TIME AND TEMPORALITY IN ACCOUNTING: A SOCIAL CONSTRUCTION

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Abstract: The purpose of this paper is to examine how concepts of time and temporality have been used in accounting in different historical periods. The primary argument of the paper is that while concepts of time and temporality are important to accounting, the categorization of events and transactions in organizational life into distinct time periods is not of recent origin, nor is time a commodity as has been argued by some historians. Instead, time and temporality have been present in organizations throughout recorded history. Moreover, accounting periods tend to repeat through time, with each period having a distinct nature, but nevertheless recurrent. Thus, periodicity in accounting is not progressive, such as that implied by the linear understanding of time in western philosophy. Time is accounting is more like a cyclical process which moves in a precise rhythm for the ultimate purpose of making sense out of organizational life. Methodologically we rely on archives and secondary sources pertaining to several historical periods discussed. The originality of the paper is that it reveals how time measurements are socially constructed and not an aspect of material reality.

Keywords: accounting theory, time, temporality, accounting history

Introduction

Time and temporality are key concepts in accounting, and these concepts are often conflated under the rubric of 'periodicity', whereby accounting events and transactions are assumed to be classifiable into distinct time periods. Nonetheless, it cannot be concluded that accounting constitutes a linear narrative, nor can accounting be useful for economic decision-making if there is at lack of clarity in the manner of construction of the periods into which events are said to be classified or the manner of aggregation of those periods. Thus, a cyclical understanding of time and temporality in accounting is needed. A failure to understand the nature of cyclicality in accounting can lead to misinterpretations and poor decision-making. Accounting must therefore provide greater understanding of organizational life rather than merely presenting a linear narrative.

The purpose of this paper is to examine time and temporality in accounting in different historical periods. The primary argument of this paper is that time and temporality have been present throughout history and that time in accounting has been primarily cyclical in nature. We support these arguments by demonstrating how concepts of time and temporality have been deployed in different historical periods. While double entry bookkeeping appears to be embedded

in a linear perspective of time, we argue that a better understanding of accounting in organizations would be provided through a cyclical view of time.

The remainder of the paper is organized as follows. Section 2 reviews the prior literature focusing on time in accounting. Section 3 analyzes several historical examples in which time and temporality in accounting appear to be cyclical. Section 4 reviews the effects of time and temporality on accounting and management control. Section 5 discusses and concludes the paper.

2. Review of prior literature

2.1 Concepts of time and temporality in accounting standards setting

William Paton, one of the earliest American accounting theorists, included 'time period' as one of his basic postulates of accounting:

> **Postulate #4: Time Period Postulate**
>
> Financial accounting provides information about the economic activities of an enterprise for specified time periods that are shorter than the life of the enterprise. Normally, the time periods are of equal length to facilitate comparisons. The time period is identified in the financial statements. The time periods are usually twelve months in length. Some companies also issue quarterly or half yearly statements to shareholders. They are considered to be interim, and essentially different from annual statements. For management use, statements covering shorter periods such as a month or week may be prepared. Dividing business activities into specific time periods creates a number of measurement problems in financial accounting such as allocation of cost of an asset to specific periods, determining income and costs associated with long term contracts covering several accounting periods, treatment of research and development costs (Paton, 1922).

The periodicity assumption was subsequently incorporated into the *Conceptual Framework* of the United States Financial Accounting Standards Board (FASB) as one of its four basic assumptions (FASB, 1980). In addition, the *Conceptual Framework* of the International Accounting Standards Board (IASB, 2018) mentions the phrase 'reporting period' on seventy-seven different occasions. In particular *Chapter 3-Financial Statements and the Reporting Entity* of the IASB *Conceptual Framework* defines 'reporting period' as follows (IASB, 2018):

> "Financial statements are prepared for a specified *period of time* and provide information about: (a) assets and liabilities—including unrecognised assets and liabilities— and equity that existed at the end of the *reporting period*, or during the *reporting period*; and (b) income and expenses for the *reporting period*."

As a result, pursuant to generally accepted accounting principles, it is assumed that events and transactions in the life of an organization can be classified into distinct time periods. Likewise, regulatory frameworks include concepts intrinsic to the management and interpretation of time such as "prospective" and "retroactive" information, and financial estimates that allow sense to be made to financial reports. Curiously, however, the origins of periodicity have rarely been examined.

2.2 Prior accounting literature dealing with time and temporality

In the previous accounting literature there have been multiple studies that have addressed the concept of time, but few have deconstructed this concept beyond an expression of stating the

importance of time to accounting practice and theory (Hopwood, 1989; Chambers, 1989; Loft, 1990; Miller and Napier, 1993; Miller and O'Leary, 1993; Ezzamel and Robson, 1995; Carnegie and Napier, 1996; Latour, 1999; Nandhakumar and Jones, 2001; Carmona, Ezzamel and Gutiérrez, 2002; Parker, 2004; Quattrone, 2005; Dawson, 2014, Adamo, Alexander and Fasiello, 2019).

In one key paper focusing on the topic of time in accounting, Ezzamel and Robson (1995) offered a distinction between a linear view of time and a cyclical view of time. A linear view conceives of time as an aspect of material reality existing apart from human events. In contrast, a cyclical view of time appreciates time as resulting from interactions among individuals in organizations. While a linear view of time approaches time as an independent variable that can be measured by clocks and calendars, a cyclical view of time sees time as a dependent variable, intersubjective and social and difficult to measure (Ezzamel and Robson, 1995). Ezzamel and Robson suggest that the idea of time as independent and measureable, does not reflect the experience of time by individuals in organizations. They also recognize that time is an organizational event, which is qualitative and cyclical (Ezzamel and Robson, 1995, p. 150). However, they point out that time measurements tend to control and regulate organizational life. They therefore indicate that the capitalist economic system depends on the control and use of time, and that modern organizations have become temporal regulators in which many of the problems of organizational management are centered on the control of time. This is a pertinent argument, but one which fails to recognize that time and temporality have been present in organizations throughout history, as later sections of this paper will seek to demonstrate.

In another seminal paper, Parker (2004) discussed also the concept of time in accounting, in particular from the standpoint of historiography. He argued for a postmodern approach to history research with a view to gaining a better understanding of the concept of time in organizational life. The notion of time as solely conceived of in a Newtonian linear sense has been challenged on a number of fronts. Alternatives include cyclical time which is the focus of the current paper. Evidence of the usefulness of a postmodern approach to time which would incorporate different views of time, can be illustrated by the co-existence of classical management theory with more recent systems and strategic approaches to accounting and management control (Parker, 2004, p. 10).

In addition, Parker argues that cyclical concepts of time can be traced to civilizations which have seen time in terms of repeating seasons, such as the metaphysical notions of time in Hinduism and Buddhism and the Greek philosophers' views of cyclical time. Such concepts persist today, for example when individual experience event as stages in a recurring process so that time become conceived of as a series of successive cycles. Cyclical concept of time are prevalent in accounting through annual financial reporting and budgetary cycles (Parker, 2004, p. 10).

In another recent paper, Adamo, Alexander and Fasiello (2019) studied how changes in the concept of time influenced the development of accounting practices in the late medieval era. The authors argue that the development of commercial partnerships among merchants in Northern Italy in the 13th and 14th centuries created the conditions for the development of periodic reporting. The authors also argue that while the accounting history literature has studied the relationship between double-entry bookkeeping and the rise of capitalism (Bryer, 1993; Carnegie and Napier, 1996; De Roover, 1938; Hopwood, 2000; Littleton, 1926, 1927; Quattrone, 2005; Yamey, 1949, 1964), there have been no systematic studies of the relationship between time and accounting.

Adamo et al. (2019) argue that periodic financial reporting may have arisen as the result of a change in the concept of time in the late Middle Ages as the result of changes in the economic and cultural environment. Prior to the thirteenth century, business enterprises were commonly organized through contractual arrangements based on maritime trading practices. These contractual arrangements constituted agreements between merchants to manage a business enterprise (such as a voyage) for a limited period of time. During the thirteenth century, there was a transition to a different form of business organization called the *compagnie* (Melis, 1991) in which merchants related by family ties, or having close business relationships, shared their economic resources in order to manage a trade or a production activity. These new forms of partnership were the first companies where individual partners or associates could be identified as being distinct from the business entity. Thus, the business entity consisted of the capital invested by the partners or associates who might or might not be members of the same family. In addition, there was a growing interest in commercial lending among merchants who eventually became bankers. According to Adamo et al. (2019), the development of this new form of partnership among merchants using the *compagnie* form, and an increase in commercial lending, created the conditions for the development of periodic financial reporting, along with a transition from single entry bookkeeping to double entry bookkeeping, which was designed to assess the periodic financial results of the business enterprise (Adamo, 2019, p. 3).

While the arguments put forth by Adamo et al. (2019) are important because they establish a connection between the emergence of the *compagnie* as an new form of business organization in the 13th and 14th century, as an influence on the concept of periodicity in accounting, what they overlook is that concepts of time and periodicity were present in many historical periods well before the late middle ages in Northern Italy. In a later section of this paper, these earlier historical examples of time and temporality will be examined more fully. As Chambers (1989) indicated, the discussion of time in accounting practice has been a perennial concern in social life.

2.3 'New history' perspectives on time in accounting

Carnegie (2019) and others have has argued that accounting is not only a technical practice but also a social practice. As a social practice, accounting impacts organizational events and the behavior of people in organizations and, as a result, accounting affects organizational functioning through regularized and cyclical procedures. In studying the behavioral dimensions of accounting, it is important to apply theories that explain the impact of social practices on human behaviour in specific contexts. Llewellyn (2003) proposed five levels of theorizing, which deal with theory as metaphor, differentiation, conceptualisation, contextualization, and as total explanation. In accounting history research, theorizations are often used to analyse or interpret the findings of studies, and such is the case with this paper. We argue that a cyclical view of accounting history is important to understanding the social aspects of accounting.

2.4 A further discussion of distinctions between linear time and cyclical time

The argument that time is a feature of physical reality existing independently from human events is often described as a Newtonian view of time. This material viewpoint allows time to be measured by clocks, calendars and other instruments much like any other physical phenomenon (Ezzamel and Robson, 1995, p. 154). This commonplace notion of time has

been transmuted by some scholars into the notion that time is a resource or commodity. Marx (1981) referred to this viewpoint as the 'commodification of time', arguing that time measurement is at the heart of the reproduction of the capitalist system. Additionally, as Hopwood (1989, p. 1) maintained:

> "Accounting undoubtedly has been one of the factors implicated in the orchestration of organization life on a temporal dimension. Costs and efforts can now be mobilized in temporal terms. An abstract concept of liner time can more reality penetrate the functioning of the organization, entering into the specification of dominate modes of visibility and providing a basis for orienting organization incentives toward more focused temporal objectives. Through standards, budgets and plans, a language of time could more readily permeate organization discourse, providing a temporal grid in which events can be located and managed".

Despite these arguments, modern scientific research has shown that clock time is effectively mythological. The scientific view of time is that it is subjective concept rather than objective (Porter, 1981). The theory of relativity indicates that each individual has their own perspective on time depending on where they are located and how fast they are moving (Hawking, 1988).

Similar to the modern scientific view of time, a cyclical view indicates that an individual's experience of time is associated with organizational events rather than identifiable time periods (i.e. where were you when a certain significant event occurred in your life?) Furthermore, the linear view of time is a social construction in that the divison of time into 60 seconds, 60 minutes, 24 hours and 365 days does not exist in physical reality. Kubler (1962, p. 13) points out that: "*Time, is unknowable as such. We only know time indirectly by what happens: by observing changes; by marking the succession of events; and by noting the distinctions between them*". Consequently, the primary argument of this paper is that time in accounting is not linear, but rather cyclical. We will attempt to support this argument through an examination of the use of time in various historical periods prior to the industrial era.

3. Historical evidence of time and temporality

The following sections discuss historical evidence of the use of time in accounting in periods prior to the industrial era. The historical evidence illustrates the cyclical nature of time. The examples are widely dispersed both chronologically and geographically. Several of the examples do not come from commercial enterprises but instead from governmental or religious organizations. This demonstrates that time is an aspect of organizational life rather than a capitalist commodification. The historical examples have been selected because of the availability of archives related to the accounting practices in the periods selected.

The first set of historical evidence comes from the Byzantine Empire in the 5th century AD where calculations were made of the value of land to serve as the basis for tax assessments. The calculations were based on the growing seasons, and hence they were cyclical. Furthermore, the records show that audits were made regarding these land valuations for the purpose of maintaining control over tax collections in a distant province of the dispersed Byzantine Empire.

The second set of historical evidence comes from the Republic of Venice in the 12th through 14th centuries AD where a state-owned ship manufacturing enterprise used time

measurements to control assembly line production. These measurements of time were cyclical in nature.

The third set of historical evidence comes from the archives of Francesco di Marco Datini, a successful merchant in Northern Italy during the late 14th and early 15th centuries. Datini used double entry bookkeeping not only to determine profit distributions among his various partnerships; he also used double entry bookkeeping to maintain management control over eight widely dispersed branches of his trading activities. With respect to the cyclicality of time, Datini used arbitrary measurements of travel time between merchant cities to hide interest calculations.

The fourth set of historical evidence comes from the accounting records of the Fugger family firm, which was the most important banking house in late 15th and early 16th century Europe. Management control of the dispersed branches of this firm required sophisticated accounting practices, including double entry bookkeeping, along with periodic financial reports and audits.

The fifth set of historical evidence comes from hospital accounting records in France in the 15th century, where hospital revenues and expenses were recorded according to seasons of the year. The accounting records were audited by officials of the church that owned and managed the hospital. The accounting records and periodic audits facilitated control over hospital operations.

In sum, these various examples of the use of time in historical periods prior to the industrial era illustrate that time in accounting has been an essential element of organizational life, and that time periods have been cyclical and primarily used to facilitate control in organizations.

3.1 The use of time in accounting in the Byzantine Empire, 5th century AD

There have been frequent debates among accounting historians regarding the nature and status of accounting practices in ancient civilizations. Some authors have argued that ancient civilizations did not possess sophisticated accounting practices (Yamey, 1949). Others have argued that accounting practices in ancient civilizations were well developed. In effect, there is a gap in the accounting history literature with respect to the period from the 4th century to the 7th century, during which period the dominant economic and political power in the Mediterranean world was the Byzantine Empire (Bury, 1923).

The most important source of state revenues in the Byzantine Empire was the land tax. This tax consisted of two parts, the *tributum*, which was imposed on conquered territories, and the *annona*. The *tributum* was paid by those communities which had previously been liable for the tax and it was required to be paid in coin. The *annona* was an exceptional tax imposed on certain provinces during emergencies, and in particular to supply the Empire with grain in the event of a famine, or to feed the army in event of a war. The scarcity of precious metals during the 3rd and 4th centuries led to a change in the method of paying soldiers. They no longer received their wages in coin; instead their wages consisted of distributions of food and provisions. The supply of provisions required to feed a soldier for one year was referred to as an *annona*. The amount of the *annona*, and its distribution among the provinces, was established by a special order of the Emperor, known as an "Indiction". The *annona* was paid annually in the form of grain and no landowner was exempt; even the imperial estates and the domains of ecclesiastical communities were required to pay the *annona*. Eventually, the *annona* became a regular tax, imposed on all parts of the Empire. The *annona* was not fixed at a specific amount; instead it was imposed by an Indiction which was declared annually (Bury, 1923).

The amount of the *annona* was based on the value of the land. The determination of the land value was based on an accounting calculation which was based on time. All the territory of the Empire was surveyed, and each piece of land was taxed according to its value in terms of its ability to produce a particular type of crop such as grain, wine or oil during a period of one year. In effect, the *annona* was a tax on the annual income producing capacity of the land. The tax was assessed according to a unit of arable land called an *iugum*. The amount of land in an *iugum* varied according to the fertility of the soil and the type of crop. This required a detailed knowledge of the income producing capacity of a particular piece of property during one year (Bury, 1923).

Agricultural land was cultivated by tenants who paid rent to the owner of the land. The *annona* tax was paid by tenants who leased the land. When monetary currency became more prevalent during the reign of Constantine in the 4th century, the *annona* was converted to a monetary payment. A large portion of the *annona* collected was paid to the military authorities in each province, while the residual was sent to the treasury of the Praetorian Prefecture in Constantinople. The Praetorian Prefecture paid the salaries of the provincial governors and their staffs. By the end of 4th century, it is estimated that there were about 500,000 soldiers in the Empire who were paid from the *annona*. While the *annona* was originally paid in kind, when it was converted into coin, it was valued at approximately 25 solidi per year for each soldier. Thus, the amount of the *annona* during one year was about 12.5 million solidi (Bury, 1923).

It can be seen that the accounting records of the Byzantine Empire demonstrated classification and reporting in recurring time periods, without which it would not have been possible to manage the tax revenues of the Empire. This periodization of accounting practices was used to maintain administrative control at a distance over a geographically dispersed empire. This type of periodization in accounting was based on *inscriptions* that enabled action at a distance (Robson, 1992). The development of accounting practice is therefore seen as a continuing refinement of inscriptions that expedite long distance control. Furthermore, it is important to recognize that this historical evidence of periodicity preceded the industrial era by over one thousand years.

3.2 The use of time in accounting in the Arsenale de Venetia, 13th century AD

The Republic of Venice was a major naval power from the twelfth to the eighteenth century, as well as a center of maritime commerce and international trade. The most important state-owned enterprise in the Venetian Republic was the *Arsenale di Venetia*, a shipyard and armory founded in the twelfth century (Davis, 2007). The Arsenale was the largest industrial complex in Europe prior to the Industrial Revolution, spanning an area of about 45 ha (110 acres), or about 15 percent of Venice. The Arsenale produced most of Venice's maritime vessels, which generated much of the city's economic wealth and power until the fall of the Venetian Republic to Napoleon in 1797 (Davis, 2007).

In terms of operational management, the historical records indicate that the production methods of the Venetian Arsenal were well in advance of ship building methods in other parts of Europe at that time. The high production capacity at the Arsenale resulted from the large number of workers employed (about 16,000), and the streamlining of production processes. Ship production was divided into three main stages: framing, planking, and assembly. Each stage employed its own workers who specialized in that area of production. Standardized parts were used in an assembly-line process using a canal through which the ships moved into different stages of production. Partially completed ships were brought to the workers, instead of workers and parts going to the ships. This type of industrial production was not seen again until the early twentieth

century when Henry Ford developed the assembly line for automobile production (Kaon Consulting, 2012).

In terms of time and periodicity, Zambon and Zan (2007) examined the Venetian Arsenal as a case study of the emergence of accounting as a control mechanism in complex pre-industrial settings. These authors studied archival records of deliberations by the Venetian Senate, which mandated that periodic inventory counts be conducted at specifc time intervals along with the maintenance of ship production records in double-entry format. These accounting records reflected the movement of raw materials to work-in-process to finished ships. The records were kept both in physical quantities and monetary amounts. Using these accounting technologies, the Venetian Republic controlled the operations of the Arsenale using time budgets and by limiting the amount of funds allocated to activities in specific time periods (wages, raw materials, timber, etc.). The implementation of these accounting techniques permitted a sophisticated calculation of the costs of ships. In a state controlled enterprise such as the Arsenale di Venetia, time periodization was a central concept which allowed management control over the production process. This time periodization was recurrent and cyclical in nature and not progressive.

3.3 The use of time in the Datini enterprises in Northern Italy in the 14th century AD

One of the most important historical accounting archives dating from the late medieval period is that of Francesco di Marco Datini (1335 – 1410), an Italian merchant active in Northern Italy in the late 14th century. After spending 32 years establishing himself as a master merchant in Avignon, France, Datini returned to his native Italy and opened a proprietorship in Pisa in 1382. He also built a home in Prato (near Florence), which became the center of his commercial activities. His original enterprise in Avignon was combined with three other companies in Florence, Prato, and Pisa. He established a total of eight branches, including Avignon, Prato, Pisa, Florence, Genoa, Barcelona, Valencia, and Majorca. These branches were managed by trusted partners and associates who reported directly to Datini. The primary focus of these enterprises was on trade in precious metals and gemstones, armor, linens, wool and other textiles. In Prato, Datini also engaged in the manufacture of woolen textiles (Struppa and Kruslin, 2016).

Datini also established a bank in Florence which issued bills of exchange to merchants engaged in trading with various cities such as Venice, Bruges, Antwerp, London and Barcelona. Bills of exchange were bought and sold among merchants who eventually evolved into bankers. The amount of money to be paid In a bill of exchange city was not determined by the exchange rate in the city where the bill would be presented to be cashed; rather there was a pre-established exchange rate set at the inception of the transaction on the date that the bill was purchased, plus an additional amount based on the time needed to travel from the originating city to the city where the bill of exchange would be cashed. The length of time between the date when the bill is drawn in one city and the date when it could be cashed in another city was set by custom (i.e. *usance*). For example, the *usance* between Venice and Bruges was 2 months. The interest component of the bill of exchange was hidden via a socially constructed and agreed upon measure of travel time between two cities. This practice allowed interest to be earned and avoided charges of usury (De Roover, 1967)

After Datini opened his bank in Florence, he began to keep detailed accounting records using double entry bookkeeping. Many of these records are now located in the *Archivi Datini* in Prato. According to the official catalog of the archive, there are 602 accounting ledgers, along with 592 envelopes of correspondence, which in turn contain about 150,000 letters. The archive

is divided into several different types of books, including correspondence, lists of amounts receivable from debtors, lists of real estate owned, lists of insurance on maritime shipments and cargoes, records of orders of goods, cash expenditures, and currency exchange (Origo, 1957).

Control over the diverse international trading activities of Datini's network of companies would have been difficult using single entry accounting methods. As a result, the Datini archives show a transition from single entry bookkeeping to double entry bookkeeping around 1383. Kuter, et al. (2019) found that the account books of partnerships were closed, and the profit distributed among the partners at various points prior to the final dissolution of the companies. However, there is no evidence that the accounting records of the Datini companies were closed and profits determined on regular basis, such as annually. Instead, the account books were closed and profits distributed only after all goods remaining in the merchandise inventory of a particular partnership had been sold, essentially similar to voyage accounting. The double entry bookkeeping method used by Datini was not standardized: some accounts were in the Venetian bilateral format, with the debit entries across from the credit entries on two facing pages, while some continued in the old vertical format where the debits were entered above the credit entries, or vice versa. Sometimes the debit and credit entries were mixed-up rather than in a sequence of all debits/credits followed by all credits/debits. These vertical paragraph accounts were labelled as 'mingled' (Kuter el al. 2019; Martinelli, 1974: 191).

The key point is that the periodic closing of the account books and profit determination was random, and not a function of calendar periods. This periodicity was based on the merchant trading activity of the partnerships and the social relationships between the partners.

3.4 The use of time in the accounting practices of the Fugger family firm, 16th century AD

The Fugger family firm was the most powerful banking house in Europe in the early 16th century. This company was active in various commercial enterprises, primarily centered on textile trading, banking and mining of silver and copper. The management of the dispersed branches of the firm required sophisticated accounting and management control practices, a knowledge of which the managing partner of the firm, Jacob Fugger, obtained as an apprentice and master trader in the Venetian Republic during the years 1473 through 1487 (Strieder, 1931).

Häberlein (2018) indicates that German merchants and bankers in the 15th century organized their commercial enterprises as family partnerships (*Personalgesellschaften*), in which the members of the family invested capital "zu Gewinn und Verlust" (for profit and loss). In the event of a bankruptcy it was not only the partners' capital investments that were at stake. Their liability extended to the entirety of their assets, which explains why these companies became known as general partnerships in legal history. The details of a company's organization and range of its commercial activity were specified in the articles of association, which were for a fixed period of time (usually three to seven years). The articles of association specified the size of the individual capital accounts, the rights and duties of the partners, the dates of closing the accounts, the dates of paying out of profits, as well as the procedures in the event of the withdrawal of a partner from the partnership, usually through death.

Many southern German trading companies, like the Fuggers, also established a permanent presence in trading centres such as Venice and Antwerp. The head employee or "factor" in these branch offices was bound by detailed instructions from the managing partner, and was held

accountable to the company through periodic accounting reports. Double entry bookkeeping was used to maintain control over the factors located in the distant branches of the firm (Häberlein, 2018).

In 1516, Matthäus Schwarz was engaged by Jacob Fugger as a bookkeeper in the main Augsburg branch of the firm (Hartsough, 1932; Inoue, 1982). In 1518 Schwarz wrote a manuscript describing the bookkeeping system used in the Venice "factory" (i.e. trading office). In this manuscript, Schwarz contrasted the bookkeeping system used in the Venice branch with what was called the "German practice" which used a single entry approach (Hartsough, 1932). Schwarz illustrated how the Venice accounts were combined with the head office accounts on a periodic basis, along with the accounts of the other branches of the Fugger firm. The Venice Branch had transactions in three types of commodities: textiles, copper, and silver. This branch received copper and silver from certain branches of the firm and sent these metals to other branches. In the Italian double-entry bookkeeping system, monetary values were assigned to these inter-branch movements. In the German system, monetary values were omitted and only quantity entries were made for the inter-branch movements. Consequently no profit calculation could be made in the German system (Inoue, 1982).

Strieder (1905) demonstrated that it was possible to calculate the profits of the firm on a periodic basis. All the ingredients of accrual accounting were present. Strieder (1905) refers to the concepts of a balance sheet ("Die Bilanz" or financial position at a given point in time), assets ("Aktiva"), liabilities ("Passiva") and the resulting profit ("Gewinnermittelung"). The evidence of the use of double entry bookkeeping in the Fugger firm is supported by the fact that the firm had an important branch in Venice where double entry was well known based as a result of the publications of the work of Paccioli and other authors (Sangster, 2016). In addition, because the Fugger firm was engaged in merchant banking partnerships, which had used double entry since the 14th century in cities like Florence, double entry would have been used throughout the various branches of the firm. In addition, double entry bookkeeping facilitated managerial control over the dispersed branches of the firm.

3.5 The use of time in hospital accounting in France, 15th century AD

This section discusses the use of time in the accounting records of the *Hotel-Dieu Saint-Thomas d'Argentan* in the 15th century AD. Argentan is a city located between Alençon and Caen in the lower Normandy region of France. Argentan was founded in the early 12th century by King Henry 1st of England, who was also the Duke of Normandy. The *Hôtel-Dieu Saint-Thomas d'Argentan* was established by bourgeois merchants as a facility to care for pregnant un-wed mothers, abandoned children and orphans, as well as the sick and the disabled elderly (Fazy, 1913) In effect, the *Hotel-Dieu* was a maternity hospital, an orphanage and a hospice. To carry out its mission, the hospital received donations from the Dukes of Normandy, the Kings of France and the Lords of Argentan. The growing number of patients, including some from parishes more than 40 km away, led to donations from a wide radius around the city. As early as the 14th century, the *Hôtel-Dieu* owned farms, land and buildings, and it had significant annual revenues from annuities, gifts and alms. The accounting records of the hospital reflect the division of the annual revenues into distinct time periods (Moulin, 2010: 64).

The administration of the *Hôtel-Dieu* was assigned to a Master Administrator who was appointed by representatives of the merchants' for a period of three years. The Master Administrator was responsible for the resources of the *Hôtel-Dieu*, and he was required to pledge his own personal wealth in support his responsibilities. The surviving accounting records were

written in a flowery script which may have been intended to impress the recipients of the accounts. An audit of the accounts was made every year at Easter by the Treasurer of the primary Catholic Church in Argentan, thus showing the cyclical nature of time in the accounting records related to the Church calendar (Baker, 2016).

From the appearance of the accounts, it can be inferred that the Master Administrator must have used books of original entry in order to prepare the formal accounts. Several types of books of original entry have been preserved in the archives, including: *journal de la recette* (receipts journal), *journal de la dépense* (expenditures journal), and *journal du maître* (a sort of general journal). The *journal de la recette* showed a list of payments due to the hospital from farmers who rented farms that were owned by the *Hôtel-Dieu*, organized by geographical order, starting with the Argentan parishes and then rural parishes. The list of rents showed the first names and surnames of the payers, the amount of the rent due, and the date of payment, which was normally the feast of Saint-Michel (29 September, corresponding with the harvest). The specific details of the properties for which the rents were to be paid were not shown in the *journal de la recette*; however the details of the properties were specified in the formal accounts. Thus, it is likely that the formal accounts served as a control with respect to the details of properties. In addition, documents showing the basis for the original donation of the farm or other property and the rental agreement were carefully kept by the Master Administrator to provide support during the final audit of the accounts. The *journal de la dépense* (expenditures journal) was a daily record of each type of expenditure, such as for food or the costs of caring for abandoned children; however, no information regarding the actual patients was provided (Moulin, 2010: 80).

Thus, it can be seen, even in the absence of double-entry bookkeeping, the concepts of time and temporality were central to the control of the operations of the medieval hospital in France. This management control was recurrent and cyclical following the agricultural seasons and the Church calendar, which was itself cyclical and recurrent (i.e. Easter did not fall on the same day every year, but instead was dependent on the phases of the moon).

4. Discussion: The myth of objectivity in time calculations

The understanding of time as a clock or calendar measurement calendar ignores the social experience of time. While time is an essential aspect of organizational life, it is not a component of material reality. Time is constituted by human beings who create accounting systems, and as with any system created by human beings, there is error. Despite the recognition of this error, a mythology has developed surrounding the objectivity and neutrality of accounting measurements.

Morgan (1988) has previously discussed the myth of accounting objectivity. He argues that accounting practice has been framed by the metaphor that accounting numbers reflect economic reality. In other words, accountants seek to represent events and transaction in the life of an organization in terms of numbers. However, this metaphorical representation is a partial and incomplete representation of the reality to which the numbers relate. Accounting numbers can only reveal those aspects of organizational reality that are quantifiable (e.g. flows of revenues and costs during a particular time period). Accounting numbers ignore those aspects of organizational life that are not quantifiable (Morgan, 1988, p. 482).

Accountants often acknowledge the limitations of numerical modes of representation, while at the same time being enmeshed in the mythology of objectivity and neutrality of accounting numbers. The myth that accounting numbers are objective and value free, has obscured the fact that accountants are engaged in interpreting reality in a partial way, and in a manner that is biased

in favor of what accountants are able to measure and what they choose to measure, using a particular accounting framework (Morgan, 1988, p. 483).

The myth of objectivity and neutrality in accounting implies that it is feasible for accountants to represent the reality of financial position and results of operations in a "true" manner. In actuality, accountants can only represent those limited aspects of reality to which their accounting frameworks relate. Accounting numbers are not objective, because objectivity is always as much a part of the observer as of the object observed. Accountants are wedded to their calculations by accounting standards, principles and practices that are based on metaphors which convey a partial and biased view the world. The myth of objectivity disguises the true nature of accounting and creates multiple managerial problems. In practice, it is known that the accounting is based on arbitrary assumptions and conventions that do not provide a 'true and fair view'. This understanding is hidden through a euphemistic reference to 'the best possible estimate'.

Modern applications of time in accounting attempt to bring past, present and future together in one calculative practice (e.g. depreciation, amortization and time value measurements). In this way, accounting appears to 'represent reality' by enclosing transactions within specific time periods, thereby allowing organizational managers to make assumptions about causal relationships and to account for these relationships. The ways in which accounting appears to capture reality and reflect it in arbitrary time periods results in a variety of misunderstandings in organizational decision-making for both business enterprises and non-enterprise organizations. To compensate, accounting practice often uses modifiers, such as: 'estimates', 'projections' and 'prospective', when speaking about time (Ezzamel and Robson, 1995: 154).

Sunder (2005: 119-120) has noted that if a manager's bonus is limited (i.e. it cannot exceed a specified amount) the manager will hide income from better years and report it in periods with lower income. If the manager receives the maximum bonus in a given year because the income exceeds a certain level, he can generate additional expenses in that year. The asymmetric recognition of 'facts' due arbitrary accounting time periods generate distortions in decision making (Quattrone and Hopper, 2005: 761). In this respect, Mattessich (2002) has offered the following critique regarding time in accounting:

> "The problem of defining the time over which benefits are to be calculated becomes of secondary importance as soon as the assumption of profit maximization is abandoned. The maximization of a short-term benefit may be in conflict with the maximization of a long-term benefit; but a profit objective (for a longer period) based on a value judgment of management can be subdivided into sub periods according to the same judgment procedure. Some do not agree that there is no definitively given time horizon (in the sense of the 'point of time beyond which there is virtually no information') since 'information is always created, not taken', but we believe that beyond such an originally established horizon, the costs of creating additional information about the future are so enormously high, that research into the future is a very limited means of extending this horizon" (Mattessich, 2002: 189).

Distortions occur by including past, present and future in the financial decisions of a given period. Discounted present value calculations provide a clear example of a process that combines dissimilar metrics to arrive at a result which appears to have an agreed upon social meaning (e.g. bond value measurements). However, in these cases most individuals lack the ability to account for time because the representations and interpretations of time related facts lose coherence. An accounting number not only requires stating the time of occurrence of the

event or transaction, but the representation of it as a fact. The arbitrary financial year, the annual audit, the monthly budget, the weekly financial reports and the daily cash statements are examples of the ways in which the techniques of accounting bring a temporal dimension to bear on organizational life. In this sense, accounting appears to be a way of acting across time. The past, the present and the future are combined together through accounting calculations (e.g. discounting). In this way, temporal fluidity is created through calculative practices (Accounting, Organizations and Society, 1996: 513).

In sum, the concept of time as involving a measurement by a clock or a calendar ignores the social experience of time. While it is recognized that time is an essential aspect of organizational life, it is not an aspect of external reality. As a metric in accounting, time is is constituted by human actors. It is therefore important to recognize that time is a socially constructed phenomenon, and that organizational time is not linear or objective, but rather cyclical in nature.

5. Conclusion

Time and temporality are key concepts in accounting and these concepts have often been conflated under the principle of 'periodicity'. While, on its face, this seems to be an ordinary and normal approach to accounting practice, the challenges associated with classifying events in the life of an organization into distinct time periods are often difficult to implement in practice.

The purpose of this paper has been to illustrate how concepts of time and temporality have been deployed in accounting in different historical periods. The primary argument of the paper has been that while concepts of time and temporality are important to accounting, the categorization of events and transactions in organizational life into distinct time periods is not of recent origin. Rather, time and temporality have been present in organizations throughout recorded history. Moreover, accounting periods tend to repeat through time, with each period having a distinct nature, but nevertheless recurrent. Thus, periodicity in accounting is not progressive, such as that implied by the linear understanding of time in western philosophy. Instead, time in accounting is a repeating process which proceeds in a precise rhythm for the ultimate purpose of making sense out of organizational life.

Methodologically we have relied on archives and secondary source material pertaining to the historical periods mentioned. The structure of the paper has been as follows. Section 2 reviewed the prior literature focusing on time and temporality in accounting. Section 3 analyzed several historical periods in which time and temporality were shown to be cyclical. Section 4 reviewed the myth of objectivity and neutrality in time and accounting measurements. The originality of the paper is that it reveals how time measurements are socially constructed and not an aspect of material reality.

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