1963; by 1975, two-thirds of all companies in the country were using the method. By 1960, direct costing was also adopted widely in France given its relative simplicity compared to the existing equivalence methods (Levant and Zimnovitch 2013).

### **Time-honoured themes**

#### *The integration of costing records*

A time-honoured theme has been the timing of the integration of the costing and financial records within the context of DEB. Examples of DEB implementation were fairly universal by the eighteenth century with the possible exception of Japan where Kimizuka (1992) and Okano and Suzuki (2007) claim it was not in evidence until the 1870s, following the Meiji Restoration. The larger question is, when did the integration of the costing and financial records occur? Iberia is an interesting case. Carmona (2007) felt that the integration came late to Spain whilst Matos Carvalho *et al.* (2007), in a study of Portuguese cost accounting, found integration at the Silk Factory Company in the eighteenth century. Integration in France appeared in the immediate post-Napoleonic period, particularly evidenced at Godard's



Baccarat Chrystalworks . However, early factories operating under royal patent were not as successful in achieving cost accounting innovation in France as they were in Spain. After the Napoleonic era, French cost accounting improved markedly, helped in large part by integration (Boyns *et al.* 1997; Nikitin 1990, 1996). Manifattura Ginari, the Italian pottery concern, had DEB in place by the early 1900s (Antonelli *et al.* 2006) but, although there are surviving costing records, the authors are unable to state definitively whether they were integrated with the financial accounts.

Integration has been an important focus in the BIR rehabilitation project. Drawing on Jones (1985), Edwards (1989) reported the integration of the costing records at the huge Cyfarthfa iron enterprise in the 1780s. Bryer (2006) and Fleischman and Macve (2007) found evidence of integration at Carron from its foundation in 1760, overlooked by Campbell (1961) and Fleischman and Parker (1990) in earlier investigations. In a study of the shipbuilding industry, 1818-1917, McLean noted an evolution from mercantile-based integrated accounting through to ‘systems of contract accounting and costing incorporating financial and cost accounting sub-systems [given the need] to provide information for pricing decisions in a competitive environment during a period of technological and organisational change’ (1995: 142). Boyns and Edwards examined the advent of double-entry-based costing in an engineering firm, 1856-1863, and found that were developed by practitioners ‘in the absence of instruction from a relevant literature’ (2016: 187). However, the British literature did begin to develop shortly after this period (e.g. Burton 1900; Plumpton 1895).

Levant and Nikitin (2012) note that the integration of cost and financial accounting was regarded as natural in France until the 1940s, when State imposition of a standardised system

of financial accounting led to the separation of systems. An attempt to re-introduce integration by means of the *ystème croisé* failed because of insufficient support.

### *Cost accountancy and war*

The impact of war on the development of cost accounting has been mixed (see also chapter 28). Serious attention has been accorded to the Venice Arsenal during the sixteenth and seventeenth centuries; the US in the nineteenth and twentieth centuries; and to the impacts of World War I and World War II.

Zan (2004a) and Zambon and Zan (2007) explored the Venice Arsenal archives for the period 1580-1679. Carmona (2007) summarised the cost accounting advances found in this research. One innovation was a form of budgeting for planning and control purposes, with the involvement not only of accountants and supervisors but also the participation of shop floor 'gang bosses'. Other features of accounting at the Arsenal were the control of waste and the articulation of a system of rewards and punishments for operatives and foremen based ostensibly on expected performance. However, as Zan and Carmona both cautioned, the events at the Venice Arsenal, as well as at other governmental installations of this type, should be evaluated in the context of an organization committed to public welfare rather than profit-seeking.

In respect of the US, the Springfield Armory story has been noted already in this chapter as it is featured in debates over the origins of purposeful managerial accounting. If the events at Springfield augured cost accounting advance at military facilities, a counter-indication was the attempt of the US government to install Taylorite systems, particularly time-and-motion studies, at arsenals and other locations in the immediate pre-World War I era. There were

labour disruptions in response to these efforts, particularly at the Naval Shipyard at Mare Island and the Watertown Arsenal. The strike at Watertown in 1911 was so severe that the US Congress passed legislation prohibiting time study in governmental shipyards and arsenals, a prohibition that lasted from 1915 to 1949 (Fleischman and Marquette 2003).

There has been conflicting evidence with respect to the impact of war on cost accounting practice. The most famous study is that of Loft (1986) who wrote of significant advances in the UK during World War I. The improvement was magnified in Loft's estimation by her perception that the UK's costing expertise was effectively at ground zero in the pre-war milieu. Loft concurred with Chandler's (1984) view that the prevalence of family firms, coupled with the power of British trade unions, had forestalled interest in innovative management techniques, such as cost accounting systems. However, neither Loft's perception of the bankruptcy of British costing before the war (cf. Boyns 1993; Boyns and Edwards 2007) nor the developments she felt occurred during the war are agreed upon universally (cf. Fleischman and Tyson 2000; Marriner 1980; Boyns and Edwards 2007).

A similar lack of consistency in respect of the World War I period is reflected in the work of McWatters and Foreman (2005) in their comparative study of meat-packing concerns in Australia and Canada. Here, and in earlier work (Foreman and Tyson 1998; Foreman 2001), the war decade in Australia saw the advent of scientific management in governmental factories, the only industrial enterprises of significant size. Meanwhile, in Canada, the verdict was that the effect of the War on accounting was minimal. Quinn and Jackson examined the impact of World War I on management accounting at Ireland's Guinness brewery and found that, whilst the War was a driver of change, in essence 'existing practices guided the creation/adaptation of [new] routines' (2014: 191). Fleischman and Tyson (2000) found no

discernible costing innovations in the US as a result of World War I. In their examination of the Italian Ministry of War and Ministry of Munitions during World War I, Antonelli *et al* noted that ‘state accounts were constructed in ways which concealed the detailed costs of war and thereby shrouded dubious contracting arrangements in which embezzlement and bribery featured’ and they concluded that budget data and processes ‘were used to legitimate decisions and policy making in the area of managing war resources’ (2014: 155-156).

Noguchi *et al.* examined World War II relationships between accounting control and the Japanese military at Mitsubishi’s Nagoya Engine Factory (NEF) and found (2015: 204) that, as the military and the NEF interacted ‘their relationships became more cooperative and specific cost accounting features employed at the NEF came to be integrated into the military’s unified rules’. There is general agreement amongst all observers that the industrial environment of World War II (Caminez 1944; Hoyt 1943) had a negative impact on standard costing (Stempf 1943). Kohler and Cooper (1945: 306) concluded their 41-page survey of World War II accounting in the *Accounting Review* by observing that ‘accounting practice suffered perceptibly and even degenerated as the result of the war’, a finding that was confirmed by a later micro-level investigation of the Sperry Corporation (Fleischman and Marquette (2003).

#### *Uniform cost accounting*

Kallapur and Krishnan (2009) examined the long history of management accounting in India. They noted that the British established the East India Company (EIC) in the early 1600s and until 1850 it was not just a company but an imperial power in itself. The EIC employed ‘uniform accounting systems for comparability’ and managerial purposes (2009: 1400). Segelod and Carlsson argue that the emergence of uniform cost accounting principles in

Sweden in the early twentieth century ‘was closely associated with the development of new methods of standardized mass production and [American-influenced] engineers . . . not, as previously assumed, German cost accounting’ (2010: 359).

An early movement in the US featured the efforts of Harvey Chase to inspire uniform municipal accounting. This was carried forward in the municipal research bureau movement and its journal, *National Municipal Review*, but without much in the way of concrete results. A multitude of trade associations, established during the 1920s, tried to effect industry-wide costing uniformity. During the Great Depression, the US government attempted standardisation across virtually every industry in the hope of minimising unfair competition that might impair recovery efforts. Despite the weightiness of these efforts, absolutely nothing was achieved.

Rather more success was evident in the UK in the private sector with uniform costing efforts in the printing industry (Walker and Mitchell, 1996, 1997, 1998). Edwards *et al.* (2003: 25) studied uniform costing initiatives in the British steel industry, a cooperative venture between the British Iron and Steel Federation and various governmental regulatory agencies, commencing in 1935 and lasting for some 35 years. It was found to be a difficult arrangement as the companies on occasion refused ‘to supply neutral accounting numbers to help the government reach decisions’. However, in the post-World War II nationalisation of industries such as coal, railroading, and electricity, uniform accounting was demanded by the regulatory agencies.

Similarly, standardised cost accounting methodology was imposed in countries where the government closely controlled the economy. On the road to war in Japan, the adoption of cost

accounting standards was demanded by the government for all munitions suppliers (Okano and Suzuki, 2007: 1124). With regard to Italy, Cinquini *et al.* (2016) employed a genealogical perspective in examining the uniform costing system initiative developed by the Fascist government and the Confederation of Industry during World War II. In the post-World War II era, the Chinese government established uniform accounting rules for 'state-owned enterprises' (Chow et al. 2007).

### *The rise of the American mega-corporation and ROI*

A series of events of profound importance coexisted chronologically with the evolution of scientific management in America. These produced the rise of the decentralised mega-corporation. The two firms that have received extensive study from Chandler (1962, 1977; Chandler and Salisbury 1971) and Johnson and Kaplan (Johnson 1980a, 1980b; Kaplan 1983; Johnson and Kaplan 1987) are DuPont and General Motors (GM). Certainly, there were huge enterprises that predated these two, such as Carnegie Steel, Standard Oil, and the American Tobacco Company, but what differentiated DuPont and GM was the appearance of a managerial hierarchy that made a multidivisional structure feasible. Earlier industrial giants tended to be highly centralised, depending on an omnipotent CEO of the calibre of Carnegie, Rockefeller, or Duke. Drawing upon Williamson (1970), Johnson and Kaplan (1987: 98) explained:

Multidivisional organizations arose to supplant these markets [labour and capital] by internalizing the multi-activity operations of several integrated firms to earn higher asset returns than the market could elicit from the same firms if they operated independently.

Nowhere in the immense scrutiny of DuPont and GM was there mention of standard costing, time-and-motion studies, or the scientific development of work routines, although Pierre DuPont was impressed by the raw material and labour cost controls important in the Taylorite system (Johnson 1980a). Furthermore, Alfred Sloan (1964), long-time chief executive of GM and architect of its managerial structure, made no mention in his autobiography of scientific management being practised there.

The story of the DuPont Powder Company, founded in 1903, tells of the transition from a single to a multi-activity firm. As the organization became increasingly diversified during World War I and beyond, it became necessary to devise a management accounting system to control the value chain and to harmonise departmental performance with ownership interests. DuPont was the first major industrial firm in the US to be decentralised, although it continued to manifest certain centralised features that characterised nineteenth century enterprises. A number of innovative managerial accounting methods were devised to control the organization. The most ingenious and famous was the adoption of an elaborate return-on-investment (ROI) measure developed by Donaldson Brown. ROI was used primarily to make decisions about alternative uses of capital rather than in its more familiar role as a mechanism to evaluate managerial performance (Flesher and Previts 2007). This focus on capital investment decisions was a new development that came with diversification. Chandler pointed out that Brown's ROI formula was also used for more routine analyses of each mill's performance, the locating of inefficiencies, and the adjustment of plans and processes when appropriate. DuPont was also heavily involved in business forecasting for inventory control and central purchasing. In this regard, it stands as an early example of a demand-pull manufacturing environment, a forerunner of the just-in-time approach.

By 1918, Pierre DuPont had taken control of GM and brought Brown in to implement DuPont's accounting and financial control structures. Brown's ROI formula was used prominently, but more traditionally to evaluate divisional and managerial performance than at DuPont where the focus was on capital decisions. The art of forecasting was well developed at GM. Brown moved the organization forward from decision making based on past and present performance to conditions anticipated in the future. GM was a pathfinder in introducing a number of accounting and managerial methods common in today's world, including flexible budgeting, market-based transfer pricing, and divisional autonomy.

#### *The management accounting/financial reporting interface*

A major component of Johnson and Kaplan's (1987) indictment of US managerial accounting was its domination by financial reporting. An important cause of this domination is the requirement that inventory be reported using absorption costing despite the greater value of direct costing for managerial decision making.

The attempt in 1933 to establish industrial codes for most US industries caused cost accountants and the NACA's leadership to envision a golden age but these dreams were soon dashed (Fleischman and Tyson 1999). The Securities Acts of 1933 and 1934 mandated audited financial statements for all publicly traded firms, guaranteeing a high-profile role for public accountants. The impact of the Securities and Exchange Commission (SEC) on the US accounting profession has been incalculable. The Securities Acts formalised the audit process, limited its practice to Certified Public Accountants (CPAs), and glamorised that part of the profession. In essence, SEC audit regulations helped enforce a CPA-based career path for ambitious accountants.



The American experience has been replicated over time in France, China, and the UK. Carmona (2007) referenced Zimnovitch (1997) who observed the delay of standard costing's advent in France until the 1950s and 1960s because French accountants, struggling to attain professional status, stonewalled its implementation as it was perceived to be a non-accounting method. In China, meanwhile, Chow *et al.* (2007) have labelled the management research and education there as introductory, lacking in theorisation, and viewed as supplemental to financial accounting (Wang and Zhang 2000). The story of UK struggles has been detailed by Boyns and Edwards (2007: 980-4).

In many parts of the world, cultural and historical developments have combined to forestall the intertwining of the two branches of the profession. This is best reflected in the role of the controller. Okano and Suzuki (2007) commented that, in Japan, greater effort is given to the improvement of managerial accounting rather than financial reporting. In Japanese industrial enterprises generally, controllers are responsible only for the financial statements whilst tasks related to planning and control are relegated to lower organizational levels and personnel where greater expertise might well reside.

By contrast, in the Germanic countries, and probably among the Nordic nations, there has been a conscious effort historically to avoid integration (Ewert and Wagenhofer 2007). In Germany, the educational system is dichotomised into financial reporting and what is called 'controlling'. German students have the option to major in 'control' as distinct from accounting. The functions of the controller differ markedly from what is typical in the US. Stoeffel (1995) compared German and American controllers and found that the majority of US controllers were responsible for financial accounting, cost accounting, financial planning, financial reporting, and tax planning. Meanwhile, German controllers were more engaged in

operational planning, strategic planning, and capital budgeting. Ewert and Wagenhofer (2007) concluded that whilst, historically, a characteristic trait of German management accounting has been to divorce itself from financial accounting, the two branches are becoming increasingly reconciled in the contemporary world.

### *The professionalization of management accounting*

Whilst there has been a substantial volume of work done on the professionalisation of public accountancy (see chapter 11), there has been comparatively less carried out on similar processes for management accountants. In the British context, the limited but developing literature on management accounting in the new industries of the Second BIR of the late nineteenth-early twentieth centuries explores the continuing importance of engineers, rather than accountants, in the costing function of a diverse range of industries such as: vehicle making (McKinstry 1999); chemicals (Matthews et al. 2003); metal, engine-powered shipbuilding (McLean, 2013); electrical engineering (McLean et al. 2015); and electricity supply (McLean and McGovern 2017). However, Loft (1986, 1990) portrayed the growing influence of accountants in her study of the formation of the Institute of Cost and Works Accountants (ICWA) in the UK in 1919, a professional body which evolved into the present-day Chartered Institute of Management Accountants (CIMA) and the Association of International Certified Professional Accountants, CIMA's joint venture with the American Institute of Certified Public Accountants (AICPA).

Fleischman and Tyson (2000) explored struggles for dominance between engineers and cost accountants in the U.S.. The National Association of Cost Accountants was established in 1919 (Carey 1969). It evolved into the Institute of Management Accountants which, along with the industry section of the AICPA, is the professional organization for management

accountants in the US. However, as Sorensen noted, ‘in 2005, 85% of the [US] accountancy profession works inside organizations as accounting professionals and 15% of the profession works externally and performs public accounting services. In other words, most accountants are management accountants’ (2009: 1271).

Anderson (1996) related the early history of the Australian Institute of Cost Accountants, founded in 1921. This professional body grew out of the events of World War I and was modelled after the US and UK organizations founded two years before. However, growth in membership was slow, given a limited use of costing in the country and the lack of a professional journal until 1936. Verma (2015) explored the genesis of the Institute of Cost and Works Accountants of India during the period 1954 – 1959 and noted the political, economic, social and imperial factors underlying its establishment.

Coenenberg and Schoenfeld (1990) examined the development of management accounting in Germany, and Heinzelmann (2016) compared the development of the profession of management accounting in the UK and German-speaking countries. German accountants formed their first professional society in 1931. However, within two years, Hitler had risen to power and perverted the organization to his purposes. Cost accountancy was forced to serve the public interest as interpreted by the Third Reich. That meant that practitioners were instructed to undertake such heinous assignments as costing slave labour in the concentration camps and determining the cost efficient way to gas Jewish and other prisoners (Funnell 1998; Lippman and Wilson 2007). In 1937, the German government mandated the *Uniform Chart of Accounts*, the Goering Plan, which identified the purpose of accounting as pricing and unit valuation. After the fall of the Nazi regime, the common chart of accounts became voluntary, although practically all German firms continued to adhere to it.

Challenges remain despite the increasing professionalization of management accounting internationally. There has been a growth in the numbers and influence of women in the profession of management accounting, but it is still thought necessary to provide ‘advice and insights from senior female management accountants around the world’ (CIMA 2010: 1) about breaking the glass ceiling. Whilst seen to be of increasing importance, the ethical dimension of management accounting is ‘not . . . well addressed in the literature’ (Bampton and Cowton 2013: 557). Moreover, whilst CIMA (2017) has published advice on *Global Management Accounting Principles*, Hopper et al. (2009) note the relative paucity of management accounting in less developed countries.

#### *Contemporary management accounting history*

After World War II, accounting information came to be seen as increasingly relevant for managerial planning, control and decision-making activities (e.g. Demski 1967; Dopuch *et al.* 1967; Scapens 1991; Schmalenbach (1948); Schweitzer 1992; Simon *et al.* 1954; Parker 1969). This contemporary growth of interest amongst theorists and practitioners of the discipline is worthy of scrutiny in relation to the debates and themes of this chapter’s historical study of management accounting.

The integration of costing records and the management accounting/financial reporting interface continue to be live issues. In a paper that spans the period from c. 1860 to the early twenty-first century, Brandau *et al.* (2017: 82) noted that the contemporary German practice of ‘a partial integration of financial and management accounting . . . is not only shaped by its current environment, but also its historical path’. However, they warned that ‘a further abandonment of the German management accounting techniques, and a reliance on the IFRS

[International Financial Reporting Standards], may risk losing the benefits of detailed, technical, operational knowledge as the basis for management control'. Nevertheless, Schäffer and Binder (2008: 34) found that 'controlling' has become an established academic 'discipline of business administration in German-speaking countries'.

MacDonald and Richardson researched the schism between management accounting education and practice in North America during the period 1967 – 1997 and found that 'education lags practice and the length of the lag has increased since the early 1980s' (2011:365). Sorensen noted that, in the US, the contemporary environment and the 'knowledge, skills and abilities required for doing management accounting [are changing] at blistering rates' (2009: 1271). The theory/practice schism has also been addressed by Dimitru *et al.* (2011) who found that Romanian research journals tend to be focused on traditional costing and management accounting topics. However, Ihantola (2010: 156) noted that research findings in the 'behavioural, social and organizational aspects of budgeting . . . were already to be found in the newest Finnish textbooks' in the 1990s. Jansen argued that interventionist researchers can help to bridge the gap between management accounting theory and practice by using 'existing theoretical knowledge in shaping interventions that aim to solve a practical problem' (2018: 1486).

In terms of the professionalization of management accounting, Kurunmäki (2004) examined hybridisation in Finnish health care during the 1990s and noted the growing acquisition of management accounting expertise by medical professionals. Issues of this nature are also a feature of the contemporary history of management accounting in the UK.

In the immediate aftermath of World War II, the UK's Labour government created the National Health Service (NHS) and, also, brought industries such as coal mining, railways and the supply of gas and electricity into public ownership as nationalised organisations. In the 1980s and 1990s, nationalised industries were returned to private ownership under the Thatcher government's privatisation programme and there have been on-going changes in the NHS. These arenas of contemporary history have proven to be fertile ground for management accounting research.

Gebreiter (2016) examined the role of costing in the administrative functions of the NHS during the two decades after its post-World War II foundation but noted that, during this period, prevailing mentalities precluded its application in the area of clinical medicine. However, under the influence of Conservative governments of the 1980s and 1990s, the concept of internal markets was introduced into the NHS. Then, beginning in 1997, under a New Labour government, the NHS introduced 'a new system focused on regulation via inspection, performance measurement and comparisons between hospitals' aligned with 'a business-focused attitude and co-operative relationships between clinicians, managers and accountants' (Conrad and Uslu (2011: 46).

In a study of an 'Area' of the nationalised National Coal Board (NCB), Berry *et al.* found that many 'of the themes that have emerged from our observations emphasise the significance of tradition and culture for an understanding of management control in the NCB' (1985: 24). History weighed heavily in the coal mining industry and the long-established approaches, skills and methods of engineers and colliery managers were dominant: 'it was deliberate [policy] that [management] accounting and financial control should not intrude into the management of the Area'.

Mueller and Carter (2007) noted that economists and engineers were the dominant professional groupings in the UK's nationalised electricity supply industry but argued that post privatisation 'economists were joined by management accountants in what amounted to a hybridisation of economics and management accounting . . . and there was an interpenetration of accounting and economics into the sphere of engineering' (2007: 181).

In the broader context, McCartney and Stittle (2017) presented a detailed analysis of cost data in the privatised railway industry and concluded that 'rail privatisation has resulted in considerable additional costs: it was a major public policy error' (2017:1).

Issues related to hybridisation have also been studied in the UK private sector (e.g. Miller *et al.* 2008) whilst Pong and Mitchell (2006) have continued the direct v absorption costing debate in their examination of manufacturing companies, 1988 – 2002. Pong and Mitchell found that that 'stock [inventory] remains a substantial variable in profit measurement' and argued for continuing research (2006: 131).

In China, the government has played an important role in the development of accounting (Lu *et al.* 2009). The survey of Chinese management accounting by Chow *et al.* (2007) centred almost entirely on post-1949 events following the establishment of the People's Republic of China. The post-1949 industrial economy was comprised largely of state-owned enterprises (SOEs) which operated under uniform accounting systems. Accounting, both financial and managerial, was used as a governmental tool for central planning; budgeting started from handed-down targets rather than forecasting, and responsibility accounting was imposed at the group rather than the individual level. From the government's perspective,

management accounting was clearly secondary to financial reporting. However, O'Connor et al. (2004: 370) reported that Chinese SOEs 'increased their use of management accounting/controls' in the 1990s as a result of the government's economic reforms.

The story of Japanese management accounting is fascinating, given the dichotomy between myth and reality. Buzzwords associated with post-World War II Japanese management such as *kanban* (just-in time), *kaizen* (continuous improvement) and target costing imply managerial innovation and sophistication. Okano and Suzuki (2007) dispelled much of this as mythical, thus re-enforcing the work of Scarbrough *et al.* (1991) who surveyed a large number of Japanese firms and found that most used traditional cost accounting methods, such as single cost systems, payback and accounting rate of return for analysing investment opportunities, ROI and residual income for evaluating managers, and standard costing.

Okano and Suzuki (2007) noted the post-World War II influence of western management gurus on Japan's reconstruction and attainment of global competitiveness (Cooper 1995). Burrows and Chenhall (2012: 139) argued, in particular, that the target costing concept had 'North American rather than Japanese origins and can be conservatively dated to the late 1940s and probably back at least to World War II'. In addition to providing a 'traditional historical overview of the development of Japanese management accounting' (Black 2017: 388), Okano's (2015) *History of Management Accounting in Japan: Institutional & Cultural Significance of Accounting* examined target costing and organisational learning at Toyota and provided a case study of the application of contemporary Japanese approaches to management accounting to the European context. Takeda and Boyns (2014) examined the development of management accounting in Japan's Kyocera Corporation, 1959-2013; they noted (2014: 345) that the corporation's 'management accounting system is embedded within



a holistic management philosophy and the corporate culture which emanates therefrom' and that management's success depended upon the ability 'to harness latent cultural beliefs'.

McLaren *et al.* (2016) employed case analyses of three New Zealand firms to 'configure and explain the life (from birth to death) of a management accounting system (MAS)'. The MAS considered, based on the concept of Economic Value Added (EVA<sup>TM</sup>), were introduced during the 1990s but were abandoned after 12 – 15 years as 'the result of a progressive accumulation of factors that related to the three companies' troublesome experience with EVA over a considerable period of time and changes in their circumstances' (2016: 354).

The contemporary world offers many research challenges and opportunities for management accounting historians. Fleischman and Tyson (2007) noted that post-1970 America has been marked by continual change and innovation, multi-tasking flexibility, customer-focused creativity, and the need for continual cost reduction; they argued that traditional, labour-based standard cost systems were simply not designed to handle such an environment of constant change, flexible relationships, and continuous innovation. However, these challenges have been responded to, in the US and elsewhere. In the US context, Sorensen (2009: 1271) noted that in 'the past two decades management accountants have moved from data accumulators, financial reporters, data analysts, decision-supporters and business advisers to business partners. Top level management accountants are now emerging as members of the most important business decision-making groups guiding major organizational, operational and strategic choices'.

Management accounting theory and practice have been developed (Bhimani *et al.* 2015; Chapman *et al.* 2007; 2009), and new systems made available: for example, ABC, the

Balanced Scorecard and nonfinancial performance measures, and management accounting for quality and just-in-time. These developments have happened at ‘blistering rates’ (Sorensen 2008: 1271) and critical analysis by management accounting historians will help to deepen our understanding of them.

Many of the contemporary developments in management accounting could not have taken place without recent changes in information technology. Whilst ‘mechanical accounting’ (Wootton and Kemmerer 2007) and early computing (Boyns and Edwards 2013; Chandar 2012) have been studied (see also Chapter 6), the impacts of digitization (Bhimani 2007), social media and big data (Arnaboldi 2017) on management accounting remain to be placed in full historical perspective.

In 2006, Scapens reviewed changes in management accounting research over the previous 35 years and argued that ‘to make sense of the diversity in management accounting practices we need to understand the complex mish-mash of inter-related influences which shape practices in individual organisations’ (2006: 1). Surely, management accounting historians have an important role to play in developing our understanding of contemporary practices and concepts.

## **Conclusion**

Stimulated by Johnson and Kaplan (1987) and Hopwood (1987), historians of management accounting have moved beyond the confines of early, pioneering, studies and have brought their discipline to the centre stage of accounting’s history (Ezzamel *et al.* 1990: 157) during the last thirty years. New, critical approaches (Miller *et al.* 1991) to the analysis and writing of history have challenged the dominance of archive-based studies that build narratives of the

technical development of management accounting in the pursuit of profit (e.g. Edwards 1989; Fleischman and Parker 1991), leading to ongoing theoretical debate (Sanchez-Matamoros and Hidalgo 2011; Boyns and Edwards 2013; Tyson and Oldroyd 2017).

In the last twenty years in particular, the discipline of management accounting history has been in decline in the US (Matthews 2017) whilst histories from beyond the Anglo-Saxon world have been brought to wider attention. However, we still know relatively little about developments in many parts of the world, including South and Central America, Africa, and many regions of Asia and also, opportunities remain for further international comparisons of management accounting's continuities and changes throughout history.

The search for the origins of management accounting continues to attract researchers, particularly from Iberia, France and Italy as well as from the UK and the US, although recent additions to the US literature are rather limited in number. Over the last thirty years, researchers have engaged in a series of lively debates in management accounting history, including, for example, 'the theory/practice schism' and 'sharing information', whilst continuing to address time-honoured themes such as the integration of costing records and the professionalization of management accounting. Management accounting histories have ranged over wide time periods but much work remains to be done for epochs both before and after Industrial Revolution. Contemporary management accounting history is a growing focus of attention, offering opportunities for research into a period of rapid and pervasive economic, social, technological and organisational change, and for collaborative research between academics and practitioners.

## **Key Works**

**Boyns and Edwards (2013)** examines British management accounting history.

**Chapman et al. (2007; 2009)** contain collections of contemporary and historical chapters on many aspects of management accounting.

**Edwards (ed.) (2000)**, volume III, reprints seventeen of the most cited articles on cost and management accounting in accounting historiography.

**Fleischman (ed.) (2006)** contains a number of highly-regarded articles on cost and management accounting, especially in volume 1, part 2 (the great debates) and volume 2, part 3 (US scientific management).

**Johnson and Kaplan (1987)** is a book about the history of managerial accounting that helped to move the discipline of accounting history centre-stage.

## References

Alvarez, M. J., Gutiérrez, F. and Romero, D. (2002) Accounting and quality control in the Royal Tobacco Factory of Seville, 1744-1790: an historical perspective, *Accounting Business & Financial History*, 12 (2): 253-74.

Anderson, R. H. (1996) A history of the Australian Institute of Cost Accountants: a progress report 1921-1939, in: G. D. Carnegie and P. W. Wolnizer (eds) *Accounting History Newsletter 1980-1989 and Accounting History 1989-1994*, pp. 169-86 (New York & London: Garland).

Antonelli, V. (2017) Tito Antoni and the Internationalization of Accounting History Scholarship, *The Accounting Historians Journal*, 44 (1): 109-111.

Antonelli, V., Boyns, T. and Cerbioni, F. (2006) Multiple origins of accounting? An early Italian example of the development of accounting for managerial purposes, *European Accounting Review*, 15 (3): 367-401.

- Antonelli, V., Boyns, T. and Cerbioni, F. (2008) The development of accounting in Europe in the era of scientific management: The Italian engineering conglomerate, Ansaldo, c.1918-c.1940, *The Accounting Historians Journal*, 35 (1): 49-81.
- Antonelli, V., Boyns, T. and Cerbioni, F. (2009) The development of cost accounting in Italy, c.1800-c.1940, *Accounting History*, 14 (4): 465-507.
- Antonelli, V., Cerbioni, F. and Parbonetti, A. (2002) The Rise of Cost Accounting: Evidence from Italy, *Accounting, Business and Financial History*, 12 (3):461-486.
- Antonelli, V., D'Alessio, R., and Rossi, R. (2014) Budgetary practices in the Ministry of War and the Ministry of Munitions in Italy, 1915-1918, *Accounting History Review*, 24 (2-3): 139-160.
- Antonelli, V., D'Alessio, R., Rossi, R. and Cafaro, E.M. (2017) Accounting in hybrid forms of capitalist/socialist enterprises: A multiple interpretative approach to the Royal Factory of Silk of San Leucio, 1802-1826, *Accounting History*, 22 (3): 274-300.
- Arnaboldi, M., Busco, C. and Cuganesan, S. (2017) Accounting, accountability and big data: revolution or hype? *Accounting, Auditing & Accountability Journal*, 30 (4): 762-776.
- Arnold, A. J. and McCartney, S. (2002) The beginnings of accounting for capital consumption: disclosure practices in the British railway industry, 1830-55, *Accounting and Business Research*, 32 (4): 195-208.
- Arnold, A. J. and McCartney, S. (2004) Were they ever 'productive to the capitalist'? Rates of return on Britain's railways, 1830-55, *Journal of European Economic History*, 33 (2): 383-410.
- Babbage, C. (1835) *On the Economy of Machinery and Manufactures*, 4th edn (London: Charles Knight).
- Ballewski, D. (1877) *Die Calculation von Maschinenfabriken* (Magdeburg).

- Bampton, R. and Cowton, C.J. 2013 Taking Stock of Accounting Ethics Scholarship: A review of the Journal Literature, *Journal of Business Ethics*, 114 (3): 549-563.
- Baxter, W. T. (2005) Direct versus absorption costing: a comment, *Accounting, Business & Financial History*, 15 (1): 89-91.
- Berland, N. (1998) The availability of information and the accumulation of experience as motors for the diffusion of budgetary control: the French experience from the 1920s to the 1960s, *Accounting, Business & Financial History*, 8 (3): 303-29.
- Berland, N. (2001) Environmental turbulence and the functions of budgetary control, *Accounting, Business & Financial History*, 11 (1): 59-77.
- Berland, N. and Boyns, T. (2002) The development of budgetary control in France and Britain from the 1920s to the 1960s: a comparison, *European Accounting Review*, 11 (2): 329-56.
- Berliner, C. and Brimson, J. A. (eds) (1988) *Cost Management in Today's Advanced Manufacturing: The CAM-1 Conceptual Design* (Boston: Harvard Business School Press).
- Berry, A.J., Capps, T., Cooper, D., Ferguson, P., Hopper, T. and Lowe, E.A. (1985) Management control in an Area of the NCB: Rationales of accounting practices in a public enterprise, *Accounting, Organizations and Society*, 10 (1); 3-28.
- Bessire, D. and Baker, R. (2005) The French *Tableau de bord* and the American Balanced Scorecard: a critical analysis, *Critical Perspectives on Accounting*, 16: 645-664.
- Bhimani, A. (1993) Indeterminacy and the specificity of accounting change: Renault 1898-1938, *Accounting, Organizations and Society*, 18 (1): 1-39.
- Bhimani, A. (1994) Accounting and the emergence of the 'economic man', *Accounting, Organizations and Society*, 19 (8): 637-74.

- Bhimani, A. (2007) Management accounting and digitization, in A. Bimani (ed) *Contemporary Issues in Management Accounting*, pp. 69-91. (Oxford: Oxford University Press).
- Bisman, J.E. (2012) Budgeting for famine in Tudor England, 1527-1528, *Accounting History Review*, 22 (2): 105-126.
- Black, W.H. (2017) Book review: Okano, H., 2015 *History of Management Accounting in Japan: Institutional & Cultural Significance of Accounting*, Bingley: Emerald Publishing Group Limited).
- Boyns, T. (1993) Cost accounting in the south Wales coal industry, c.1870-1913, *Accounting, Business & Financial History*, 9 (3): 327-52.
- Boyns, T. (1998) Budgets and budgetary control in British businesses to c.1945, *Accounting, Business & Financial History*, 8 (3): 261-301.
- Boyns, T. (2003) In memoriam: Alexander Hamilton Church's system of 'scientific machine rates' at Hans Renold Ltd., c.1901-c.1920, *Accounting Historians Journal*, 30 (1): 3-44.
- Boyns, T. and Edwards, J. R. (1996a) Change agents and the dissemination of accounting technology: Wales' basic industries, c.1750-c.1870, *Accounting History*, 1 (1): 9-34.
- Boyns, T. and Edwards, J. R. (1996b) The development of accounting in mid-nineteenth century Britain: a non-disciplinary view, *Accounting, Auditing & Accountability Journal*, 9 (3): 40-60.
- Boyns, T. and Edwards, J. R. (1997) Cost and management accounting in early Victorian Britain: a Chandleresque analysis?, *Management Accounting Research*, 8 (1): 19-46.
- Boyns, T. and Edwards, J. R. (2007) The development of cost and management accounting in Britain, in C. S. Chapman, A. G. Hopwood and M. D. Shields (eds) *Handbook of Management Accounting Research*, pp. 987-1052 (Oxford: Elsevier).

- Boyns, T. and Edwards, J.R. (2013) *A History of Management Accounting, The British Experience* (Abingdon: Routledge).
- Boyns, T. and Edwards, J.R. (2016) The advent of double-entry-based costing practices in the British engineering industry: Ransomes of Ipswich, 1856-1863, *Accounting History Review*, 26 (3): 171-190.
- Boyns, T., Edwards, J. R. and Nikitin, M. (1997) *The Birth of Industrial Accounting in France and Britain* (New York: Garland).
- Brackenborough, S., McLean, T. and Oldroyd, D. (2001) The emergence of discounted cash flow analysis in the Tyneside coal industry, c.1700-1820, *British Accounting Review*, 33 (2): 137-155.
- Brandau, M., Endenich, C., Luther, R, and Trapp, R. (2017) Separation – integration – and now...? A historical perspective on the relationship between German management accounting and financial accounting, *Accounting History*, 22 (1): 67-91.
- Bromwich, M. and Bhimani, A. (1989) *Management Accounting: Evolution Not Revolution* (London: Chartered Institute of Management Accountants).
- Brun, R. (1930) A fourteenth-century merchant in Italy, *Journal of Economic and Business History*, 2 (3): 451-66.
- Bryer, R. A. (2005) A Marxist accounting history of the British industrial revolution: a review of the evidence and suggestions for research, *Accounting, Organizations and Society*, 30 (1): 25-65.
- Bryer, R. A. (2006) Capitalist accountability and the British industrial revolution: the Carron Company, 1759-circa 1850, *Accounting, Organizations and Society*, 31 (8): 687-734.
- Bryer, R. A., Fleischman, R. K. and Macve, R. H. (2007) Smith, Marx, or Foucault in understanding the early British industrial revolution? Paper presented at Seventeenth



Accounting, Business & Financial History Conference, Cardiff Business School, 14-15 September.

Burrows, G. and Chenhall, R.H. (2012) Target costing: first band second comings, *Accounting History Review*, 22 (2): 127-142.

Burton, F.G. (1900) *Engineers' and Shipbuilders' Accounts*, 2<sup>nd</sup> edn (London: The Technical Publishing Co.).

Caminez, D. B. (1944) Controlling costs with physical unit budgets, *NACA Year Book*, 25: 143-69.

Campbell, R. H. (1961) *Carron Company* (Edinburgh and London: Oliver & Boyd).

Carey, J. L. (1969) *The Rise of the Accounting Profession* (New York: AICPA).

Carmona, S. (2004) Accounting history research and its diffusion in an international context, *Accounting History*, 9 (3): 7-23.

Carmona, S. (2007) The history of management accounting in France, Italy, Portugal, and Spain, in C. S. Chapman, A. G. Hopwood and M. D. Shields (eds) *Handbook of Management Accounting Research*, pp. 923-40 (Oxford: Elsevier).

Carmona S. and Donoso, R. (2004) Cost accounting in early regulated markets: the case of the Royal Soap Factory of Seville (1525-1692), *Journal of Accounting and Public Policy*, 23 (2): 129-57.

Carmona, E. and Gómez, D. (2002) Early cost management practices, state ownership and market competition: the case of the Royal Textile Mill of Guadalajara, 1714-1744, *Accounting, Business & Financial History*, 12 (3): 231-51.

Carmona, S. and Zan, L. (2002) Mapping variety in the history of accounting and management practices, *European Accounting Review*, 11 (2): 291-304.

Carmona, S., Ezzamel, M. and Gutiérrez, F. (1997) Control and cost accounting practices in the Spanish Royal Tobacco Factory, *Accounting, Organizations and Society*, 22 (5): 411-66.

- Carmona, S., Ezzamel, M. and Gutiérrez, F. (1998) Towards an institutional analysis of accounting change in the Royal Tobacco factory of Seville, *Accounting Historians Journal*, 25 (1): 115-47.
- Chandar, N., Collier, D. and Miranti, P. (2012) Graph standardization and management accounting at AT&T during the 1920s, *Accounting History*, 17 (1): 35-62.
- Chandler, A. D. (1962) *Strategy and Structure* (Cambridge, MA: MIT Press).
- Chandler, A. D. (1977) *The Visible Hand: the Managerial Revolution in American Business* (Cambridge, MA: Harvard University Press).
- Chandler, A. D. (1984) The emergence of managerial capitalism, *Business History Review*, 58 (4): 473-503.
- Chandler, A. D. (1990) *Scale and Scope: The Dynamics of Industrial Capitalism* (Cambridge, MA: Harvard University Press).
- Chandler, A. D. and Salisbury, S. (1971) *Pierre DuPont and the Making of the Modern Corporation* (New York, NY: Harper & Row).
- Chapman, C. S., Hopwood, A. G. and Shields, M. D. (eds) (2007; 2009) *Handbook of Management Accounting Research*, Vols. 1 - 3 (Oxford: Elsevier).
- Chatfield, M. (1977) *A History of Accounting Thought* (Huntington, NY: Krieger).
- Chow, C. W., Duh, R. -R. and Xiao, J. Z. (2007) Management accounting practices in the People's Republic of China, in S. C. Chapman, A. G. Hopwood and M. D. Shields (eds) *Handbook of Management Accounting Research*, pp. 941-86 (Oxford: Elsevier).
- Church, A. H. (1901) The proper distribution of establishment charges, *Engineering Magazine*, 21: 508-17, 725-34, 904-12; 22: 31-40, 231-40, 367-76.
- CIMA 2010 *Breaking glass, strategies for tomorrow's leaders* (London: CIMA).
- CIMA 2017 *Global Management Accounting Principles* (London: CIMA).

- Cinquini, L., Marelli, A. and Tenucci, A. (2008) An Analysis of Publishing Patterns in Accounting History Research in Italy, 1990-2004, *Accounting Historians Journal*, 35 (1): 1-48.
- Cinquini, L., Giannetti, R. and Tenucci, A. (2016) The making of uniform costing in a war economy: The case of the *Uniconti* Commission in Fascist Italy, *Accounting History*, 21 (4): 445-471.
- Coenenberg, A. G. and Schoenfeld, H. M. W. (1990) The development of managerial accounting in Germany: a historical analysis, *Accounting Historians Journal*, 17 (2): 95-112.
- Conrad, L. and Uslu, P.G. (2011) Investigation of the impact of 'Payment by Results' on performance measurement and management in NHS Trusts, *Management Accounting Research*, 22 (1): 46-55.
- Cooper, R. (1995) *When Lean Enterprises Collide* (Boston: Harvard Business School Press).
- Cooper, R. and Kaplan, R. S. (1988) Measure costs right: make the right decisions, *Harvard Business Review*, 88 (5): 96-103.
- Croizé, A. and Croizé, H. (1907) *De l'Inventaire Commercial* (Paris: Librairie Comptable Pigier).
- De Cazaux, L. F. G. (1824) *De la Comptabilité dans une Entreprise Industrielle et Spécialement dans une Exploitation Rurale* (Toulouse: J. M. Douladoure).
- De Roover, R. (1941) A Florentine firm of cloth manufacturers, *Speculum*, 16 (1): 3-33.
- Demski, J. S. (1967) An accounting system structured on a linear programming model, *Accounting Review*, 42 (4): 701-12.
- Díaz, D.C., Hernández-Esteve, E., Caparrós, M.J.M., Toledano, D.S. (2009) 20<sup>th</sup> century publications on cost accounting by Spanish authors previous to the Standardization Act (1900-1978), *Accounting Historians Journal*, 36 (2): 139-179.
- Dicksee, L. R. (1911) *Advanced Accounting* (London: Gee).

- Dimitru, M., Calu, D.A. and Gorgan, C. (2011) A historical approach of change in management accounting topics published in Romania, *Accounting and Management Information Systems*, 10 (3): 375-396.
- Ding, Y.Y. and McKinstry, S. (2012) Paper trails: The development of management accounting at Alex. Cowan & Sons Ltd. Penicuik, 1779-1965, *Accounting History*, 18(1): 99-119.
- Dobie, A. (2011) A review of the granators' accounts of Durham Cathedral Priory 1294-1433: an early example of process accounting? *Accounting History Review*, 21 (1): 7-35.
- Dobie, A. (2015) *Accounting at Durham Cathedral Priory: Management and Control of a Major Ecclesiastical Corporation, 1083 – 1539* (Basingstoke: Palgrave Macmillan).
- Dodson, J. (1759) *The Accountant or the Method of Book-keeping* (London: J. Norse).
- Dopuch, N., Birnberg, J. G. and Demski, J. S. (1967) An analysis of standard cost variance analysis, *Accounting Review*, 42 (3): 526-36.
- Drucker, A. P. R. (1929) Budgeting and the sales quota, *Accounting Review*, 4 (1): 75-80.
- Dugdale, D. and Jones, T. C. (2003) Battles in the costing war: UK debates, 1950-75, *Accounting, Business & Financial History*, 13 (3): 305-38.
- Dugdale, D. and Jones, T. C. (2005) Direct versus absorption costing: a reply, *Accounting, Business & Financial History*, 15 (1): 93-5.
- Edwards, J. R. (1989) Industrial cost accounting development in Britain to 1830: a review article, *Accounting and Business Research*, 19 (76): 305-17.
- Edwards, J. R. (ed.) (2000) *The History of Accounting. Critical Perspectives on Business and Management* (London & New York: Routledge).
- Edwards, J.R. (2018) Towards constructing the governable worker in nineteenth-century Britain, *Critical Perspectives on accounting*, 50: 36-55.

Edwards, J. R. and Boyns, T. (1992) Industrial organization and accounting innovation: charcoal ironmaking in England 1690-1783, *Management Accounting Research*, 3 (2): 51-69.

Edwards, J. R. and Newell, E. (1991) The development of industrial cost and management accounting before 1850: a survey of the evidence, *Business History*, 33 (1): 35-57.

Edwards, J. R., Boyns, T. and Matthews, M. (2003) Cost, pricing and politics in the British steel industry, 1918-1967, *Management Accounting Research*, 14 (2): 25-49.

Edwards, J. R., Hammersley, G. and Newell, E. (1990) Cost accounting at Keswick, England, c.1598-1615: the German connection, *Accounting Historians Journal*, 17 (1): 61-80.

Edwards, R. (2010) Job analysis on the LMS: mechanisation and modernisation c.1930-c.1939, *Accounting, Business & Financial History*, 17 (1): 91-105.

Edwards, R. S. (1937) Some notes on the early literature and development of cost accounting in Great Britain, *Accountant*, 97: 193-5, 225-31, 253-5, 283-7.

Elder, F. (1937) Cost accounting in the sixteenth century, *Accounting Review*, 12 (3): 226-37.

Emerson, H. (1914) *Efficiencies as a Basis for Operation and Wages*, 4th edn (New York: Engineering Magazine Co.).

Epstein, M. J. (1978) *The Effect of Scientific Management on the Development of Standard Costing* (New York: Arno Press).

Ewert, R. and Wagenhofer, A. (2007) Management accounting theory and practice in German-speaking countries, in C. S. Chapman, A. G. Hopwood and M. D. Shields (eds) *Handbook of Management Accounting Research*, pp. 1053-87 (Oxford: Elsevier).

Ezzamel, M., Hoskin, K. and Macve, R. (1990) Managing it all by numbers: a review of Johnson and Kaplan's *Relevance Lost*, *Accounting and Business Research*, 20 (78): 153-66.

Faria, A.R.S., 2008 An analysis of accounting history research in Portugal: 1990-2004, *Accounting History*, 13 (3): 353-382.

Fatjó, P. 1991 Organización y gestión de una hacienda eclesiástica en la Cataluña de XVII: la cathedral de Barcelona, *Revista de Historia Económica*, XVII (1): 89-118.

Fatjó, P. 2001 La contabilidad de una institución eclesiásticas desde la perspectiva del historiador económico, *XI Congreso de la Asociación Española de Contabilidad y Administración de Empresas* (Madrid: AECA).

Fleischman, R. K. (1996) A history of management accounting through the 1960s, in: T. A. Lee, A. Bishop and R. H. Parker (eds) *Accounting History from the Renaissance to the Present*, pp. 119-42 (New York: Garland).

Fleischman, R. K. (2000) Completing the triangle: Taylorism and the paradigms, *Accounting, Auditing & Accountability Journal*, 13 (5): 597-623.

Fleischman, R. K. (ed.) (2006) *Accounting History* (London: Sage).

Fleischman, R.K. (2009) Management accounting: theory and practice in J.R. Edwards and S.P. Walker (eds) *The Routledge Companion to Accounting History*, pp.189-223 (London: Routledge).

Fleischman, R. K. and Macve, R. H. (2002) Coals from Newcastle: alternative histories of cost and management accounting in the northeast coal mining during the British industrial revolution, *Accounting and Business Research*, 32 (3): 133-52.

Fleischman, R. K. and Macve, R. H. (2007) Carron Company, non-Marxist perspectives: responses to Bryer. Paper presented at Fifth Accounting History Conference, Banff, 9-11 August.

Fleischman, R. K. and Marquette, R. P. (2003) The impact of World War II on cost accounting at the Sperry Corporation, *Accounting Historians Journal*, 30 (2): 67-104.

Fleischman, R. K. and Parker, L. D. (1990) Management accounting early in the British industrial revolution: the Carron Company, a case study, *Accounting and Business Research*, 20 (79): 211-21.

- Fleischman, R. K. and Parker, L. D. (1991) British entrepreneurs and pre-industrial revolution evidence of cost management, *Accounting Review*, 66 (2): 361-75.
- Fleischman, R. K. and Parker, L. D. (1992) The cost accounting environment in the British industrial revolution iron industry, *Accounting, Business & Financial History*, 2 (2): 141-60.
- Fleischman, R. K. and Parker, L. D. (1997) *What is Past is Prologue: Cost Accounting in the British Industrial Revolution, 1760-1850* (New York: Garland).
- Fleischman, R. K. and Radcliffe, V. S. (2003) Divergent streams of accounting history: a review and call for confluence, in: R. K. Fleischman, V. S. Radcliffe and P. A. Shoemaker (eds) *Doing Accounting History*, pp. 1-29 (Amsterdam: JAI).
- Fleischman, R. K. and Tyson, T. N. (1998) The evolution of standard costing in the UK and US: from decision making to control, *Abacus*, 34 (1): 92-119.
- Fleischman, R. K. and Tyson, T. N. (1999) Opportunity lost? Chances for cost accountants professionalization under the National Recovery Act of 1933, *Accounting, Business & Financial History*, 9 (1): 51-75.
- Fleischman, R. K. and Tyson, T. N. (2000) Parallels between US and UK cost accountancy in the World War I era, *Accounting, Business & Financial History*, 10 (2): 191-212.
- Fleischman, R. K. and Tyson, T. N. (2007) The history of management accounting in the U.S., in C. S. Chapman, A. G. Hopwood and M. D. Shields (eds) *Handbook of Management Accounting Research*, pp. 1089-107 (Oxford: Elsevier).
- Fleischman, R. K., Boyns, T. and Tyson, T. N. (2008) The search for standard costing in the United States and Britain, *Abacus*, 44 (4): 341-376.
- Fleischman, R. K., Hoskin, K. W. and Macve, R. H. (1995) The Boulton & Watt case: the crux of alternative approaches to accounting history?, *Accounting and Business Research*, 25 (99): 162-76.

- Fleischman, R. K., Kalbers, L. P. and Parker, L. D. (1996) Expanding the dialogue: industrial revolution costing historiography, *Critical Perspectives on Accounting*, 7 (3): 315-37.
- Fleming, A.I.M., McKinstry, S. and Wallace, K. (2000) cost accounting in the shipbuilding, engineering and metals industries of the west of Scotland, 'The workshop of the empire', c.1900-1960, *Accounting and Business Research*, 30 (3): 195-211.
- Flesher, D. L. and Previts, G. J. (2007) Donaldson Brown (1885-1965): twentieth-century financial management innovator. Paper presented at Business History Conference, Cleveland, 31 May-2 June.
- Flesher, D. L., Samson, W. D. and Previts, G. J. (2003) Accounting, economic development, and financial reporting: the case of three pre-Civil War US railroads, *Accounting History*, 8 (2): 61-77.
- Flinn, M. W. (1962) *Men of Iron: the Crowleys in the Early Iron Industry* (Edinburgh: Edinburgh University Press).
- Flinn, M. W. (ed.) (1957) *The Law Book of the Crowley Ironworks* (Durham: Andrews).
- Foreman, P. (2001) The transfer of accounting technology: a study of the Commonwealth of Australia government factories, 1910-1916, *Accounting History*, 6 (1): 31-59.
- Foreman, P. and Tyson, T. N. (1998) Accounting, accountability and cost efficiency at the Commonwealth of Australia clothing factory, 1911-1918, *Accounting History*, 3 (2): 7-36.
- Fu, P. Y. (1971) Government accounting in China during the Chou dynasty, *Journal of Accounting Research*, 9 (1): 40-51.
- Frear, J. (1994) Robert Loder, Jacobean management accountant, *Abacus*, 6:25-38.
- Funnell, W. N. (1998) Accounting in the service of the Holocaust, *Critical Perspectives on Accounting*, 9 (4): 435-64.
- Funnell, W., Holden, A. and Oldroyd, D. (2014) Costing in the Newcastle Infirmary, 1840-1888, *Accounting, Auditing and Accountability Journal*, 27 (3): 465-488.



- Gantt, H. L. (1916) Production and sales, *Engineering Magazine*, 50: 593-600.
- Garcke, F. and Fells, J. M. (1887) *Factory Accounts, their Principles and Practice* (London: Crosby, Lockwood).
- Garner, S. P. (1954) *Evolution of Cost Accounting to 1925* (University, AL: University of Alabama Press).
- Gebreiter, F. (2016) “Comparing the incomparable”: Hospital costing and the art of medicine in post-war Britain, *The British Accounting Review*, 48: 257-268.
- Gervais, P. and Quinn, M. (2016) Costing in the early Industrial Revolution: gradual change to cost calculations at US cloth mills in the 1820s, *Accounting History Review*, 26 (3): 191-217.
- Gilman, S. (1922) Discussion, *NACA Year Book*, 3: 263-6.
- Godard, M. (1827) *Traité Général et Sommaire de la Comptabilité Commerciale* (Paris).
- Greer, H. C. (1965) Alternatives to direct costing, in: R. P. Marple (ed.) *National Association of Accountants on Direct Costing*, pp. 147-58 (New York: Ronald Press).
- Guillén, J.M. (2005) The Bordázar Memorandum: cost calculation in Spanish printing during the 18<sup>th</sup> century, *The Accounting Historians Journal*, 32 (2): 81-103.
- Guo, D. (1988) The historical contribution of Chinese accounting, in: A. T. Craswell (ed.) *Collected Papers of the Fifth World Congress of Accounting Historians*, pp. 1-8 (Sydney: University of Sydney).
- Gutiérrez, F. (1993) ‘Distribución Espacial y Cambio Contable: El Caso de la Real Fábrica de Tabacos de Sevilla en el Siglo XVIII’, unpublished thesis, University of Seville.
- Gutiérrez, F. and Romero, D. (2007) The 1770s, a lively decade for quality control: the case of the Royal Tobacco Factory of Seville, *Accounting History*, 12 (4):393-415.
- Gutiérrez, F., Larrinaga, C. and Núñez, M. (2005) Pre-industrial revolution evidence of cost and management accounting in Spain, *Accounting Historians Journal*, 32 (1) 111-48.

- Hamilton, R. (1777) *An Introduction to Merchandise* (Edinburgh: privately printed).
- Harris, J. N. (1965) What did we earn last month?, in: R. P. Marple (ed.) *National Association of Accountants on Direct Costing*, pp. 17-40 (New York: Ronald Press).
- Harrison, G. C. (1918-19) Cost accounting to aid production, *Industrial Management*, 56 (4): 273-82, (5): 391-8, (6): 456-63; 57 (1): 49-55, (2): 131-8, (3): 218-24, (4): 314-7, (5): 400-3, (6): 483-7.
- Harrison, G. C. (1930) *Standard costs: installation, operation and use* (New York: Ronald Press).
- Heier, J. R. (2000) The foundation of modern cost management: the life and work of Albert Fink, *Accounting, Business & Financial History*, 10 (2): 213-43.
- Heinzelmann, R. (2016) Comparing Professions in UK and German-speaking Management Accounting, *Accounting in Europe*, 13 (1): 103-120.
- Holzer, H. P. and Rogers, W. (1990) The origins and developments of French costing systems, *Accounting Historians Journal*, 17 (2): 57-71.
- Hopper T. M. and Armstrong, P. (1991) Cost accounting, controlling labour and the rise of conglomerates, *Accounting, Organizations and Society*, 16 (5/6): 405-38.
- Hopper, T. Tsamenyi, M. and Uddin, S. (2009) management accounting in less developed countries: what is known and needs known, *Accounting, Auditing & Accountability Journal*, 22 (3): 469-514.
- Hopwood A.G. (1987) The archaeology of accounting systems, *Accounting, Organizations and Society*, 12 (3): 207-234.
- Hoskin, K. W. and Macve, R. H. (1988) The genesis of accountability: the West Point connections, *Accounting, Organizations and Society*, 13 (1): 37-73.

- Hoskin, K. W. and Macve, R. H. (1994) Reappraising the genesis of managerialism: a re-examination of the role of accounting at the Springfield Armory 1815-1845, *Accounting, Auditing & Accountability Journal*, 7 (2): 4-29.
- Hoskin, K. W. and Macve, R. H. (1996) The Lawrence Manufacturing Company: a note on early cost accounting in US textile mills, *Accounting, Business & Financial History*, 6 (3): 337-61.
- Hoskin, K. W. and Macve, R. H. (2000) Knowing more as knowing less? Alternative histories of cost and management accounting in the U.S. and the U.K., *Accounting Historians Journal*, 27 (1): 91-149.
- Hoskin, K. W. and Macve, R. H. (2007) The Pennsylvania Railroad, 1849 and the invention of modern management, working paper.
- Hoxie, R. F. (1920) *Scientific Management and Labor* (New York: D. Appleton).
- Hoyt, F. F. (1943) Cost control in wartime, *NACA Year Book*, 24: 81-97.
- Hudson, P. (1977) Some aspects of nineteenth-century accounting development in the West Riding textile industry, *Accounting History*, 2 (2): 4-22.
- Ihantola, E-M. (2010) An historical analysis of budgetary thought in Finnish specialist business journals from c.1950 to c.2000, *Accounting, Business & Financial History*, 20 (2): 135-161.
- Jansen, E. P. (2018) Bridging the gap between theory and practice in management accounting: Reviewing the literature to shape interventions, *Accounting, Auditing & Accountability Journal*, 31 (5): 1486-1509.
- Johnson, H. T. (1972) Early cost accounting for internal management control: Lyman Mills in the 1850s, *Business History Review*, 46 (4): 466-74.

- Johnson, H. T. (1980a) Management accounting in an early integrated industrial: E. I. DuPont de Nemours Powder Co., 1903-1912, in: H. T. Johnson (ed.) *System and Profits*, pp. 184-204 (New York: Arno Press).
- Johnson, H. T. (1980b) Management accounting in an early multidivisional organization: General Motors in the 1920s, in H. T. Johnson (ed.) *System and Profits*, pp. 490-517 (New York: Arno Press).
- Johnson, H. T. and Kaplan, R. S. (1987) *Relevance Lost: the Rise and Fall of Management Accounting* (Boston: Harvard Business School Press).
- Jones, H. (1985) *Accounting, Costing and Cost Estimation, Welsh Industry: 1700-1830* (Cardiff: University of Wales Press).
- Kallapur, S. and Krishnan, R. (2009) Management Accounting in India, in C. S. Chapman, A. G. Hopwood and M. D. Shields (eds) *Handbook of Management Accounting Research*, Vol. 3, pp. 1399 - 1410 (Oxford: Elsevier).
- Kaplan, R. S. (1983) Measuring manufacturing performance: a new challenge for managerial accounting research, *Accounting Review*, 58 (4): 686-705.
- Kimizuka, Y. (1992) Cost accounting in the Meiji era (1868-1912), *Sakushin Business Review*, 1: 13-42.
- King, P.W. (2010) Management, finance, and cost control in the Midlands charcoal industry. *Accounting, Business and Financial History*, 20(3): 385-412.
- Kininmonth, K.W. and McKinstry, S. (2007). Stitching it up: accounting and financial control at J & P Coats Ltd, c1890-1960, *Accounting History*, 12(4): 367-391.
- Kohler, E. L. and Cooper, W. W. (1945) Costs prices and profits: accounting in the war program, *Accounting Review*, 20 (3): 267-308.

- Kurunmäki, L. (2004) A hybrid profession - the acquisition of management accounting expertise by medical professionals, *Accounting, Organizations and Society*, 29 (3-4): 327-347.
- Lampe, M. and Sharp, P. (2017) A quest for useful knowledge: the early development of agricultural accounting in Denmark and Northern Germany, *Accounting History Review*, 27 (1): 73-99.
- Léautey, E. and Guilbault, A. (1889) *La Science des Comptes Mise à la Portée de tous* (Paris: Librairie Comptable et Administrative).
- Lemarchand, Y. (2016) Revisiting the birth of industrial accounting in France, a return to the actors involved, *Accounting History Review*, 26 (3): 351-371.
- Levant, Y. and Nikitin, M. (2006) Should Charles Eugène Bedaux be revisited? ? Paper presented at Eighteenth Accounting, Business & Financial History Conference, Cardiff Business School, 14-15 September.
- Levant, Y. and Nikitin, M. (2009) Charles Eugène Bedaux (1886-1944): 'cost killer' or Utopian socialist?, *Accounting, Business and Financial History*, 19 (2): 167-187.
- Levant, Y. and Nikitin, M. (2012) Can cost and financial accounting be fully re-integrated? The role of the French state in the separation of accounting systems and the failed attempt of the *ystème croisé* to re-integrate them, *Accounting History*, 17 (3-4): 437-461.
- Levant, Y. and Zimnovitch, H. (2013) Contemporary evolutions in costing methods: Understanding these trends through the use of equivalence methods in France, *Accounting History*, 18 (1): 51-75.
- Lin, Z. J. (1992) Chinese double-entry bookkeeping before the nineteenth century, *Accounting Historians Journal*, 19 (2): 103-22.
- Lin, Z. J. (2003) Chinese bookkeeping systems: a study of accounting adaptation an change, *Accounting, Business & Financial History*, 13 (1): 83-98.

- Lippman, E. J. and Wilson, P. A. (2007) The culpability of accounting in perpetuating the Holocaust, *Accounting History*, 12 (3): 283-303.
- Littleton, A. C. (1933) *Accounting Evolution to 1900* (New York: American Institute Publishing Co.).
- Llopis, E., Fidalgo, E. and Méndez, T. (2002) The ‘Hojas de Ganado’ of the Monastery of Guadalupe, 1597-1784: an accounting instrument for fundamental economic decisions, *Accounting, Business & Financial History*, 12 (2): 203-29.
- Lloyd Jones, B. (2010) Was the nineteenth-century Denbighshire coalfield a worthwhile investment? An analysis of the investors and their returns, *Accounting, Business & Financial History*, 20 (2): 231-261.
- Loft, A. (1986) Towards a critical understanding of accounting: the case of accounting in the UK, 1914-1925, *Accounting, Organizations and Society*, 11 (2): 137-69.
- Loft, A. (1990) *Coming into the Light* (New York: Chartered Institute of Management Accountants).
- Loft, A. (1995) The history of management accounting: relevance found, in: D. Ashton, T. Hopper, and R. W. Scapens (eds) *Issues in Management Accounting*, pp. 17-38 (London & New York: Prentice Hall).
- Lu, W., Ji, X-d. and Aiken, M. (2009) Governmental influences in the development of Chinese accounting during the modern era, *Accounting, Business & Financial History*, 19 (3): 305-326.
- Ludwig, J. W. (1965) Inaccuracies of direct costing, in: R. P. Marple (ed.) *National Association of Accountants on Direct Costing*, pp. 167-79 (New York: Ronald Press).
- Luenstroth, H. W. (1965) The case for direct costing, in: R. P. Marple (ed.) *National Association of Accountants on Direct Costing*, pp. 95-112 (New York: Ronald Press).

- Luft, J. (2007) Historical theorizing in Management Accounting Research, in C. S. Chapman, A. G. Hopwood and M. D. Shields (eds) *Handbook of Management Accounting Research*, pp. 269-284 (Oxford: Elsevier).
- Lukka, K. (1988) Budgetary biasing in organizations: theoretical frameworks and empirical evidence, *Accounting, Organizations and Society*, 13 (3): 281-301.
- MacDonald, L.D. and Richardson, A.J. (2011) Does academic management accounting practice lag? A cliometric study, *Accounting History*, 16 (4): 365-388.
- McCartney, S. and Stittle, J. (2017) 'A very costly industry': The cost of Britain's privatised railway, *Critical Perspectives on Accounting*, 49: 1-17.
- McKendrick, N. (1970) Josiah Wedgwood and cost accounting in the industrial revolution, *Economic History Review*, 23 (1): 45-67.
- McKinsey, J. O. (1922) *Budgetary Control* (New York: Ronald Press).
- McKinstry, S. and Ding, Y.Y. (2015) "Hybridised" financial control in the Victorian construction industry: George Gilbert Scott's rebuilding of Glasgow University, 1864-1872, *Accounting History*, 20(2): 206-227.
- McKinstry, S. (1999) Engineering culture and accounting development at Albion Motors, 1900-1970, *Accounting, Business and Financial History*, 9 (2): 203-223.
- McLaren, J., Appleyard, T and Mitchell, F. (2016) The rise and fall of management accounting systems A case study investigation of EVA<sup>TM</sup>, *The British Accounting Review*, 48: 341-358.
- McLean, T. (1995) Contract costing and accounting in the Sunderland shipbuilding industry, 1818-1917, *Accounting, Business & Financial History*. 5 (1): 109-145.
- McLean, T. (2009) The measurement and management of human performance in seventeenth century English farming: the case of Henry Best. *Accounting Forum*, 33 (1): 62-73.

- McLean, T. (2013) Cost engineering and costing in Hawthorn Leslie Shipbuilders, 1886-1915, *The British Accounting Review*, 45: 177-190.
- McLean, T., McGovern, T. and Davie, S. (2015) Management accounting, engineering and the management of company growth: Clarke Chapman, 1864-1914, *The British Accounting Review*, 47 (2): 177-190.
- McLean, T. and McGovern, T. (2017) Costing for strategy development and analysis in an emerging industry: The Newcastle Upon Tyne Electric Supply Company, 1889-1914, *The British Accounting Review*, 49 (3): 294-315.
- McLean, T. and Tyson, T. (2006) Standard Costs, Standard Costing and the Introduction of Scientific Management and New Technology into the Post-Second World War Sunderland Shipbuilding Industry, *Accounting, Business & Financial History*, 16 (3): 389-417.
- McWatters, C. S. and Foreman, P. (2005) Reaction to World War I constraints to normal trade: the meat-packing industry in Canada and Australia, *Accounting History*, 10 (2): 67-102.
- Macias, M. (2002a) Ownership structure and accountability: the case of the privatization of the Spanish tobacco monopoly, 1887-96, *Accounting, Business & Financial History*, 12 (2): 317-45.
- Macias, M., (2002b) Privatization and management accounting systems change: the case of the 19th century Spanish tobacco monopoly, *Accounting Historians Journal*, 29 (2): 31-57.
- Mann, J. (1903a) Cost records or factory accounts, *Encyclopaedia of Accounting* (London: William Green).
- Mann, J. (1903b) Oncosts, *Encyclopaedia of Accounting* (London: William Green).
- Maran, L. and Leoni, G. (2018) The contribution of the Italian literature to the international accounting history literature, *Accounting History*, published online, July 2018.



- Marple, R. P. (ed.) (1965) *National Association of Accountants on Direct Costing* (New York: Ronald Press)
- Marquette, R. P. and Fleischman, R. K. (1992) Government/business synergy: early American innovation in budgeting and cost accounting, *Accounting Historians Journal*, 19 (2): 123-45.
- Marriner, S. (1980) The Ministry of Munitions 1915-1919 and government accounting procedures, *Accounting and Business Research*, 10 (37A): 130-42.
- Marshall, G. (1980) *Presbyteries and Profits* (Oxford: Clarendon Press).
- Matos Carvalho, J., Lima Rodrigues, L. and Craig, R. (2007) Early cost accounting practices and private ownership: the Silk Factory Company of Portugal, 1745-1747, *Accounting Historians Journal*, 34 (1): 57-89.
- Matthews, D. (2017) Publications in Accounting History: A Long-Run Statistical Survey, *Accounting Historians Journal*, 44 (2): 69-98.
- Matthews, M., Boyns, T. and Edwards, J.R. (2003) Chandlerian image or mirror image? Managerial and accounting control in the chemical industry: the case of Albright & Wilson, c.1892-c.1923, *Business History*, 45 (4): 24-52.
- Maynard, H. W. (1928) What the standard costs and the flexible budget are doing for the reduction of costs in the manufacturing department, *NACA Year Book*, 9: 300-8.
- Melis, F. (1950) *Storia Della Ragioneria* (Bologna: Dott, Cesare Zuffi).
- Miller, P., Kurunmäki, L. and O'Leary, T. (2008) Accounting hybrids and the management of risk, *Accounting, Organizations and Society*, 13: 942-967. .
- Miller, P., Hopper, T. and Laughlin, R. (1991) The new accounting history: an introduction. *Accounting, Organizations and Society*, 12 (3): 235-265.
- Miller, P and Napier, C. (1993) Genealogies of Calculation. *Accounting, Organizations and Society*, 18 (7-8): 631-647.

- Miller, P. and O'Leary, T. (1987) Accounting and the construction of the governable person, *Accounting, Organizations and Society*, 12 (3): 235-65.
- Moussalli, S.D., Flesher, D.L. and Lemarchand, Y. (2009) Pierre Boucher and the 1803 edition of *La science des négocians: accounting in the Republic*, *Accounting, Business and Financial History*, 19 (3): 353-364.
- Mueller, F. and Carter, C. (2007) 'We are all managers now': Managerialism and professional engineering in UK electricity utilities, *Accounting, Organizations and Society*, 32 (1-2): 181-195.
- Mura, A. and Emmanuel, C. (2010) Transfer pricing: early Italian contributions, *Accounting, Business and Financial History*, 20 (3): 365-383.
- Mussari, R. and Magliacani, M. (2007) Agricultural Accounting in the Nineteenth and Early Twentieth Centuries: The Case of the Noble Rucellia Family Farm in Campi, *Accounting, Business and Financial History*, 17 (1): 87-103.
- Napier, C.J. (2001) Accounting history and accounting progress, *Accounting History*, 6 (2): 7-31.
- Näsi, S. and Rohde, C. (2007) Development of cost and management accounting ideas in the Nordic countries, in C. S. Chapman, A. G. Hopwood and M. D. Shields (eds) *Handbook of Management Accounting Research*, pp. 1109-37 (Oxford: Elsevier).
- National Association of Accountants (1957) NAA research series no. 23: direct costing (New York: National Association of Accountants).
- Nelson, D. (1974) Scientific management, systematic management, and labor, 1880-1915, *Business History Review*, 48 (4): 479-500.
- Nelson, D. (1975) *Frederick W. Taylor and the Rise of Scientific Management* (Madison, WI: University of Wisconsin Press).

- Nicholson, J. L. (1909) *Factory Organisation and Costs* (New York: Kohl Technical Publishing Co.).
- Nikitin, M. (1990) Setting up an industrial accounting system at Saint-Gobain (1820-1880), *Accounting Historians Journal*, 17 (2): 73-93.
- Nikitin, M. (1996) The birth of industrial accounting in France: the role of Pierre-Antoine Godard-Desmarest (1767-1850) as strategist, industrialist, and accountant at the Baccarat Crystalworks, *Accounting, Business & Financial History*, 6 (1): 93-110.
- Noguchi, M. and Boyns, T. (2012) The development of budgets and their use for purposes of control in Japanese aviation, 1928-1945: The role of the state, *Accounting, Auditing & Accountability Journal*, 25 (3): 416-451.
- Noguchi, M., Nakamura, T. and Shimizu, Y. (2015) Accounting control and interorganisational relations with the military under the wartime regime: The case of Mitsubishi Heavy Industry's Nagoya Engine Factory, *The British Accounting Review*, 47 (2): 204-223.
- Norton, G. P. (1889) *Textile Manufacturers' Bookkeeping for the Counting House, Mill and Warehouse* (London: Simpkin, Marshall, Hamilton & Kent).
- Núñez, T. M. (2002) Organizational change and accounting: the gunpowder monopoly in New Spain, 1757-87, *Accounting, Business & Financial History*, 12 (2): 275-315.
- O'Connor, N.G., Chow, C.W. and Wu, A. (2004) The adoption of "Western" management accounting/controls in China's state-owned enterprises during economic transition, *Accounting, Organizations and Society*, 29: 349-375.
- Okano, H., 2015 *History of Management Accounting in Japan: Institutional & Cultural Significance of Accounting* (Bingley: Emerald Publishing Group Limited).

- Okano, H. and Suzuki, T. (2007) A history of Japanese management accounting, in C. S. Chapman, A. G. Hopwood and M. D. Shields (eds) *Handbook of Management Accounting Research*, pp. 1139-57 (Oxford: Elsevier).
- Oldroyd, D. (1996) The costing records of George Bowes and the grand allies in the north-east coal trade in the eighteenth century: their type and significance, *Accounting, Business & Financial History*, 9 (2): 175-201.
- Oldroyd, D. (2007) *Estates, Enterprise and Investment at the Dawn of the Industrial Revolution: Estate Management and Accounting in the North-East of England c. 1700-1780* (Aldershot: Ashgate).
- Oldroyd, D. and Dobie, A. (2009) Bookkeeping, in J.R. Edwards and S.P. Walker (eds) *The Routledge Companion to Accounting History*, (pp. 95-119) (London: Routledge).
- Parker, L.D. (2016) The global Fayol: contemporary management and accounting traces, *Enterprises et Histoire*, 2 (83): 51-63.
- Parker, L. D. and Lewis, N. R. (1995) Classical management control in contemporary management and accounting: the persistence of Taylor and Fayol's world, *Accounting, Business & Financial History*, 5 (2): 211-35.
- Parker, R. H. (1969) *Management Accounting: an Historical Perspective* (New York: Augustus Kelley).
- Parker, R. H. (1986) *The Development of the Accountancy Profession in Britain in the Early Twentieth Century* (San Antonio, TX: Academy of Accounting Historians).
- Payen, A. (1817) *Essai sur la Tenue des Livres d'un Manufacturer* (Paris: Chez A. Johanneau).
- Pezet, A. (2009) The history of the French tableau de bord (1875-1975): evidence from the archives, *Accounting, Business and Financial History*, 19 (2): 103-125.

- Planas, J. and Saguer, E. (2005) Accounting records of large rural estates and the dynamics of agriculture in Catalonia (Spain), 1850-1950, *Accounting, Business and Financial History*, 15 (2): 171-185.
- Plumpton. T. (1895) Manufacturing costs as applied to shipbuilding, *The Accountant*, 21 September: 758-760; 28 September: 773-775.
- Pollard, S. (1965) *The Genesis of Modern Management* (Cambridge, MA: Harvard University Press).
- Pong, C. and Mitchel, F. (2006) Full costing versus variable costing: Does the choice still matter? An empirical exploration of UK manufacturing companies 1988-2002, *The British Accounting Review*, 38: 131-148.
- Quinn, M. and Jackson, W.J. (2014) Accounting for war risk costs: management accounting change at Guinness during the First World War, *Accounting History Review*, 24 (2-3): 191-209.
- Richardson, A. (2008) Organizational Founding, Strategic Renewal, and the Role of Accounting: Management Accounting Concepts in the Formation of the “Penny Post”, *Journal of Management Accounting Research*, Special Issue: 107-127.
- Rogers, D. M. (1932) Development of the modern business budget, *Journal of Accountancy*, 53 (3): 186-205.
- Roll, E. (1930) *An Early Experiment in Industrial Organization* (New York: Augustus Kelley).
- Sakuri, M. (1989) Target costing and how to use it, *Journal of Cost Management*, 3 (2): 39-50.
- Samson, W. D., Flesher, D. L. and Previts, G. D. (2006) Corporate governance and external and internal controls: the case of the Baltimore and Ohio Railroad, circa 1831, *Issues in Accounting Education*, 21 (1): 45-62.

- Sánchez-Matamoros, J.B. and Hidalgo, F.G. (2011) Publishing patterns of accounting history research in generalist journals: Lessons from the past, *Accounting History*, 16 (3): 331-342.
- Sánchez-Matamoros, J.B. and Hidalgo, F.G. (2012) Accounting for the production of coins: The enactment and implementation of the Spanish Ordinances of the Mints, 1730, *Accounting History*, 17 (3-4): 351-367.
- Sapori, A. (1932) *Una Compagnia di Calimala ai Primi del Trecento* (Florence: Olschki).
- Scapens, R. W. (1991) *Management Accounting: a Review of Recent Developments* (London: Macmillan).
- Scapens, R.W. (2006) Understanding management accounting practices: A personal journey, *The British Accounting Review*, 38: 1-30.
- Scarbrough, P., Nanni, A. J. and Sakurai, M. (1991) Japanese management accounting practices and the effects of assembly and process automation, *Management Accounting Research*, 2 (1): 27-46.
- Schäffer, U. and Binder, C. (2008) “Controlling” as an academic discipline: the development of management accounting and management control research in German-speaking countries between 1970 and 2003, *Accounting History*, 13 (1): 33-74.
- Scheuermann, L. (1929) *Die Fugger als Montanindustrielle in Tirol und Karnten* (Munich: Duncker & Humbolt).
- Schmalenbach, E. (1899) Buchfuehrung und Kalkulation in Fabrikgeschäft, *Deutsche Metallindustriezeitung*, 15.
- Schmalenbach, E. (1948) *Pretiale Wirtschaftslenkung* (Bremen-Horn: W. Dorn).
- Schweitzer, M. (1992) Eugèn Schmalenbach as the founder of cost accounting in the German-speaking world, in: A. Tsuji (ed.) *Collected Papers of the Sixth World Congress of Accounting Historians*, Vol. II, pp. 393-418 (Japan: Accounting History Association).

- Scorgie, M.E. (1997) Progenitors of modern management accounting concepts and mensurations in pre-industrial England, *Accounting, Business and Financial History*, 7 (1): 31-59.
- Segelod, E. and Carlsson, L. (2010) The emergence of uniform principles of cost accounting in Sweden 1900-36, *Accounting, Business and Financial History*, 20 (3): 327-363.
- Shank J. K. and Govindarajan, V. (1989) *Strategic Cost Analysis: the Evolution from Managerial to Strategic Accounting* (Homewood, IL: Irwin).
- Simon, F. N. (1830) *Méthode Complète de Tenue des Livres* (Châtillon sur Seine: Cornillac).
- Simon, H. A., Guetzkow, H., Kozmetsky, G. and Tyndall, G. (1954) *Centralization vs. Decentralization in Organizing the Controller's Department* (New York: Controllershship Foundation).
- Sloan, A. P. (1964) *My Years at General Motors* (Garden City, NY: Doubleday).
- Solomons, D. (1952) *Studies in Costing* (London: Sweet & Maxwell).
- Smith, I. and Boyns, T. (2005) Scientific management and the pursuit of control in Britain to c. 1960, *Accounting, Business and Financial History*, 15: 2 (187-216).
- Sorensen, J. E. (2009) Management Accountants in the United States: Practitioner and Academic Views of Recent Developments, in S. C. Chapman, A. G. Hopwood and M. D. Shields (eds) *Handbook of Management Accounting Research*, pp. 1271-1296 (Oxford: Elsevier).
- Sowell, E. M. (1973) *The Evolution of the Theories and Techniques of Standard Costs* (Tuscaloosa, AL: University of Alabama Press).
- Spraakman, G. and Margret, J (2005) The Transfer of Management Accounting Practices from London Counting Houses to the British North American Fur Trade, *Accounting, Business & Financial History*, 15 (2): 101-119.
- Stacey, N. A. H. (1954) *English Accountancy 1800-1954* (London: Gee).

- Stempf, V. H. (1943) War contracts, costs, and profits, *Journal of Accountancy*, 75 (6): 496-509.
- Stoeffel, K. (1995) *Controllershship im Internationalen Vergleich* (Wiesbaden: Gabler).
- Stone, W. E. (1973) An early English cotton mill cost accounting system: Charlton Mills, 1810-1889, *Accounting and Business Research*, 4 (17): 71-8.
- Takeda, H. and Boyns, T. (2014) Management, accounting and philosophy: The development of management accounting at Kyocera, 1959-2013, *Accounting, Auditing & Accountability Journal*, 27 (2): 317-356.
- Taylor, F. W. (1903) *Shop Management* (New York: Harper & Brothers).
- Taylor, F. W. (1911) *The Principles of Scientific Management* (New York: Harper).
- Taylor, F. W. (1912) *Scientific Management* (New York: Harper).
- Theiss, E. L. (1937) The beginnings of business budgeting, *Accounting Review*, 12 (1): 43-55.
- Tolkmitt, H. (1894) *Grundriss der Fabrik-Geschaefsfuehrung* (Leipzig: Verlag von G. A. Gloeckner).
- Toms, S. and Fleischman, R.K. (2015) Accounting fundamentals and accounting change: Boulton & Watt and the Springfield Armory, *Accounting, Organizations and Society*, 41: 1-20.
- Toms, S. and Shepherd, A. (2017) Accounting and social conflict: Profit and regulated working time in the British Industrial Revolution, *Critical Perspectives on Accounting*, 49: 57-75.
- Tyson, T. N. (1990) Accounting for labor in the early nineteenth century: the U.S. arms making experience, *Accounting Historians Journal*, 17 (1): 47-59.
- Tyson, T. N. (1992) The nature and environment of cost management among early 19th century U.S. textile manufacturers, *Accounting Historians Journal*, 19 (1): 1-24.



- Tyson, T. N. (1993) Keeping the record straight: Foucauldian revisionism and 19th century cost accounting history, *Accounting, Auditing & Accountability Journal*, 6 (2): 4-16.
- Tyson, T. N. (1998) Mercantilism, management accounting or managerialism? Cost accounting in early 19th century US textile mill, *Accounting, Business & Financial History*, 8 (2): 211-29.
- Tyson, T. N. (2000) Accounting history and the emperor's new clothes: a response to 'knowing more or knowing less'? *Accounting Historians Journal*, 27 (1): 159-71.
- Tyson, T.N. and Oldroyd, D. (2017) The debate between postmodernism and historiography: An accounting historian's manifesto, *Accounting History*, 22 (1): 29-43.
- Urwick, L. and Brech, E.F.L. (1964) *The Making of Scientific Management* (London: Sir Isaac Pitman).
- Vent, G. A. (1991) The standardization of the Bewick, Moreing & Co. cost accounts, *Accounting History*, 2 (2): 65-79
- Vent, G. A. and Milne R. A. (1997) Cost accounting practices at precious metal mines: a comparative study, 1869-1905, *Accounting History*, 2 (2): 77-104.
- Verma, S. (2015) Political, economic, social and imperial influences on the establishment of the Institute of Cost and Works Accountants in India post independence, *Critical Perspectives on Accounting*, 31: 5-22.
- Walker, S. P. and Mitchell, F. (1996) Propaganda, attitude change and uniform costing in the British printing industry, 1913-1939, *Accounting, Auditing & Accountability Journal*, 9 (3): 98-126.
- Walker, S. P. and Mitchell, F. (1998) Labor and costing: the employees' dilemma, *Accounting Historians Journal*, 25 (2): 35-62.
- Walker, S. P. and Mitchell, F. (eds) (1997) *Trade Associations and Uniform Costing in the British Printing Industry, 1900-1963* (New York & London: Garland).

- Wang, L. Y. and Zhang, R. (2000) The management value of accounting information – past, present and future of management accounting, *Finance and Accounting*, 2: 20-3.
- Wells, M. C. (1977) Some influences on the development of cost accounting, *Accounting Historians Journal*, 4 (2): 47-61.
- Wells, M. C. (1978) *Accounting for Common Costs* (Urbana, IL: Center for International Education and Research in Accounting).
- Whitmore, J. (1908) Shoe factory cost accounts, *Journal of Accountancy*, 4 (1): 12-25.
- Williamson, O. E. (1970) *Corporate Control and Business Behavior: an Inquiry into the Effects of Organization Form on Enterprise Behavior* (Englewood Cliffs, NJ: Prentice-Hall).
- Wootton, C.W. and Kemmerer, B.E. (2007) The emergence of mechanical accounting in the U.S., 1880-1930, *The Accounting Historians Journal*, 34 (1); 91-124.
- Yamey, B. S. (1949) Scientific bookkeeping and the rise of capitalism, *Economic History Review*, 1 (2/3): 99-113.
- Yamey, B. S. (1960) The development of company accounting conventions, *Three Banks Review*, 47 (September): 3-18.
- Zambon, S. and Zan, L. (2007) Controlling expenditure, or the slow emergence of costing at the Venice Arsenal, 1586-1633, *Accounting, Business & Financial History*, 17 (1): 105-28.
- Zan, L. (2004a) Accounting and management discourse in proto-industrial settings: the Venice Arsenal in the turn of the 16th century, *Accounting and Business Research*, 34 (2): 145-75.
- Zan, L. (2004b) Writing accounting and management history. Insights from unorthodox music historiography, *Accounting Historians Journal*, 31 (2): 171-92.
- Zimnovitch, H. (1997) *Les calculs du prix de revient dans la seconde industrialisation en France*, unpublished dissertation, Poitiers University.