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Profit Calculation in a late 14th century sole proprietorship, the case of Francesco DATINI

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Title Page (must be a Word file)

PROFIT CALCULATION IN A LATE 14TH CENTURY SOLE PROPRIETORSHIP, THE CASE OF FRANCESCO DATINI

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PROFIT CALCULATION IN A LATE 14TH CENTURY SOLE PROPRIETORSHIP, THE CASE OF FRANCESCO DATINI

ABSTRACT

This paper examines the *Profit on merchandise* accounts (a forerunner of the income statement) in a sole proprietorship in Pisa that officially operated between 1386 and 1392, but took several months to finally end its activities, which it did in 1393. The *Profit on merchandise* account was where the balance on each goods account was transferred when all the items recorded in it were sold. The principal contribution of this paper is the identification of a unique approach to medieval product costing that ensured indirect expenses on merchandise were recovered from customers when sales took place, while earning an average return of over 10 percent on those costs. It also highlights the problems encountered when working with archival material that has deteriorated over time; and presents a research method that reconstructs missing data using the trail to original entries and contra entries recorded in double entry.

Key words: Medieval, bookkeeping**,** Profit on merchandise account, Datini, product costing.

I. INTRODUCTION

There is a perception that medieval archival materials, including the books that comprise the accounting records of sole proprietorships and partnerships that belonged to Francesco Datini, dating to the late 14th and early 15th centuries, have been extensively investigated by various researchers. When applied to the Datini sole proprietorships and partnerships, as well as in general to the development of double-entry bookkeeping, various significant factors have been identified, starting with the simplest internal ones in the form of increasing the professional skills of bookkeepers or with the appearance of accounts with debit and credit sections across two facing pages (bilateral). The first detailed studies dedicated to formal attributes of double entry bookkeeping were carried out by Besta (1909, 342), Ceccherelli (1910, 29–34), De Roover (1938, 146), and Littleton (1966, 12–21). In addition, research in the Datini archives was developed by de Roover (1937, 274–275; 1956, 141), Zerbi (1936; 1952, 131–136), Melis (1962; 1972). These authors emphasized the role of revenues and expenditures as the factors directly influencing the financial result (i.e. profit and loss), and the special accounts created to reflect the financial result.

However, none of these researchers, nor their followers, who studied the medieval archives of accounting records in general, and those of Francesco Datini in particular, identified the progressive development of the financial result calculation in Datini's sole proprietorships and partnerships in Pisa in the late 14th century.

With respect to the present study, the assessment of the accounting system of Datini's sole proprietorships and partnership in Pisa described by de Roover is of a particular interest. De Roover's first publication on the topic in 1937 focused on the Datini archives (De Roover, 1937, 273–275). Using the work of Bensa (1928), De Roover included a biography of Datini and the history of the creation of the archives. The introduction to this publication stated:

> The Genoese documents[1] show us a system that has already reached maturity, but does not tell us the way the transition from simple accounting to the double-entry method took place. On this subject, a number of hypotheses have been constructed more or less imprinted with fantasy. The publication of copious excerpts from Francesco Datini da Prato's registers, which started with simple accounting and ended up by keeping the books in double entry according to all the rules of art, allows us to grasp how the transformation was accomplished. (de Roover, 1937, 273)

The primary contribution of our series of publications, of which this paper is one, is that they provide details about medieval techniques of determining profits. This is particularly important, because one of the earliest surviving examples of the evolution from single entry to double entry is found in the Datini archives, in which a vast amount of archival materials are available enabling us to reproduce the accounting practices related to the determination of the financial result. The completeness of the archive, covering 47 years of commercial activity in various southern European commercial centers, includes over 500 account books and thousands of other items. The Datini archive is vastly more informative than the far smaller collections that have been the focus of previous studies, such as the partially complete ledger of the Italian merchant Giovanni Farolfi's branch in Provence (1299-1300), the

[1] De Roover refers to the Massari ledger of the Municipality of the Commune City of Genoa (1340).

archives of Dell Bene (1318-1324), and the book of financiers (massari) of the Commune of Genoa (1340).

Of particular significance with respect to the research described in this paper is the fact that a detailed review of the accounting procedures used for recording, calculation and accumulation of operating results (operating profits and operating losses) has been carried out.

This paper also discusses how a merchant who initially kept records in mingled accounts in Avignon (1363–1382) (in columnar form) and calculated his financial result without using Merchandise accounts and Profit on merchandise accounts, introduced double entry and double-entry bookkeeping in Pisa during a period of 13 years (1382–1395). This process is presented, not as the use of previously developed methods and practices, but as a creative process that was unique not only for that time, but also fully meets the requirements of today.

Many researchers, relying on the work of Federigo Melis, believe that there were two sole proprietorships and several partnerships established by Datini in Pisa between 1382 and 1400. These proprietorships and partnerships were periodically closed and opened the next day, with new partnerships beginning with the capital transferred from the previous partnerships. However, this was not always how one of Datini's new businesses was formed. As was evident from his earlier bookkeeping practices in Pisa between 1382 and 1386, when Datini closed a business, if the inventory was not transferred to a new business, the closed business continued to sell until all the merchandise was sold. In this paper, we shall explore this practice in more detail in relation to another of Datini's firms, his Second sole proprietorship in Pisa that Federigo Melis claimed operated between 1386 and 1392. When the Second sole proprietorship in Pisa was replaced by a partnership in 1392, Datini spent several months selling the remaining merchandise of this Second sole proprietorship before its ledger was finally closed in 1393.

The accounting system for the calculation of financial results in Datini's business in Pisa between 1382 and 1410 developed over time, conditioned by changes in organizational and legal forms of ownership (two sole proprietorships (1383-1386 and 1386-1392) and a partnership (1392-1410). Changes were made as new techniques and procedures were developed to meet the needs of the business activity and in response to differing levels of professional expertise of the firm's bookkeepers.

This paper describes the procedures adopted in Datini's Second sole proprietorship for the calculation of the financial result. It includes a description of use of four of the principal account books in use: a Merchandise book, a Ledger, and an expenses book, and a receipts book; the use of an account for Profits on Merchandise, which was the forerunner of a Profit & Loss account; the use of an account for indirect Merchandise Expenses; the identification of a premium of 10% on indirect merchandise expenses incurred by the firm being added to the amount charged to customers at the point of sale; and clarification of the time that passed while the activities of the firm were being wound down after the business was terminated. In doing so, it highlights one of the difficulties faced by archival researchers: missing text; and describes the research method adopted in order to successfully address this major problem.

II. REVIEW OF PRIOR LITERATURE

The first discussions of the Francesco Datini sole proprietorships and partnerships are to be found in the works of Fabio Besta (Besta, 1909, 317-320; Sargiacomo et al, 2012) and Besta's students such as Gaetano Corsani (Corsani, 1922, 83-85) and Alberto Ceccherelli (Ceccherelli, 1913; 1914a; 1914b; 1939). Their research was intertwined to a certain extent. Besta used the material that "was kindly prepared especially for him by his talented and favourite student Corsani", for which the professor expressed his gratitude (Besta, 1909,

p. 318). In 1922, Corsani used some of that material in his own book (1922, pp. 83–85), which he dedicated, in turn, to Fabio Besta.

Several authors at the end of the 19th and in the first half of the 20th century [Guasti (1880); Carradori (1896); Livi (1910); Nicastro (1914); and Bensa (1923; 1925; 1928)] described the account books stored in the State Archive of Prato, the city in which Datini lived and worked. However, none of them focused on either the manner in which the medieval bookkeeper maintained accounting procedures or on the accounts in which the bookkeeper reflected the different transactions.

Federigo Melis dedicated a vast amount of time to an exploration of the account books in these archives – he even numbered the pages of every book. Melis did a great deal of work in organizing the books according to the sole proprietorships and partnerships to which they related (Melis, 1962), and his cataloguing is still relied upon today. Despite many years devoted to researching this archive, he focused on the Datini accounting practice in only one of his works, published in 1954 in Italian and English.

Basing his work on Melis (1962). Alvaro Martinelli (1974, 191-192) also provided a description of the Datini Partnership's accounts:

> The case of Francesco Datini from Prato is remarkable. He established a branch-office in Avignon, where from 1366 until 1401 he kept his books according to the old form; that is he used accounts with mingled sections; he introduced in his ledgers the new "Venetian method" only in 1401. This new form, which used accounts with lateral sections, had already been introduced into the accounting systems of the branch-offices of Genoa, Florence, Pisa, Barcelona, Majorca and Valencia, which he established and managed with other partners from 1383 to 1393.

De Roover (1956, 141), writing about Datini's bookkeeping in Pisa wrote:

> This system is altered in a later ledger (1383–1386), also a *libro giallo*, belonging to Datini's Pisan branch. In it, the personal accounts for receivables and payables are in bilateral form, but merchandise expense, and profit-and-loss accounts continue to have the credit beneath instead of beside the debit. The presence of accounts for operating results has led to the conclusion that this ledger is in double entry.
>
> After 1390 this system (i.e. double entry) was certainly applied in most of the Datini branches abroad and at his main office in Florence (Corsani, 1922, 91–92). Branch managers were expected to send regularly a copy of the balance sheet to headquarters, and several of such copies are still preserved in Prato.

De Roover noted (1937, p. 275):

> The records of Francesco Datini present an exceptional interest for the history of commercial accounting, because they provide us with at least some details on the evolutionary process which, starting at the single-entry accounting, led gradually to the introduction of the double-entry method. In this evolution, two factors played a decisive role: the integration of personal and impersonal accounts into a complete system and the presentation of the accounts in an adequate form which was finally achieved by putting the debit and credit side by side.

Although much has been written about Datini, his business and his archives (e.g. Origo, 1957; Nigro, 2010) a review of the descriptions of the Datini accounting systems indicates that the archival materials have still not been thoroughly studied; and many accounting procedures have not been analysed. As a result, there is still much to be learned from carrying out detailed studies of the account books of his various enterprises.

III. RESEARCH METHOD

The principal research method adopted in this study is archival. It uses material found in the State Archive of Prato. Our research team has been working with the material in this archive for the past 15 years. During this time, many of the records have been recorded and linked together using logical-analytical modeling. This is an approach that we developed for the purpose of enabling entries in the account books to be traced visually between accounts and books and from page to page. By adopting this approach, we are able to see the entire accounting system electronically, making entries and their sources clear in a way that is not possible if all that you have is the original set of account books. This enables us to consider each transaction in detail, trace its classification, and explain the bookkeeping and accounting methods adopted without misinterpretation. This approach allows a new analysis and interpretation of accounting practices for periods when there was no standard methods or a single approach to accounting or financial reporting. Most importantly in the context of the present study, it also facilitates the identification of the content of missing pages and missing text. This enables researchers to determine the content of text that can no longer be read. In this paper, we present the bookkeeping method adopted by the bookkeeper in Pisa. As far as we are aware, the entries in the account books included in this study have never previously been analyzed in this way or for this purpose.

IV. A BRIEF HISTORY OF FRANCESCO DATINI'S BUSINESS UNTIL 1386

Francesco di Marco Datini (c. 1335–1410) was head of a large trading network that operated in Avignon, Pisa, Florence, Prato, Genoa, Barcelona, Valencia and Majorca between 1363 and Datini's death in 1410. His business started in 1363 in Avignon, during the period of the Avignon Papacy. The first partnership was set up with Niccolò di Bernardo, in which Datini acted as a junior partner. Datini's capital was half that of his partner but both partners received an equal fixed return on their investment of f. 200. As Datini's investment was half that of Niccolò di Bernardo, Datini received a 34.3% return on capital, while the senior partner received only 17.15%. Federigo Melis discussed this different level of return on capital and concluded (1962, p. 143) that it was in recognition of the extra work a junior partner would be expected to do. On December 31, 1364 the partnership agreement was terminated on Francesco's initiative. The next day, Datini set up a new partnership with Tuccio Lambertucci, with approximately equal investments in the business by both partners. Their joint business existed until October 24, 1367.

On October 25, 1367 Datini and Lambertucci merged their capital and formed a new partnership with Toro di Berto. Five times over the course of six and a half years, this partnership prepared a report containing a list of all the debit and credit balances, allowing a calculation of the financial result. In all of these periods, the business was successful. The most successful one was the period of 671 days from March 1, 1371 to December 31, 1372, when a profit was made of f. 2964 s. 14 d. 4, or 32.34% on the invested capital.

On March 15, 1373 Datini initiated the termination of the partnership agreement, and on March 21, 1373 he set up a sole proprietorship, or, as Melis describes it (1962, p. 137): *in* *proprio* or *azienda individule.* The senior managers of the closed partnership started working for the Datini's sole proprietorship. It was successful and ran for about ten years until November 30, 1382. By that time, the exile of the Pope was over. The Holy See returned to the Vatican. Accordingly, business activity in Avignon plummeted. Meanwhile, Datini had married in Avignon on 7 September 1376 (Origo, p. 49), but the couple had not had any children and were being pressurized by both their families to return to Tuscany where it was thought there was a greater possibility of a successful conception (ibid, pp. 161-163). Thus, on December 1, 1382 Datini established a new partnership in Avignon with his proven managers, Boninsegna di Matteo and Tieri di Benci, neither of whom contributed any capital to the partnership. Soon thereafter, he and his wife travelled to Prato, followed by two other managers from his previous firm.

In the work by Melis, devoted to the study of account books kept in Datini's archives in Prato, it is stated (1962, 176) that the First sole proprietorship in Pisa was officially created on February 5, 1383 and ceased its activity after 926 days, that is, on August 19, 1386. The next day, Datini set up the Second sole proprietorship. This business continued for 2,140 days until June 30, 1392.

On July 1, 1392 Datini opened his first partnership in Pisa. The partners Manno d'Albizo degli Agli, the local manager, and Datini's "Florence" partnership, a firm belonging to himself and Stoldo di Lorenzo di ser Berizo, his reliable friend in private life and business. All three had been involved in the First sole proprietorship (Melis, 1962).

As previously mentioned, when Datini closed a business, if the inventory was not transferred to a new business, the closed business continued to sell the merchandise until it was completely sold. In Pisa, this happened with the First sole proprietorship (1382-1386) that continued to sell its inventory until 1406, when the remaining unsold goods were written off at a loss. A Profit on merchandise account was introduced at the end of the Merchandise book at the date of the final closing of First Sole proprietorship. The second sole proprietorship also continued to sell its inventory for several months after it closed in 1392, finally selling it all in 1393. This practice awas repeated when Datini's Pisa partnership ceased on July 25, 1400 following Manno's death on June 21 (Melis 1962, p.176). The now closed partnership continued to sell its inventory until Datini's death in 1410.

That Datini adopted this practice of continuing to sell inventory after an enterprise was closed, is hardly surprising. Why would a new partnership willingly take over inventory that it did not acquire, some of which had remained unsold for a considerable period? In the 14th century, there were the additional problems of plague and war, which left people with only enough money for food, medicine and funerals for their relatives. People had to limit themselves when purchasing other goods (Berti, 2010, p. 285). Thus, in the 14th century, accounts for merchandise may have remained open for many years.

Very little has been written about Datini's Second sole proprietorship in Pisa, and nothing has been said about the proprietorship's bookkeeping. However, in 2010 Marcello Berti wrote (p. 294-295):

> The second business lasting from the 20th of August 1386 until the 30th of June 1392, and set up with the capital passed onto it by the first, coincided with a great increase in the activity of the *fondaco* in keeping with the 'notable spur' to activity which Melis saw occurring in the first months of 1384.

And further:

> From 1386, and until the corporate structure was established, the Pisa *fondaco* – finally able to mobilize fully with the weakening or disappearance of some obstacles to its internal and external performance and with the added advantage provided by direct contact with Datini himself – emerged in all its vitality and committed itself massively in the Mediterranean trading area, particularly in the West. Correspondence from various sources is eloquent on the subject.

Unlike the first sole proprietorship, the second sole proprietorship used a Profit on merchandise account throughout its existence. Since the Profit on merchandise account of the First sole proprietorship was prepared only in 1406, and that of the First partnership in 1394, this paper investigates the following two-part research question:

How did the sole proprietorship accounting system in Pisa develop; and what factors influenced its development?

V. DEVELOPMENT OF THE ACCOUNTING SYSTEM FOR THE CALCULATION OF FINANCIAL RESULT

At first, Datini did not appear to have been involved in the day-to-day running of the business:

> From the beginning, the running of the *fondaco* was entrusted to Cristofano di Bartolo Carocci and, soon after, to Simone di Andrea Bellandi, while Manno d'Albizo accumulated experience which would later be rewarded with his inclusion in the group of partners who formed the new partnership set up on the 1st July 1392 (Berti, 2010, p. 294).

From the sources that have preserved the names of those responsible for keeping the books, it can be assumed that the first people to introduce double entry in Pisa were Stoldo di Lorenzo di ser Berizo and Matteo di Lorenzo di Matteo Boninsegna. They both followed Datini to Italy from Avignon. Stoldo di Lorenzo was Datini's personal friend and was in his employ from October 14, 1371. Matteo di Lorenzo joined Datini's sole proprietorship in Avignon shortly before he left for Tuscany on February 28, 1382. He was the son of a partner in the partnership in Avignon.

Initially, they kept all their records in one book – Memorial book "A" (Prato, AS, D. №366). In it, they took into account both settlements with debtors and creditors, and revenue earned and expenses incurred. In 1383, after the opening of the sole proprietorship, they began to use a set of special purpose books.

On November 26, 1384 Matteo di Lorenzo di Matteo Boninsegna died. From then on, Simone di Andrea Bellandi, who was joined by Cristofano di Bartolo Carocci on July 3, 1385, were the bookkeepers in Datini's sole proprietorships and partnerships in Pisa, Barcelona, Majorca, and Valencia. In Pisa, they did the bookkeeping in turns, as Datini sent them to different affiliated branches for long periods. It seems that until the end of 1387, Cristofano di Bartolo was in charge of bookkeeping, and until December 1390 – Simone di

Andrea (though one book (Quaderni di Spese di Casa, Prato, AS, D. №422) has the name of di Matteo d' Anntonio di Firenze on it, something apparently undetected by Federigo Melis). From April 28, 1390 to June 27 that year, the account books passed again to Cristofano di Bartolo. The first accounting period of the partnership in Pisa (1392-1394) was Simone di Andrea's responsibility. In April 1393, Cristofano di Bartolo returned to Pisa. He took over the bookkeeping on August 13, 1394, when Simone di Andrea left for Barcelona. Cristofano di Bartolo continued as the bookkeeper in Pisa until February 26, 1396, while Simone di Andrea remained in Barcelona until his death in 1407.

Previous studies have identified a number of bookkeeping practices in Datini's sole proprietorships. Sangster et al (2017), for example, described the existence of:

- Merchandise accounts – a special account for purchase and sale of individual goods and batches of goods. The debit entries included the cost of goods purchased for resale in correspondence with the seller's account, as well as other expenses related to the purchase and sale of such goods. The credit entries included the sale value of the goods in correspondence with the buyer's account. This account identified an operating profit or operating loss (the result of a particular transaction) and it was transferred to the special accounts for the accumulation of operation profits and operation losses.
- A Profit on merchandise account (a forerunner of the Profits and Losses account), designed to determine the financial result over all types of activities.
- Accounts for the accumulation of operational results (de Roover called them "accounts for operating results") with separate accounts for profit accumulation and separate accounts for loss accumulation. These accounts accumulated the operating results calculated in the Merchandise accounts. As a rule, such accounts occupied several cartas (pages), which were united into the consecutive lines of the account, the accumulated result of which was directly transferred to the "Profit on merchandise"

account. The use of consecutive lines of operating results was a special invention of Datini's bookkeeping in Pisa.

Among the specific features of the account books used in Datini's sole proprietorships, the Memorial book and Merchandise (*Mercanzie*) book should be given prominence. Some will recognize the Memorial book from the descriptions by Luca Pacioli:

> Thus the memorial, or as some call it the waste-book, is a book in which day by day and hour by hour the merchant writes all the transactions, both small and large, in which he is involved. In this book he writes in detail everything sold and purchased (and other transactions), not leaving out a jot, of whom, of what, of when, of where in all clarity and explicitness … The owner of the business, his employees, the apprentices and the women (if able to write) make entries in the memorial, in the absence of one or the other; because the merchant with a large business will not always keep his apprentices and employees at home… and only the women or other apprentices who maybe can hardly write, remain at home. But to avoid turning away business they have to sell, collect, pay and buy according to the instructions given by their principal. And to the best of their ability they must write everything in the memorial, simply mentioning the monies and weights involved, and indicating the kinds of money in sales and purchases or paid or received… the bookkeeper will put everything in order when he writes up the journal (from the memorial)" (Yamey, 1994, pp. 47–48).

As we can see, in Pacioli's terms the Memorial book appears as an auxiliary book to the double entry system, and its keeping is not difficult. In contrast, in Datini's sole proprietorships, the Memorial book is simultaneously a register of a chronological record and a systematic record that was, in part, part of the double entry system. Personal accounts of debtors and creditors were opened in the Ledger. In the Memorial book, in addition to registering business facts, Merchandise accounts were also entered.

The Merchandise book was considered to be one of the very important books in Datini's sole proprietorships. It contained accounts relating to revenues and expenses and the calculation of financial result. The Merchandise accounts, and the consecutive lines of the accounts as they spread across the pages of the book, were ultimately combined to enable calculation of the accumulated operating results. The Profit on merchandise account created for the First sole proprietorship in Pisa in 1406 was not the first time Datini's bookkeeper created a Profit on merchandise account. That first occurred in relation to Datini's Second sole proprietorship in Pisa.

The accounting system in Datini's Second sole proprietorship

The second sole proprietorship adopted many of the accounting practices of the First. Merchandise accounts were initially opened in two books: the Merchandise book (Prato, AS, D. №359) and the Memorial book (Prato, AS, D. №369). The first page in the Memorial book reveals that the Second sole proprietorship started purchasing on August 16, 1386. The year is confirmed on the first page of Merchandise book, though the text containing the actual date has not survived.

Unlike accounting in Tuscan partnerships where the activity was carried out until a stated end-date, when accounts were balanced and profits and losses were distributed, in sole proprietorships there was no need to calculate the final balance of goods in accounts, since accounts for individual units or batches of merchandise were not closed until they were sold.

Operational results in the Second sole proprietorship were accumulated in a Profits on Merchandise account in the Merchandise book. When a batch of goods in a merchandise account was completely sold, the closing balance (profit from sale or loss from sale) was transferred into this Profits on Merchandise account. When the page in the ledger containing the Profits on Merchandise account was full, it was balanced and the amount was carried forward to another page. This process continued for as long as the business was operating.

The surviving Merchandise book of the Second sole proprietorship is in extremely poor condition. Although the book was subjected to special restoration, some sheets were lost, and on the remaining sheets of the book much information was damaged and cannot be restored. For example, On the right-facing pages (labelled "r" for *recto*, i.e. front), the text of the records is significantly damaged. In addition, the bottom of both pages of the double-page, where the totals of the entries were entered on each page, are completely destroyed. Those records of the Profits on Merchandise account are on cartas 119r, 121r, 125v, 128v, 129r, 137r, 137v, 139v. Perhaps due to its condition, no one has ever tried to investigate it. But, using our logical-analytical reconstruction approach (see Appendix), we found that enough had remained for us to be able to reconstruct what the account contained. In doing so, we recreated for the first time, the detail originally entered in the Merchandise book.

The most valuable cartas for our reconstruction and for our ability to address our research question are 126r, 129v, and 142v. Although in poor condition, they have survived. Carta 129v contains a Profit on merchandise account prepared up to the date when the Merchandise book was closed. Carta 126r takes into account the totals of operating losses from sales of goods, and 142v accumulates the totals of profits from various types of activities.

Preparation of the interim Profit on merchandise account as of June 30, 1392

The final page where the Profit on merchandise account is located is carta 129v. As can be seen in Figure 1, up to the sub-total of f. 2598 s. 5 d. 1 *a oro* (in Roman numerals and centered on the page) not a single numerical entry has survived, and the text is almost completely absent.

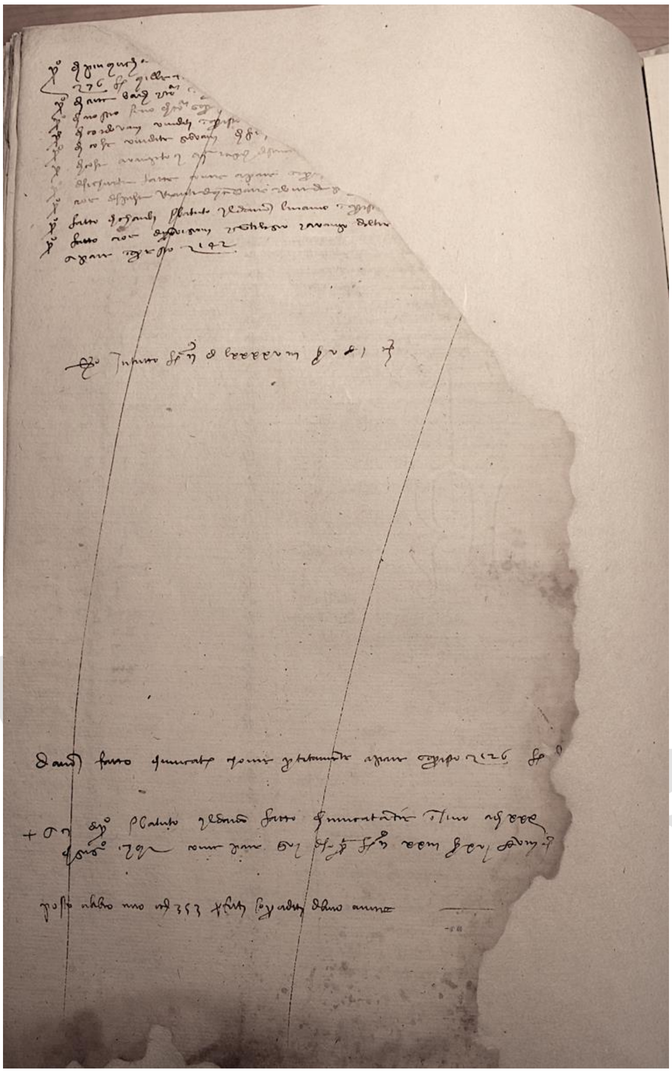

Figure 1. The Profits on merchandise account on carta 129v.

As can be seen in Figure 1, the final 3 paragraphs can be read. Their transcription and translations are shown below:

Somma in tutto f. II(M)DLXXXXVIII s. V d. I a oro	*The total sum is f. 2598 s. 5 d. 1 a oro*
Danno fatto di mercatantie come partitamente apare in questo a c. 126	*Loss on merchandises as it can be clearly seen in this book at c. 126*
Acci di pro sbattuto il danno fatto di mercatantie insino a dì XXX di giugno 1392 come pare qui di sopra f. II(M)XXIII s. XVI d. VIII a oro	*There is profit, once subtracted the loss on merchandises until June 30, 1392, as it can be seen here above, f. 2023 s. 16 d. 8 a oro*
Posto a libro nero a c. 353 per tuti sopradetti debino avere	*Put in the Black Book at c. 353 where the aforementioned Profit must have*

We found the amount for the first of these entries on carta 126 and were able to restore the details of several other entries using logical-analytical reconstruction. The total profit before deduction of the loss was calculated by adding back the accumulated loss of fl.574 s.8 d.5 to the total accumulated profits. While we only found limited details of the fourth, fifth and sixth entries by working through the rest of the ledger looking for entries to this account, we have sufficient detail to proceed. Figure 2 shows how everything was brought together in this Profits on merchandise account on carta 129v.

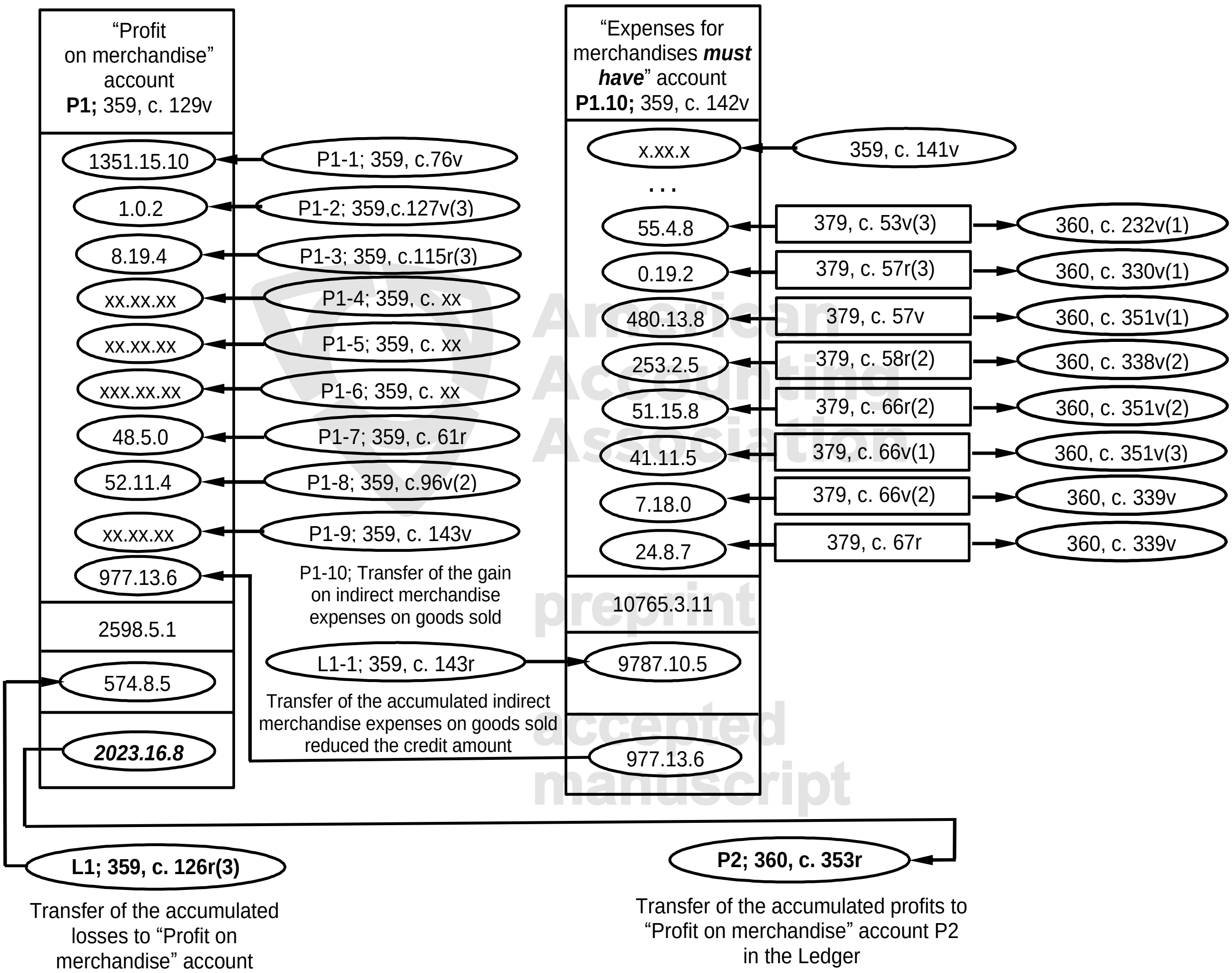

Figure 2. Recording of the first folio of the Profits on merchandise account (P1) in the Merchandise book of Datini’s sole proprietorship in Pisa (1386–1393)

Below is an abbreviated translation of the entries on this Profit on merchandise account on carta 129v. (The numbering corresponding to the profit (P1) and losses (L1) indicators has been insrted at the beginning of these lines to aid understanding of the discussion that follows. The two totals near the foot can be seen in Figure 1.

[…]		
P1-1 *Profit on many merchandises […]*	*76v*	*f.1351 s. 15 d.10*
P1-2 *Profit on barbaresca wax and wax of Romania […]*	*127v(3)*	*f. 1 d. 2*
P1-3 *Profit on our tallow of Romania […]*	*115r(3)*	*f. 8 s. 19 d. 4*
P1-4 *Profit on ropes sold as in this book […]*		
P1-5 *Profit on goods sold to Giovanni of Florence […]*		
P1-6 *Profit on goods sold […]*		
P1-7 *Profit on insurance made as it can be seen […]*	*61r*	*f. 48 s. 5*
P1-8 *Profit on expenses recovered of food and beverage […]*	*96v(2)*	*f. 52 s. 11 d. 4*
P1-9 *Profit made on exchanges once subtracted the loss as in this book at c. 143*	*143x*	*f. xxx s. xx d. x*
P1-10 *Profit made, that is on commissions and stabling and profit on many other things […] As it can be seen in this book at c. 142*	*142v*	*f. 977 s. 13 d. 6*
The total sum is f. 2598 s. 5 d. 1 a oro		
L1-1 *Loss on merchandises as it can be clearly seen in this book at c.126*	*126r(3)*	*f. 574 s. 8 d. 5*
There is profit, once subtracted the loss on merchandises until June 30, 1392, as it can be seen here above, ***f. 2023 s. 16 d. 8 a oro****.* *Put in the Black Book at c. 353 where the aforementioned Profit* ***must have***		

The process adopted is now explained in greater detail. The continuation of each account across several pages of the ledger that ultimately enabled the accumulated operating results to be identified, were created separately for operating profits and operating losses in mingled accounts. Credit entries occupied the top of the account and the debit, intended to carry the accumulated total to the next page (continuation) of the account, was located at the bottom. The account shown on the first row in Figure 2 spread across three pages (15r, 43r and 76v). The first page collected profits on 44 batches of goods amounting to f. 271 s. 13 d. 7. The second page accumulated a total of 48 consignments of goods sold at a profit of f. 413 s. 15 d. 10. The final page of the account collected figures of 49 profits from closed Merchandise accounts to the amount of f. 666 s. 6 d. 5., giving a final total of f. 1351 s. 15 d. 10 representing the overall profit on 141 fully sold consignments of goods. This was then transferred to the first row of the Profit on merchandise account.

The ellipses to the right of the figure of f. 1351 s. 15 d. 10 in Figure 2 shows that the entry is transferred from c. 76v of the Merchandise book and identified for our purposes as P1-1. Similar notation is used in the rest of Figure 2.

For items 2-6, we had to go through all the pages of the Merchandise book to identify them. On carta 127v we were able to find a reference to carta 129v where the amount of operating profit shown in the second line of Figure 2 of f. 1 d. 2 was accompanied by the remainder of the text: "barbaresca wax and wax of Romania". Similaraly, the details for third line were identified on carta 115r, where we found a small part of the text ("our tallow of Romania") and the final figures of the deducted profit amount (s. ?9 d. 4). These partially preserved entries on the account allowed us to identify the actual amount of profit recorded of f. 8 s. 19 d. 4.

Unfortunately, for Items 4 to 6, all we could find was the partial text shown translated above from carta 129v.

Item 7 – Profit on insurance (Datini was acting as the insurer) of f. 48 s. 5 – is calculated in the corresponding account on carta 61r which contains six entries. [The accounting practices of Maritime insurance of Datini's business are examined in detail in (Kuter et al, 2020).]

Similarly, item 8 – Profit on expenses recovered of food and beverage – is determined in the account on carta 96v, which contains eight entries. This highlights a difference in the treatment of household accounts by sole proprietorships and partnerships. In order to ensure the objectivity of the expenses incurred by partners, the bookkeeper separately took into account the expenses for the objects of value transferred to partners as well as services provided to them. For this purpose, a special account was opened, in which the amounts received were reflected. Thus, as a rule, in Datini's partnerships, household expenses were entered into accounts of Household Expenses (Kuter & Gurskaya, 2018). There was no need for these accounts in sole proprietorships; Household Expenses were attributed directly to the "Expenses for merchandise" account.

Entry 9 – Profit made on exchanges once subtracted the loss as in this book at c. 143 – was formed from two separate accounts: Profit made on exchanges and Loss on exchanges

(Figure 3).

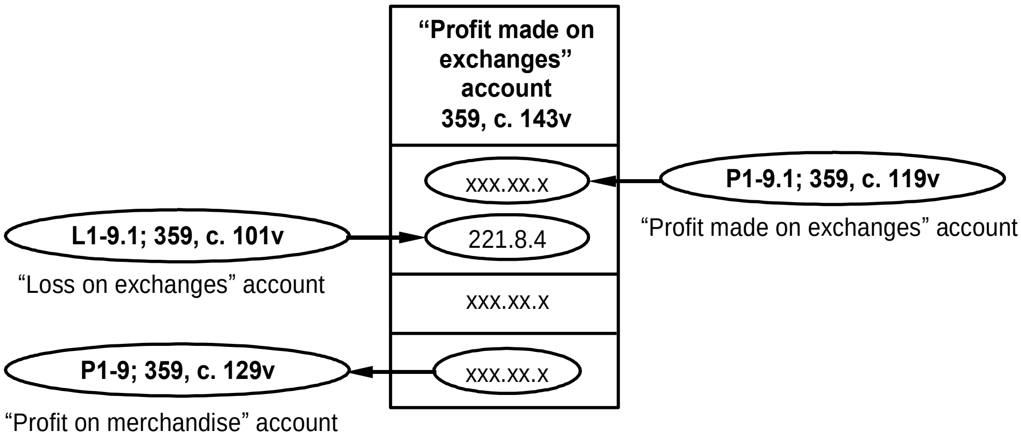

Figure 3. Schematic representation of the formation of indicator P1-9 “Profit made on exchanges once subtracted the loss”

The first entry for Profits made on exchanges is on carta 4v. It is formed by two entries on carta 6v in the Memorial book “A” (Prato, AS, D. №369). The notation “**4+**” before the entry indicates that the sum of s. 6 d. 6 *a oro* is recognized as profit on exchange and transferred to carta 4v of the Merchandise book, the first page of a consecutive line of profit P1-9 “Profit made on exchanges”.

The total for the account on carta 4v is transferred to carta 48v of the Merchandise book where it reached a total of f. 206 s. 11 d. 4. The problems arose with the final page of this account on carta 119v, the lower part of which is significantly damaged and completely unreadable. This does not allow us to see the final accumulated total of the consecutive line, which is transferred to the lost page, carta 143v. The continuations of the account over several pages includes more than 140 entries.

The second component of the amount transferred to carta 129v is the final total in the account for Loss on exchanges, which is recorded on only two pages: cartas 5r and 101v. While, as shown in Figure 3, that amount is known, the overall amount transferred to carata 129v is not.

We shall return to Item 10 after discussing the other remaining lines of the account.

- Item 11 – The total sum of the Profit on Merchandise account before deducting losses (f. 2598 s. 5 d. 1 *a oro*).is shown on carta 129v.
- The text of the 12th line – "Loss on merchandises as it can be clearly seen in this book at carta 126", has survived, but not the amount. We restored it using the entry on carta 126r for f. 574 s. 8 d. 5.
- The final line of the account of f. 2023 s. 16 d. 8 *a oro* is determined by calculation because, as with the 12th line, the text of the entry can be read in the closed Profit on merchandise account, but not the amount. The Merchandise book was also closed at this point, in 30 June 1392.

All the lines of the Profit on merchandise account shown in Figure 2 have now been presented, except line 10: "Profit made, that is on commissions and stabling and profit on many other things," is shown at the foot of the middle column in Figure 2 as having been transferred from carta 142v. This led us to examine carta 142v. When doing so, we discovered a bookkeeping practice that, so far as we are aware, has never previously been identified or described.

Carta 142v: Charging customers for merchandise expenses incurred when goods were purchased by the firm

Most of carta 142v is unreadable, including the accumulated total brought forward from carta 141v, which is also lost on carta 141v. Of the 23 entries on that page, we were able to determine eight of them by cross-referencing to Quaderno "B" (Prato, AS, D. No. 379). As shown in Figure 2 to the right of the column for carta 142v, each entry in Quaderno "B" links to two other books, the Merchandise Book (Prato, AS, D. No. 359) and the Ledger (Prato, AS, D. No. 360). This revealed the special nature of these entries on carta 142v. They all involve charges to customers for expenses incurred by the sole proprietorship. In each case, an entry was made to the credit side of the Expenses for merchandises account in the Merchandise book and a debit entry was made in the buyer's account in the Ledger. This is how we know that customers were charged for the merchandise expenses incurred by the firm.

Despite all the missing detail on carta 142v, two of the final three entries on the account could be read in full. However, only the text was visible of the other. These three entries are essential to our analysis as they summarise the outcome on the account. The second is a debit entry the amount of which (f. 9787 s. 10 d. 5 a oro) can be deduced from the other two entries. In this mingled account, the debit entry reduces the credit entries amount. And the third is the final credit balance:

- The total sum is f. 10765 s. 3 d. 11 *a oro.*
- Expenses made to many goods must give as it can be seen in this book at c. 143 …
- Expenses should yet have f. 977 s. 13 d. 5 *a oro*[2]. Put in this book at Profit on merchandise account at c. 129[3].

The last of these entries representing the balance on the account was the tenth item credited to the Profit on merchandise account, as shown in Figure 2.

Datini's sole proprietorships and partnerships used the Tuscan practice whereby the costs of merchandise included:

– the cost of goods purchased (contra entry to the credit of the supplier's account);

– expenses for delivery, storage and preparation of goods for sale (for sale commission, for carrying to the port, for shipping, for unloading, for packing, for weighing and bringing home, etc.);

[2] This was the accumulated total of the account P1-10.

[3] The original text of these three entries were:

Somma in tutto f. X(M)DCCLXV s. III d. XI a oro

Spese fatti di rinpetto a più mercatantie devano dare come apare di rinpetto c. 143

Restano avere le spese riaute f. DCCCCLXXVII s. XIII d. V a oro messo in questo a Quaderno di Mercatantie c. 129

– gains and losses on monetary exchange.

The peculiarity of the Datini sole proprietorship bookkeeping system was identified when we looked at carta 142v in that the expenses for delivery, storage and preparation of goods for sale appear twice. First, when the sole proprietorship incurred them, when they were recognized as debit entries in the Expenses for merchandise should give account, the final balance of which (of f. 9787 s. 10 d. 5) was on lost carta 143r.

The second time they were recorded was when they are recharged to customers through Quaderno "B", as shown on the right-side of Figure 2. This resulted in a debit to the customer's account in the Ledger and a credit to the Expenses for merchandises account. The consecutive line of these credits to the Expenses for merchandises account is 1,691 entries across 33 pages.

Because these expenses related to bulk wholesale purchases, the charge to customers was a proportion of these indirect expenses which related to the quantity purchased by the customer. It may not be a coincidence that the charges to customers resulted in the sole proprietorship making a gain of approximately 10%, or f. 977 s. 13 d. 6 on the f. 9787 s. 10 d 5 expenses on merchandise the business had incurred. This practice is recognised by (Melis, 1950, 553):

> We are not able to judge the amount by which the indirect costs were shared [in most cases] because the [records] used for the related calculations are lost…[but] for example, at Datini - almost constant percentage rates were used, depending on the type of general costs.

The end of the sole proprietorship.

After the Merchandise book was closed on 30 June 1392, it might be assumed that all the Merchandise accounts were closed and the operating results (profits or losses) were all transferred to the Profit on merchandise account, with the final entries being made within it on carta 129v. This assumption is supported by the fact that after the transfer of the balance of profit on the account of f. 2023 s. 16 d. 8 to carta 353r of the Ledger, not a single entry and not a single correction was made in the Merchandise book.

However, what have happened was that the decision had been taken to transfer the relevant accounts from the Merchandise book into the Ledger. That coincided with a decision to cease purchasing merchandise and do so through a new partnership, which was established a day later, on 1 July 1392.

During the remaining period until the final closure of the Second sole proprietorship in 1393, the bookkeeper kept records relating to it in the Ledger, and in Memorial book "A", and Memorial book "B". The accounts in the Ledger were maintained bilaterally, not in the mingled form adopted in the Merchandise book. It is according to this principle that the Profit on merchandise was opened in the Ledger: losses and expenses were entered as debits on the left, while profits and other income were entered as credits on the right .

The first entry in the credit side of the account on carta 353r was the transfer of the total from carta 129v of the closed Merchandise book:

> *Profit on merchandises from the 20 of August until the 30 of June, f. 2023 s. 16 d. 8, we took from the Profit on merchandise account at c. 129 once subtracted all the expenses and losses.*

The Second sole proprietorship purchased no goods after the Merchandise book was closed on June 30, 1392. However, as evidenced by entries in the Profit on merchandise account in the Ledger, sales of items purchased prior to closure of the sole proprietorship on 30 June 1392 continued until 1393. Almost all the entries in that account are from accounts in the Ledger, Memorial book "A", or Memorial book "B". However, four entries are made that mention the closed Merchandise book. These were the remaining open accounts on cartas 143 and 144 when the Merchandise book was closed. Their balances were entered in the ledger.

The Profit on merchandises account in the Ledger continues across three double pages, the last of which is on cartas 369v–370r. The account was not balanced but, at the very bottom of the debit side far below the entries, the bookkeeper wrote: "f. 1852 s. 18 d. 1". This was the final profit due to Datini as the sole owner of the Second sole proprietorship in Pisa. As the amount transferred to the Ledger when the Merchandise Book was closed f. 2023 s. 16 d. 8, then, as a result of selling some of the remaining goods below their purchase price, or their disposal because of loss of quality, or incomplete collecting debts, the amount of profit decreased by f. 170 s. 18 d. 7.

Regarding when the Second sole proprietorship actually ceased its activity and why. Federigo Melis believed that the Second sole proprietorship was closed the day before the opening of the First Partnership in Pisa, that is, on June 30, 1392. That date is correct if this meant the termination of purchases. The entries in Memorial book "B" are evidence of this. However, the business did not cease at that point. During the next several months and into 1393, as indicated by the dates in the ledger, cash was received from debtors and the remaining merchandise belonging to the Second sole proprietorship was sold. Only at this point, in 1393, did the bookkeeper informally record the closure of the Profit on merchandise account, which also indicated the final ending of activities relating to the Second sole proprietorship.

VI. CONCLUSION

This paper is of interest to accounting historians because it raises issues related to the little-studied process of the calculation of financial result in a double-entry bookkeeping system and the introduction of a special account for its recording in the late 14th century. It answers the research question: How did the sole proprietorship accounting system in Pisa develop; and what factors influenced its development?

In the method it adopted, the Second sole proprietorship of Francesco di Marco Datini in Pisa (1386–1393) left a noticeable mark in the development of double-entry bookkeeping. During this period, a Profit on merchandise account (the prototype of the "Profits and Losses" account) was introduced. It had not been used in the accounting practice of the previous sole proprietorship. By the end of the Second sole proprietorship, there had also been several significant changes, both in the structure of the account of financial results and in the methodology of its calculation.

The particular significance of the research described in this paper lies in the fact that, perhaps for the first time, a detailed review is presented of the accounting procedures used for recording, calculating and accumulating the operating results for a significant variety of types of economic and financial activities of the firm.

When Datini was applying the methods described in this paper, the problem of establishing the correct balances in Merchandise accounts, based on the inventory of the unsold part of goods for each batch and their valuation at cost of acquisition plus additional handling and storage, had not been solved. Attempts to solve this problem would be made by Francesco Datini's bookkeepers after June 1392 in the first partnership in Pisa. The problem would be finally solved in the Second period of activity of that Partnership in 1394–1395.

During the seven years of the Second sole proprietorship's existence, the accounting system changed. Initially in the Memorial book and Merchandise book, all the accounts were carried out in "Paragraph" (mingled) form. Accordingly, the first presentation of the "Profit on merchandise" account in the Merchandise book had the same form. After closing the Merchandise book on 30 June 1392, the continuation of the Profit on Merchandise account was in the Ledger, where it spread over four double pages before the final closure of the business in 1393.

Finally, the closing date of the sole proprietorship is the date when the ledger was closed, Not the date when a subsidiary account book – the merchandise book – was closed. In this respect, we conclude that Federigo Melis must have failed to notice that the Profits on merchandise account was transferred into the Ledger where it continued in use until 1393.

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Appendix

Logical-analytical reconstruction

Logical and analytical modeling is intended to link all the transactions registered in all the account books for an entity into one diagrammatic presentation. This can be done at any level, and is generally performed to generate diagrammatical presentations of the interaction and activity of an interconnected set of accounts. As an example of the extent of this approach, the accounting system of Datini's second sole proprietorship in Pisa from 1386 to 1393 is recorded in the following books:

- 360 Libro Grande Nero A (1386–1393)
- 359 Mercanzie B (1386–1391)
- 404 Entrata e Uscita A (1386–1390)
- 405 Entrata e Uscita B (1390–1392)
- 369 Memoriale A (1386–1390)
- 379 Quaderno B (1390–1392)

The model allows the user to follow the path presented by the entries in the trial balance and the Merchandise account to the contra account in which they were entered, when the original transaction was recorded, (i.e. it enables the user to work backwards from these two accounts to identify the accounts and the transactions that gave rise to the entries within them).

The model also facilitates analysis in the opposite direction, from the entries in individual accounts to the trial balance and the Merchandise account.

This approach enables users to trace the path of each entry to each account, from the moment of recording to the moment of the transferal of the balance of the account, to the final location. The construction of the model makes it possible to identify the common patterns and the striking features of each entry that is being traced.

This form of analysis of the accounting system and its comparison with other accounting systems by time, location, and types of ownership, should lead to establishing more clearly the development of modern accounting systems from their earliest beginnings to the present day.