

2007

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Carvalho, Jose Matos; Rodrigues, Lucia Lima; and Craig, Russell (2007) "Early cost accounting practices and private ownership: The Silk Factory Company of Portugal, 1745-1747," *Accounting Historians Journal*: Vol. 34 : Iss. 1 , Article 5.

Available at: https://egrove.olemiss.edu/aah_journal/vol34/iss1/5

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Accounting Historians Journal
Vol. 34, No. 1
June 2007
pp. 57-89

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EARLY COST ACCOUNTING PRACTICES AND PRIVATE OWNERSHIP: THE SILK FACTORY COMPANY OF PORTUGAL, 1745-1747

Abstract: This paper contributes to an understanding of the historical development of management accounting by presenting an example of cost accounting practice in Portugal in the first half of the 18th century. It explores the integration of cost and financial accounting systems within a double-entry accounting framework by the Silk Factory Company (SFC) between 1745 and 1747. The SFC's methods of product costing, pricing, inventory accounting, expense recognition, and production control are reviewed within the political, economic, and social context of Portugal at the time. The SFC is revealed to have used job-order product costing, with allocations of overhead costs, allowances for wastage and shrinkage, and elements of rudimentary standard costing. Our findings provide evidence of the existence of cost accounting and management control techniques at a private rather than a state-owned enterprise prior to the industrial revolution.

INTRODUCTION

This paper analyzes the management accounting system of one of the most important Portuguese manufacturing entities in the first half of the 18th century, the Silk Factory Company (*Companhia da Fábrica das Sedas*) (SFC), during its second administration, 1745-1747 [National Archives of Portugal (*Arquivos Nacionais da Torre do Tombo*) (ANTT hereafter), *Conselho da Fazenda, Decretos, maço*, 1699-1755; Neves, 1827, p. 41; Macedo,

Acknowledgments: The authors thank Susana Gago, Richard Fleischman, Dick Edwards, and three anonymous reviewers for their helpful comments and suggestions.

1982, p. 97].¹ The SFC had three administrations: the first from October 1734 to January 1745; the second, from February 1745 to October 1747; and the third, from November 1747 to May 1750. Upon its bankruptcy in May 1750, it became state-owned and known as the Royal Silk Factory (*Real Fábrica das Sedas*).

Although several books have survived from the first administration of the company, only the accounting records from its second administration are analyzed here because it is only then that the company used a double-entry bookkeeping (DEB) system. The relevant records – journal (*jornal*), ledger (*livro mestre*),² and inventory book (*inventário*) – were accessed at the ANTT. These records contain rich examples of cost accounting techniques, such as job-order costing with overhead cost allocation.

We have three general aims: first, to explain the cost accounting system of the SFC; second, to explore the accounting system of the SFC in the context of the ambient social, political, and economic context of Portugal; and, third, to contribute to an understanding of how and where management accounting techniques developed prior to the industrial revolution.³

Our exploration of the accounting system of the SFC reveals many useful insights to the development of management accounting practice. Such insights arise because the political, social, and economic context of Portugal during three years of the pre-industrial period, 1745-1747, is distinctive and under-explored in accounting history literature. The date of the accounting records analyzed is significant also because it precedes the first accounting book published in Portuguese, *Exact Merchant and his Books of Accounts* (*Mercador Exacto nos*

¹José Acúrsio das Neves, manager of the Royal Silk Factory from 1810-1821, wrote the administrative and economic history of the SFC. He described its foundation as an historic occasion because it was the most important of all factories in Portugal and because its charter contained the same principles adopted subsequently in the monopolist companies created by King D. José I (Joseph I). The only exception was the seventh paragraph of the charter which provided for the taxing of exports rather than imports.

²The ledger is accompanied by a small book containing an index of accounts (*Abecedário do Livro Mestre*) in alphabetical order.

³In explaining the SFC's cost accounting system, we do not focus, as did Macías [2002, p. 31], on exploring the role of a firm's capital structure on "the parameters and uses of cost accounting information."

seus Livros de Contas]) by João Baptista Bonavie in 1758⁴ and precedes the foundation of the Portuguese School of Commerce (*Aula do Comércio*) in Lisbon in 1759.⁵

We draw from a rich vein of under-explored archival material to provide fresh comparative counterpoints to the bulk of existing analyses of manufacturing accounting history which have been written from a predominantly Anglo-Saxon vantage point. We elicit information to sustain or refute existing conjectures about manufacturing accounting developments on the Iberian Peninsula. The results will be useful in evaluating the findings of many previous studies. Primary sources relied upon include several of the 1,115 accounting books written between 1734 and 1835 which are available in the ANTT. They are catalogued there under the name of the SFC's successor company, the Royal Silk Factory. Appendix 1 classifies this inventory and the 34 books accessible for the SFC's operations in the period 1734 to 1750.

Although manufacturing and industrial accounting has been studied in depth *after* the Industrial Revolution, there are fewer case studies of such accounting *before* the second half of the 19th century. This is consistent with the observations of Carmona [2004, 2005] that "accounting history research published in international journals focuses overwhelmingly on the narrow time segment of 1850-1940." According to Boyns et al. [1998, p. 398] and Boyns and Edwards [1997, p. 2], few cost accounting texts focus on industrial accounting practice before 1750, apart from Moschetti [1610],⁶ Monteage [1683], Collins [1697], North [1714], and Dodson [1750]. Few scholarly papers in the English language analyze cases of manufacturing accounting before the second half of the 19th century. The principal

⁴There is some dispute about the identity of the first Portuguese accounting book. Yamey [1969] and Bywater and Yamey [1982, p. 9] claim that the first such books were published in Portuguese by Bonavie (1758) and by an anonymous author (*Treatado Sobre as Partidas Dobradas por Meyo da Qual Podem Aprender a Arrumar as Contas nos Livros* (Treatise on Accounting Using Double-Entry Bookkeeping), 1764; and that both these books "correspond closely" with (plagiarize?) Barrême's book, *Traité des Parties Doubles* (Treatise on Double-Entry Bookkeeping), 1721.

⁵This school is alleged, in the Portuguese literature at least, to be the first government-sponsored school of commerce in the world. Four subjects were taught: arithmetic, algebra, and geometry; exchange, weights, and measures; insurance; and the DEB method [Rodrigues et al., 2003, 2004].

⁶According to Sá [1998, pp. 59-60], this is the first book dedicated to industrial accounting.

exceptions are papers with an Anglo-Saxon bias [e.g., Edwards, 1989; Fleischman and Parker, 1990, 1991; Edwards and Newell, 1991; Fleischman et al., 1995, 1996; Boyns and Edwards, 1997; Fleischman and Tyson, 1998] and papers focusing exclusively on examples from Spain [e.g., Carmona et al., 1997; Carmona and Macías, 2001; Carmona and Gómez, 2002; Carmona and Donoso, 2004; Gutiérrez et al., 2005; Martínez Guillén, 2005; Romero Fúnez, 2005] and those from Italy [e.g., Zan, 2004; Zambon and Zan, 2005]. Several papers in languages other than English [e.g., in French, by Nitikin, 1994] deal with cost accounting developments in other countries. There are some comparative studies [e.g., Boyns et al., 1998] of the similarities and differences in industrial accounting prior to 1880 between Britain and France. Carmona [2006] provides an instructive review of the history of management accounting in four European Latin countries: Spain, France, Italy, and Portugal.

We concur with Boyns and Edwards [2000], Hoskin and Macve [2000], Fleischman and Tyson [1998], and Fleischman et al. [1995], among others, that it is desirable to conduct further research into cost and management accounting history by examining business records in a wide variety of countries. We contend that Portugal should be one of the countries for which such further research is needed and likely to be insightful. In Carmona's [2006] review of management accounting history in four countries of Continental Europe, the focus is preponderantly on the histories of Spain and France, and to a lesser degree Italy, with only a brief mention of the development of management accounting in Portugal. Accordingly, this paper adds to extant literature by presenting, in English, an example of cost accounting practices, 1745-1747, in a privately owned, Portuguese, silk textiles manufacturing company. Analysis of the SFC's accounting system has the potential to enhance understanding because of the SFC's distinctive geo-political context, the time period, the SFC's private ownership, and the strong competition the company faced from imports and small firms.

We begin by discussing relevant previous literature on early cost and management accounting practices. Then we present a brief historical background of Portugal in the 18th century and a brief historical overview of the SFC. Thereafter, we outline the operation of the SFC's management accounting system, highlighting its distinctive features and formative influences. The final section discusses our findings and conclusions.

LITERATURE REVIEW

A growing body of research has concluded that sophisticated cost accounting techniques were used *before* the second half of the 19th century [see, for example, Gutiérrez et al., 2005]. This is contrary to some earlier management accounting historiography [see Fleischman and Parker, 1991, citing Solomons, 1952; Garner, 1954; Pollard, 1965; Kaplan, 1984]. Pollard [1965], for example, contended that high profit margins and the absence of competition provided little incentive for firms to adopt cost accounting during the British Industrial Revolution. However, Fleischman and Parker [1990, p. 220] have argued that some notable innovative cost accounting methods were used in the U.K. between 1760 and 1850. They cite the accounting practices of the Carron Company, a Scottish ironworks, in which the cost accounting processes “appear to have been motivated by the firm’s early problems with securing adequate partnership capital, attaining profitability, and maintaining liquidity.”

Carmona et al. [1997, p. 412] analyzed the cost accounting system used by a large, state-owned tobacco factory in Spain, the Royal Tobacco Factory of Seville (RTF). They argued that intense competition most likely stimulated cost calculations which could be used in a quest to improve firm efficiency and strengthen competitive position. Nonetheless, they contended that in the case of the RTF, linking the emergence of cost accounting purely to the logic of profits “yields only a partial explanation of the cost accounting phenomenon” and that the development of cost accounting practices at the RTF was part of a strong disciplinary regime⁷ which aimed to minimize opportunities for tobacco theft and facilitate the surveillance of factory labor. Cost accounting techniques assumed this disciplining role, prompted by the importance of tobacco revenue to the State Treasury. Because of problems in ensuring effective visual supervision, the cost accounting system calculated expected costs of direct labor and material consumption for each phase of the production process.

In a similar vein, Carmona and Donoso [2004] studied the role of cost accounting systems in enforcing public policy in early regulated (monopoly) markets at the Royal Soap Factory of Seville (RSF) (1525-1692). They found that a complex system of cost calculation had been the basis for price negotiations for

⁷Romero Fúnez [2005] develops this point by analyzing the regulations of the RTF. He concludes that the RTF’s accounting system contributed to a “spirit of discipline,” aimed at ensuring the behavior of individuals complied with requirements under the regulations.

many years and that centuries before the advent of scientific management in the late 19th century, the RSF's raw materials standards anticipated the introduction of standards based on expectations from prior results. Martínez Guillén [2005, p. 101] analyzed a memorandum authored by Antonio Bordázar de Artazu in 1732 (13 years before our analysis period), in which a costing model is presented for use in the Spanish printing industry. Bordázar's model is significant for two major reasons: first, it advocates cost-based retail price calculations in order to help challenge a monopoly within a strictly regulated market; and second, it includes "concepts such as the imputation of indirect costs, application of interest and the separation of direct and indirect wages. In addition, the retail price was determined as a multiple of the total cost of the books."

Gutiérrez et al. [2005] applied the model used by Fleischman and Parker [1991] and concluded that sophisticated cost accounting practices existed in Spain before 1800. The surveys of company practices by Fleischman and Parker [1991] and Gutiérrez et al. [2005], although differing considerably in terms of their political, institutional, and social contexts, both suggest the emergence of modern cost accounting after 1760. The survey of Spanish practices by Gutiérrez et al. [2005] was conducted predominantly in monopoly companies and in an environment of government (or crown) intervention. In contrast, the focus of Fleischman and Parker [1991] was on UK companies which were predominantly subject to private ownership and non-interventionist governments. Gutiérrez et al. [2005] contend that sophisticated costing emerged in Spain as the cumulative result of two sets of factors. First, there were *economic factors*. Because the textile industry was open to foreign and national competition, most managers required information for decision making because of the business complexities they faced. Second, there were *political factors*. Most factories analyzed were related closely to the crown. Gutiérrez et al. [2005] claim that the royal textile factories faced financial difficulties because of the high levels of capital investment they required, the need to integrate activities, high transport costs, and the lack of skilled workers. Such difficulties, especially the financial one, are argued plausibly to have prompted Spanish textile companies to monitor and control costs more closely and to use innovative accounting techniques [Carmona and Gómez, 2002, p. 237]. Of particular concern was the impact of fixed costs since the interest on debt was substantial and the salaries of accountants and managers were very high.

Fleischman et al. [1995] argue that firms focused initially on controlling raw materials, and then turned to the development of proper techniques to evaluate and assess production processes and operational performance. Using the accounts of the Royal Textile Mill of Guadalajara (RTM), 1717-1744, as a case study, Carmona and Gómez [2002] contend that the RTM's cost accounting techniques concentrated on control of raw materials and waste, control of labour and management, and allocation of overhead to determine product cost. However, because of the lack of expertise in textile manufacturing in Spain in the early 18th century, the state-owned RTM company hired experienced Dutch workers who received high fixed salaries. In this context, Carmona and Gómez [2002, p. 248] found that the "RTM deployed standards of control for labour either before, or contemporaneously with, the implementation of standard costs for raw materials." Their findings are inconsistent with those of Fleischman et al. [1995] who argue that because control of labor requires a higher degree of sophistication than control of raw materials, accounting controls for labor usually were developed *after* accounting controls for raw materials. However, as Carmona [2005] has noted, the evidence is mixed about whether standards for control of raw materials *preceded* those for labor. Some results [e.g., Zan, 2004; Zambon and Zan, 2005] are consistent with those of Fleischman et al. [1995], whereas other results show the *simultaneous* use of control standards for materials and labor [Carmona et al., 1997, 2002].

HISTORICAL BACKGROUND

The Political, Economic, and Social Context of Portugal: In the western world of the first half of the millennium, Italian city-states, such as Venice, dominated international commerce with the East. Their accounting was highly developed and their businessmen were well educated. However, in 1498, this dominance was put at risk by the discovery by Portugal's Vasco da Gama of the sea route to India, via the Cape of Good Hope. Portugal exploited this discovery. It gained trading advantages with Asia and maintained them for fifty years [see Peres, 1959; Godinho, 1962, 1981; Boxer, 1969; Livermore, 1976; Serrão, 1980]. Merchants from Italian city-states came to Lisbon seeking to profit from the Portuguese advantage, bringing with them knowledge of DEB techniques.

Portugal's influence as a colonizing nation flourished in the first decades of the 16th century but was soon eclipsed by

the rise of other major colonial powers. Portuguese affluence began to decline during the reign of King D. João III (John III) between 1521 and 1557. A major reason for this was the onset of the Portuguese Inquisition in 1531. This prompted a significant number of Portuguese Jews, who had played an important role in Portuguese discoveries, to leave the country [Kayserling, 1971; Livermore, 1976, p. 147; Tavares, 1995; Nogueira, 2001; Rodrigues et al., 2003; Rodrigues and Craig, 2004, p. 341]. The loss of influential merchants was accompanied also by the flight of much capital from Portugal and the depletion of the country's entrepreneurial skills [Marques, 1984; Rodrigues et al., 2003]. The Portuguese Inquisition was on-going and adversely affected many influential businessmen, progressively weakened the bourgeoisie, and helped lead Portugal to "abyss and ruin" [Kayserling, 1971, p. 284].

During the reign of King D. Pedro II (Peter II) (1668-1706), when Portugal was under the governorship of the Count of Ericeira, the country experienced economic difficulties. It attempted to develop industry by encouraging manufacturing activity. Throughout the country, factory systems were established to operate in concert with artisan workshops and a domestic cottage industry. Artisans required very little capital and low-priced equipment. However, with the transition to manufacturing, large sums of capital and a large workforce were needed. In 1677, King D. Pedro II authorized Rolando Duclos to establish a silk factory. A complex industrial entity with fifty silk looms and about one thousand workers was constructed [Macedo, 1982, p. 37]. A supporting infrastructure of medieval guilds developed around the factory. To help ensure a stable workforce, protection was given to the factory by the king. Factory workers could not terminate their employment unless other workers were available to replace them [Macedo, 1982, p. 251]. In the same way, the Bragança⁸ silk factory, which was in a state of decline at the time, was supported by the king who summoned experts and technicians from Toledo to teach silk producers appropriate techniques and methods [Sousa, 2005, p. 2].

During the first half of the 18th century, Portugal benefited from the flow of diamonds and gold from Brazil. The Portuguese court became one of the richest in Europe [Serrão, 1996]. Nevertheless, the economy was under-industrialized in comparison with other European nations [Marques, 1984; Maxwell, 1995].

⁸Bragança is located in Trás-Os-Montes, in Portugal's northeastern interior, bordering Spain.

After the death of the Count of Ericeira in 1690, interest in manufacturing declined, so much so that in the first quarter of the 18th century, silk manufacturing activity was conducted only in artisan workshops and in a “cottage system” [Macedo, 1982, p. 70].

The ideals of the Enlightenment, imported from France during the reign of King D. João V (John V) (1706-1750), spread slowly in Portugal. The king wanted to modernize Portugal and expand its power, but he had only limited success. The economy was under-industrialized and in decay. Attempts to industrialize were not pursued as vigorously as they had been, in part because it was easier to derive wealth from shipments of gold from Portugal’s colony in Brazil [Almeida, 1989-90, p. 1]. Portugal’s generous commercial treaties with England also were a disincentive to industrialization [Macedo, 1982].⁹

Applying the French model, D. João V sought to expand his power base and to modernize the country, thereby reinforcing an absolute monarchical regime in Portugal [Livermore, 1976; Marques, 1984]. Despite such political reforms, the strong conservatism, cultural backwardness, and religious intolerance of Portugal provided a weak base for the adoption of Enlightenment ideals [Fonseca, 2000]. The Inquisition, through its censorship of many books, helped suppress intellectual creativity and promoted hostility to innovation [Marques, 1984]. The Catholic Church was wealthy and dominated teaching, but it did not teach accounting. Rates of illiteracy were very high and the nobility did not value education or business [Azevedo, 1929; Rodrigues et al., 2003].

In the 1730s, interest in silk manufacturing activity was rekindled [Macedo, 1982, p. 72], but many problems had to be addressed. Administrators, for example, lacked management skills and knowledge of how to market manufactured products effectively [Macedo, 1982, p. 72]. Portugal began to imitate French mercantilism [Dias, 1984, pp. 142-150, 212-213]. Influenced by Colbert’s example in France, Cardeal da Mota, the prime minister of D. João V, supported the development of big to acquire the corporations operated by privileged bourgeoisie [Falcon, 2005]. He encouraged industry to acquire the skills of foreign artisans and craftsmen. A popular model for establishing a

⁹From 1661, Portugal had a political alliance with England. This was strengthened in 1703 with the Metween Treaty establishing special conditions, including a reduction in taxes, for the export of Portuguese wine to England. It also removed restrictions on the import of English textiles into Portugal.

manufacturing operation involved inviting a foreigner to initiate the project, and later to invite the participation of Portuguese partners. According to Macedo [1982, p. 72], the social and economic structure which supported Portugal's keenness to engage in manufacturing between 1720 and 1740 was characterized by "improvisation," insufficient capital, and lack of technical and administrative skills. The SFC was regarded as one of the most important activities of the new manufacturing era. It was the largest manufacturing company operating during the reign of D. João V [Almeida, 1989-90, p. 2]. Although there were only a few factories in Portugal at the time, there were many artisan workshops and many vestiges of a cottage industry system.

The accounting at the SFC, which we explore, was conducted in the transition from the cottage industry¹⁰ to the industrial revolution era. This transition period, which witnessed the initial uses of a factory system, is often described as the manufacturing era. To better understand the accounting at the SFC, in a footnote we provide a brief outline of the 18th century Portuguese systems of weight (*arrátel*), length (*côvado*), and currency (*real*).¹¹

Brief History of the SFC: The SFC was created in 1734 as a private company by the Frenchman Robert Godin, with financial support from wealthy backers and authorization from King D. João V. Godin received a charter on February 25, 1734¹² from the king, granting him many privileges, including monopoly rights to produce silk for 20 years (no further silk factories could be created without Godin's permission, para. 2 of the charter), tax exemptions for ten years from a wide variety of taxes (para. 6), no import tax on raw materials (paras. 7 and 8), exemptions of employees from military service (para. 6), and execution of

¹⁰This describes a system in which materials were put in an artisan's workshop or in a person's home to be transformed into products.

¹¹One *arrátel* was 459 grams or 16 *onças* (ounces). 32 *arráteis* (plural of *arrátel*) constituted one *arroba*. In this paper, we represent *arrátel* with the notation "a." A *côvado* was 0.66 meters and was written C^{do}. Percent was written as *pC*.

The monetary unit was a *real* (plural *réis*, and abbreviated to *rs.*). To indicate one thousand *réis*, a \$ was written, followed by three zeros. Thus, 2,000 *réis* was written as 2\$000. A million *réis* was written using a colon (:). Thus, 5,000,000 *réis* was 5:000\$000. Tables presented by Mata and Valério [1993, p. 279] help us to understand the relationship between *réis* in 1745 and their conversion into *euros* in 2000; approximately 25 *réis* in 1745 are equivalent to €1 in 2000. One thousand *réis* are equivalent to approximately €39, and one million *réis* to €39,000.

¹²Neves [1827] states that the original charter was destroyed in the 1755 Lisbon earthquake. A copy of the charter has survived.

the company's debts as royal debts (para. 20). However, the king insisted also that compulsory preference be given to Portuguese raw materials and labor (especially in the case of apprentices, para. 14); and that the factory be audited annually by the state (paras. 10, 11, and 12) [ANTT, *Ministério do Reino*, book 167, sheet 211; ANTT, *Cartórios Notariais de Lisboa, Cartório no. 11*, book 526, sheets 4-6 and 8V-9; Neves, 1827, pp. 25-40; Macedo, 1982, pp. 251-256].

Godin and his partners¹³ raised capital and formed a joint stock company. The company produced silk products trimmed with gold and silver, velvet, damasks, grogram, brocades, satins, taffetas, and gold and silver laces [Santos, 2002]. The SFC enticed expert designers and craftsmen to Portugal from France and commenced operations in a modest factory in Fonte Santana, where Godin lived. In 1738, the SFC established itself in a new and large factory in Rato, Lisbon, even though construction of the factory was not finished until 1741. In 1749, there were 100 assembled looms in the factory [ANTT, *Conselho de Guerra, Decretos, maço 258*; Neves, 1827; Santos, 2002].

The administrators of the company were elected by the partners. They supervised three main offices: general administration, sales administration, and accounting [ANTT, *Cartórios Notariais de Lisboa, Cartório no. 11*, book 526, sheets 4V-6V]. The directors of the first Administration were Manoel Nunes da Silva Tojal, Francisco Ferraz de Oliveira, and Domingos da Silva Vieira. After the death of Ferraz de Oliveira and Silva Vieira, Tojal was left as the sole administrator, but he acted with the advice of Manuel de Sande de Vasconcelos [ANTT, *Conselho da Guerra, Decretos, maço 258*]. The administrators were responsible for purchases, sales, payments, maintenance of the accounting books, and general decision making. Godin provided technical advice on the manufacturing operations [Almeida, 1989-90].

At the end of October 1734, the capital of the company was 16 million réis (40 shares of 400\$000 each). However, the capital needs increased quickly with the construction of the large

¹³They were: Manoel Nunes da Silva Tojal, Manoel de Sande de Vasconcelos, Francisco Xavier Ferraz de Oliveira, João de Castro Carneiro, Manoel da Costa Pinheiro, Domingos da Silva Vieira, D. Gabriel António Gomes, Christian Stockler, and Domingos da Cruz Lisboa. Godin did not subscribe any capital, but he was considered to be a partner who gave to the company his knowledge and "his intelligence and activity" [ANTT, *Cartórios Notariais de Lisboa, Cartório no. 11*, book 526, sheet V]. Godin received an annual salary of 480\$000. He received a smaller amount of dividends "because he did not deliver any capital" [ANTT, *Cartórios Notariais de Lisboa, Cartório no. 11*, book 526, sheet 6V].

factory at Rato between 1735 and 1741 [Neves, 1827]. By May 1742, capital had risen to approximately 61.2 million réis (153 shares) [partners' share register book (*entrada de sócios*) no. 980].¹⁴ Soon the company's capital needs were such that it had to borrow money, repayable with interest.

In addition to the manufacturing plant, the building had six retail shops. There were several offices housing the commercial staff (a merchant specializing in sewing silk, a merchant specializing in wool and silk, a general director of sales, a clerk and a director of production) and the directors of the company. Several employees of the company lived in the same building (the bookkeeper, the clerk, and the doorkeeper). The SFC's staff also included silk weavers, silk manufacturers, foremen, designers,¹⁵ sock makers, lace makers, dyers, a storekeeper, blacksmiths, carpenters, two cooks, a water carrier, a doctor, and a nurse [Macedo, 1982]. In 1749, "the factory employed 200 men (specialized workers and artisans) and approximately one thousand female silk winders. The factory also contracted many silk throwers, gold and silver drawers, carpenters, turners, joiners and blacksmiths" [ANTT, *Conselho de Guerra, Decretos, maço 258*]. Many of the specialized foreign workers were French [Almeida, 1989-90].

On July 3, 1745, the cashier and administrator of the SFC, Manuel Nunes da Silva Tojal, was advised by the government auditor that the company had sustained a very sizable operating loss of 18:796\$990 from its inception through to August 1744 [ANTT, *Conselho da Fazenda, Maço, Decretos, 1725 e anos seguintes*]. The company's capital had been exhausted by the construction of the new factory in Rato. A memorial written by Godin on September 1, 1749 revealed that the first administration had expended 31:037\$875 réis building the new factory. In the period, salaries and gratuities totalling 32:644\$800 réis were paid as well [ANTT, *Conselho da Guerra, Decretos, maço 258*]. Manufacturing was undertaken in the face of strong external competition from legal imports and contraband products [Macedo, 1982, p. 72; Pedreira, 1994, p. 40], and the SFC was not profitable.

¹⁴This amount corresponds to 1.2% of the large amount received in gold from Brazil in 1745 (about 5,200 million réis) [Mauro, 1991, p. 247]. Besides the capital subscription, the partners loaned the company 21:000\$000, bringing the total amount delivered by the partners to 82:200\$00 (ANTT, *Conselho da Guerra, Decretos, maço 258*). That amount corresponds to 1.6% of the amount received in gold from Brazil in 1745.

¹⁵The first designer was a Frenchman, Mr. Alezon [Santos, 2002].

To help ease the difficult trading situation faced by the SFC, the *Companhia da China* (China Company) was created in June 1741. It was granted privileges in the commercial traffic with Macau for a period of 16 years.¹⁶ The charter of 1741 suggested that this company “would improve both companies, consolidated in only one” [ANTT, *Chancellaria de D. João V*, book 102, sheets 270V-272V]. The objective was to help the SFC obtain silk foliage which was much cheaper in Macau than in Europe [Almeida, 1989-90, p. 7]. The elected administrators (Christian Stockler, Manuel Passos Dias, Rodrigo de Sande de Vasconcelos, and Manoel Nunes da Silva Tojal) prepared the statutes of the new company, whose capitalization was open to public subscription. The close relationship between commercial and industrial activities created hope that the prosperity of commerce would extend to the manufacturing sector [Almeida, 1989-90].

On July 4, 1745, Godin requested that the king extend these privileges for a further ten years. Godin argued that the partners had not benefited from their investment in such a “fantastic factory, one of the biggest of its type, which has become of public interest not only because of the silks produced but also because of the many craftsmen employed” [ANTT, *Conselho da Fazenda, Maço, Decretos, 1725 e seguintes*]. However, neither the granting of the extension of the privileges for a further ten years nor the stopping of major expenses related to the building construction was sufficient to help the company recover its poor financial situation [Macedo, 1982, p. 71; Pedreira, 1994, p. 40]. The SFC’s financial deficit made it impossible to take advantage of the industrial and commercial privileges it had received [Macedo, 1982].

The second administration was conducted by Manoel de Sande Vasconcelos, Christian Stockler, and Manoel Nunes da Silva Tojal. Christian Stockler was a consul who represented the City of Hamburg in Lisbon. There were serious disagreements between Godin and Stockler [ANTT, *Conselho da Guerra, Decretos, maço 258*; Almeida, 1989-90]. Godin accused Stockler of incompatibility on the grounds that it would be impossible to promote the commercial interests of Portugal and Hamburg at the same time [ANTT, *Conselho de Guerra, Decretos, maço 258*]. It seems that the SFC’s financial problems were compounded by personality differences and discipline problems [Almeida, 1989-90]. Al-

¹⁶However, since the company was in a difficult financial situation, the number of ships per year never exceeded one [Macedo, 1982].

though Stockler was replaced¹⁷ in the third administration, the company failed in 1750. The cause was attributed to the high costs of property and of training personnel [Neves, 1827]. This was not surprising in view of the criticism by Sebastião José de Carvalho e Melo,¹⁸ better known as the Marquis of Pombal, of the strategy the company had adopted. In a letter written from London to Marco António de Azevedo Coutinho, the secretary of state for war and foreign affairs to King D. João V, Pombal noted that unlike the big and expensive factory the SFC had just constructed in Rato, in London he could see only small and cheap factories [Macedo, 1982; Barreto, 1986]. Pombal [1741a] contended that companies should be small and cheap to make it easier for them to be profitable. Pombal, who was later foreign affairs minister (1750-1755) and chief minister (1756-1777) in the Portuguese government, had a very influential impact on Portuguese economic thinking of the time [Rodrigues and Craig, 2004, pp. 333-337].¹⁹ It was under Pombal's leadership that the SFC was transformed into the Royal Silk Factory, a state-owned enterprise.

ACCOUNTING SYSTEM OF THE SFC

The SFC factory was surrounded by houses in which strands of raw silk were produced from silk cocoons. They were then passed to the factory for processing into finished silk products. The production cycle was:

silk filament → *raw silk thread* → *dyed silk* →
reeled silk → *silk fabrics* → *finished silk clothes*

An integrated accounting system using DEB and job-order costing computed full costs of units produced. It was allied with

¹⁷The third administration was conducted by Rodrigo de Sande de Vasconcelos, Manoel Nunes da Silva Tojal, and Francisco Ferreira da Silva.

¹⁸He acquired the title, Marquis of Pombal, in 1769. In 1741, he was the ambassador of the Portuguese King D. João V to the English Court of King George II. In this letter, Pombal advised the King that in England the small manufacturing operations he observed there were not experiencing the same financial problems as were being experienced in Portugal because the English firms did not have the same structure and amount of costs. Pombal stated that the value of the building where the Silk Company was established was greater than all the similar companies established in London and surrounding regions [Pombal, 1741a].

¹⁹Pombal's "Report on Grievances" to the king of Portugal in 1741 is regarded by many, such as Barreto [1986], to be one of the most important expressions of Portuguese economic thought in the first half of the 18th century.

a charge and discharge system of accounting in which administrators and artisans were each accountable for the materials disbursed to them. The quality of production was controlled and the cost per *côvado* was computed. Artisans were discharged from responsibility for raw materials when they forwarded finished products. Stocks were valued at an average estimated cost. Expense control was achieved by comparing the variance between allocated costs and actual costs. Administrators were responsible for controlling expenses, rendering accounts, and paying creditors. The central account was a “finished goods” account (*fazendas em ser na mão da administração da venda das fazendas da fábrica*; literally, “finished fabrics held by the sales administration”).

Cost Calculation and the Finished Goods Account: The computed cost of each job was entered in the factory invoices book (*livro de facturas da fábrica*). For the first job order, direct costs were 71\$540 réis and indirect costs were 15\$022 réis, with total costs of 86\$562 réis. The output was 66½ *côvados* so that the unit cost was approximately 1\$301 réis per *côvado*. During February 1745, 20 job orders were completed, comprising 1323.25 *côvados*, or approximately 873 meters of silk, at a total cost of réis 2:776\$272. Job number 1, the first of 20 pieces completed on February 28, 1745, is recorded in the “account of cost” as follows [ANTT, book no. 676, p. 1]:

FIGURE 1

Job-Order Cost Sheet, SFC, February 28, 1745

No. 1 1 st Piece -66 1/2 <i>côvados</i> of brilliant grey colour produced by Loom no. 76 by Vicente Febregat		
a	9 " 15 " weight of the piece [9 arratéis and 15 ounces]	
a	- " 10 " loss	
a	10 " 9 " of dyed silk @ 4000 réis.	rs. 42\$250
	salary of the artisan and foremen @ 260 rs. per C. ^{do} [by <i>côvado</i>]	" 17\$290
	salary of the apprentice @ 150 rs. by C. ^{do}	" 9\$900
	Silk reeling @ 200 rs. per a [by arrátel]	" <u>2\$100</u>
		" 71\$540
	interest @ 6 p C. ¹	" 4\$292
	general factory expenses @ 3 p C. ¹	" 2\$146
	wages @ 6 p C. ¹	" 4\$292
	letting of the house and looms @ 6 p C. ¹	" <u>4\$292</u>
		" <u>86\$562</u>

We have 66 1/2 C.^{do}s. The cost per *côvado* is 1\$301 réis and the remainder is 45½ réis.

Full cost per *côvado* was defined in a fashion similar to the French *prix de revient*, the total cost accounting system that Nikitin [1990] found at Saint-Gobain between 1820 and 1880 and that Bordázar proposed in the Spanish printing industry in 1732 [Martínez Guillén, 2005]. As with Bordázar's proposal, there is an indirect imputation of costs and a separation between wages of workers directly involved with silk production and those who were not. *Estimated* overheads were applied in a consistent fashion as a set percentage of direct costs. Indirect wages, interest, and costs of "letting of the house and looms" were allocated at 6% of total direct costs, and general factory expenses at 3%. Because the SFC had obtained a charter with monopoly rights, managers believed that the fair sales price could be calculated by adding the "cost price" and a fair profit.²⁰ Accordingly, calculation of the "cost price" (full cost of products) was most important. Note that at the RTM of Guadalajara in 1742, indirect salaries of "the superintendent and the personnel employed in the accounting and cash offices and in the warehouses" were allocated (at the rate of one-eighth of their yearly wages) to the cost of the white twill [Carmona and Gómez, 2002, p. 246]. It is also relevant to note that in the costing model proposed by Bordázar in 1732 [Martínez Guillén, 2005], cost was increased by 5% per year to reflect the financial interest costs likely to be incurred in storing finished goods (books) for several years. In the case of the SFC, the imputation of interest costs arose because the company had to borrow a large sum of money to construct the new factory in Rato.

The integration of cost accounting and financial accounting can be seen in the journal and ledger. For instance, at the end of February, the following entry was recorded in the journal [ANTT, book no. 720, pp. 13-14]:

DR.	Finished Goods	2:776\$272	
CR.	Creditors ²¹		2:776\$272

During the month of February, 20 pieces of silk were produced by the looms and were delivered to the Administration:

²⁰This reasoning was wrong since, as Sousa [2005] argues, the silk industry was the most important sector of Trás-os-Montes. Records show that in 1721-1724, Bragança had 30 registered spinning wheels and 350 looms. Freixo de Espada à Cinta, another city in the region, had more than 100 looms.

²¹"Creditors" here means all costs that contribute to the finished goods.

FIGURE 2
Items Transferred to Finished Goods Inventory, SFC,
February 1745

1 st Piece – 66 1/2 côvados of brilliant grey colour	86\$562
2 nd Piece – 46 1/2 côvados of black and silver program	157\$344
3 rd Piece – 74 côvados of black <i>Grodetur</i>	98\$701
4 th Piece – 100 côvados of black <i>Grodetur</i>	135\$713
5 th Piece – 45 1/4 côvados of white and gold program	187\$755
6 th Piece – 80 côvados of black skirt	144\$728
7 th Piece – 44 3/4 côvados of purple and gold satin	340\$314
<u>(7 pieces – 457 côvados)</u>	<u>1:151\$117</u>
(next page)	
<u>(7 pieces – 457 côvados)</u>	<u>1:151\$117</u>
8 th Piece – 45 1/4 côvados of purple and gold satin	349\$374
9 th Piece – 94 côvados of mantles	82\$103
10 th Piece – 92 côvados of white serge	58\$170
11 th Piece – 99 1/2 côvados of mantles	84\$268
12 th Piece – 89 côvados of black <i>Nobreza</i>	64\$363
13 th Piece – 45 1/2 côvados of green program	96\$025
14 th Piece – 48 côvados of blue <i>Persiana</i>	68\$216
15 th Piece – 45 1/2 côvados of silver program	263\$422
16 th Piece – 68 1/2 côvados of black program	81\$535
17 th Piece – 66 côvados of brilliant gold colour	70\$336
18 th Piece – 36 côvados of white and gold damask	191\$134
19 th Piece – 92 côvados of brilliant cinnamon-colour	118\$039
20 th Piece – 48 côvados of black skirts	98\$180
<u>20 pieces – 1323 1/4 côvados</u>	<u>2:776\$272</u>
Dyed silks of 20 pieces	935\$875
Expenses of artisans and foremen of 20 pieces	444\$205
Expenses of apprentices of 20 pieces	230\$509
Silk reeling	46\$294
Interests	137\$684
Factory general expenses	68\$337
Wages	137\$684
Letting the house, factory and looms	137\$684
	<u>2:138\$272</u>
Gold, silver strand	638\$000
	<u>2:776\$272</u>

The double-entry system facilitated computation of the value of finished goods at the end of the period (2:776\$272). Such a value was computed using information in the account that recorded the cost of each job order. For example, the cost of the first piece (86\$562) was the first debit in the finished goods account. This sum was obtained from the invoice book, the book of cost account. Such a treatment provides evidence of the integration of the SFC's cost and financial accounting systems. The SFC's

integration of costing procedures into its double-entry accounting system, like such systems elsewhere, had the potential to give “managers improved control over operations” [Edwards and Newell, 1991, p. 48]. This was because there was less chance of omitting costs within the more secure double-entry accounting framework. All transactions which supported the costing of products were recorded. The SFC provides evidence additional to that gathered for the coal, iron, and steel industries to show that the “two branches into which accounting is today conventionally categorized – financial and costing – rather than developing from separate beginnings, as was previously believed, in certain industries at least grew naturally out of a single system” (Boyns and Edwards, 1997, p. 20). At the SFC, costing information was provided jointly with important information about products.

During the SFC’s second administration, there were 663 job orders for silk products and monthly orders for silk stockings. Product costs were determined as full costs, using a job-order costing system. Each job order included, as direct costs, dyed silk at an estimated cost based on weight (including a shrinkage loss), salaries of artisans and foremen (paid by piece), salaries of apprentices (paid by piece), and silk reeling (paid by weight unit). Indirect costs were comprised of interest (6% of direct costs), factory general expenses and indirect materials (3% of direct cost), indirect labor wages (6% of direct cost), and rent on the house, factory, and looms (6% of direct cost).

Materials were valued at an estimated average cost, a rudimentary form of standard cost. A particularly interesting feature of line 2 of the job cost sheet for Job No. 1 is that the weight of materials included an allowance of approximately 6% (10 ounces) for losses due to spoilage and shrinkage. The recognition of materials wastage was observed also by Zan [2004] in managerial and accounting discourse at the Venice Arsenal, and by Carmona and Gómez [2002] at the RTM of Guadalajara. Artisans, foremen, and apprentices were paid by piece rate. Manufacturing overheads, interest, non-manufacturing wages, and building and equipment repair were included at a pre-determined percentage of direct costs. The SFC was also one of the early entities to include interest in the identification of costs, as was the case with the Essex textile manufacturer, Thomas Griggs, 1742-1760, noted by Edwards [1989].

Further, as with other firms noted by Edwards and Newell [1991], the SFC was aware of the imperative to recoup all its costs. This provided an incentive to control costs, particularly

during periods when market conditions squeezed profit levels. Total costs were expressed as averages, in cost units of “cost per *covâdo*.” (See Figure 1 where the unit cost of job order no. 1 was approximately 1\$301 réis per *covâdo*.) Such averages would have been useful for control and efficiency assessment since these “units could be compared over time to provide indicators of changes in production costs of the pieces of silk and compared with the market price” [Edwards and Newell, 1991, p. 46]. The SFC had some controls over material usage, as we explain later. Although it was possible to exercise some control over payments made to each artisan and foreman, control of labor efficiency seems to have been lacking because foremen and artisans were paid according to the amount of production they completed.

Overheads were calculated as a percentage of direct costs as outlined earlier. But, as Gutiérrez et al. [2005, p. 131] note, “different foundations” for overhead allocation were used in the management accounting systems of the 13 large and medium-sized 18th century Spanish companies they examined. The “storage costs” of the Royal Textile Factory of Ezcaray were allocated on a flat rate of seven *reales* per unit and “damages and contingencies” at 1.5% of production costs. The notion of “ability to bear” was an instrumental determinant of overhead allocation because “baling cost and the managers’ and accountants’ wages were allocated at a different rate for each type of fabric depending on its class – *allowing higher rates for higher quality fabrics*” (emphasis added).

The fact that the cost of each job order was computed in the “invoice book” leads to the belief that a major objective of product costing at the SFC was to compute selling price. Although the SFC had been granted monopoly rights by the government to produce silk in Portugal, it suffered strong competition from small and big factories which were in operation when the SFC was created. The competition between the SFC and the companies from Trás-os-Montes is recognized by Sousa [2005, p. 3] who argues that “the second industrial boom (1720-1740), during the reign of D. João V, did not seem to have any positive impact on the revival of the Trás-os-Montes silk industry. On the contrary, the establishment of the Rato silk factory in Lisbon led to a fall in the demand for silk fabrics from Trás-os-Montes.” Most importantly, national silk fabrics were subject to competition from untaxed imported goods. King D. João V’s government adopted a policy of taxing silk exports but allowing silk imports to remain tax-free. This arrangement made export and national sales very difficult for the SFC to achieve. “This was a

fatal mistake for agriculture and even more for manufacturing. Later, all developed nations, as did our King D. José I, adopted the opposite policy of facilitating exports and shutting out imports” [Neves, 1827, p. 41]. To suggest that the SFC determined its own prices would be an over-simplification because prices for silk and silk products were influenced by market forces and governmental economic policy. Selling prices were not a function of cost plus a mark-up, but could vary. This can be seen by comparing sales prices and full costs by job order (in *réis*) in the following examples [ANTT, comparison of books 676 and 978]:

FIGURE 3
Job Cost/Sales Price Comparisons, 1745, SFC

Job No.	Total Cost	Sales Price	(Loss)
10	631	620	(11)
18	5\$309	5\$200	(109)
29	1\$988	1\$800	(188)
35	1\$030	960	(70)
40	1\$403	1\$300	(103)

This comparison suggests that there were difficulties in selling finished product. Indeed, the company’s sales were low in comparison to its level of production. As with the textiles factories in Ezcaray and Guadalajara [Gutiérrez et al., 2005, p. 136], the SFC had trouble selling its products in the market. Its costs were higher than the prevailing sales prices.

Other Important Accounts: The account “administration of fabric sales” (*administração das vendas das fazendas da fabrica*) was a partial profit and loss summary account [ANTT, book no. 978]. Sales of silk fabrics were credited to this account, and the full applied cost of goods sold debited, with an amount transferred from the finished goods account. The resulting balance, representing the *expected* trading surplus for the period, was transferred to the profit and loss account. The *actual* profit would have differed from this *expected* profit if, as was usual, there were differences between actual costs and applied costs. The profit and loss statement served mainly as “a weeding-out process, in which the detailed and unwanted information in the ledger was removed” [Yamey, 1977, p. 23].

Two other important accounts were “dyed silks” (*sedas tintas*) and “general factory expenses” (*gastos gerais da fabrica*) [ANTT, ledger, book 718]. The dyed silks account was credited with the estimated costs to produce dyed silk and debited with

the actual costs incurred. The difference was transferred to the profit and loss account. "Dyed silks" was also an account on the balance sheet that was debited with the opening stock and credited with closing stock when charging the new administration. The "general factory expense" account was credited with applied cost and debited with actual cost; it was also a balance sheet debit account. The *actual* profit would have differed from this expected profit if, as would be usual, there were differences between actual costs, including actual overhead costs, and the applied costs, including applied overhead costs.

As Nikitin [1994] found in the cost accounting at the Forges D'Oberbrück Company (1738-1745), the cost accounting system revolved around the inventory accounts. However, at the SFC, the cost system was more sophisticated. The cost accounts and finished goods account were debited with the actual costs and credited with estimated costs. The differences were transferred to the profit account. The balance of the account "administration of fabric sales" showed the difference between sales and total estimated cost. The profit and loss account was composed of this value and the differences between actual and estimated costs. As with Bordázar's cost accounting model [Martínez Guillén, 2005], the profit and loss statement did not include depreciation expense. Whenever a fixed asset had to be repaired, the cost was simply booked as an expense against the period.

Charge and Discharge System and DEB: In the transition from the first to the second administration, the company's accounting system was a mixture of agency bookkeeping or "charge and discharge" accounting and a system of double-entry accounting incorporating several costing procedures. The main characteristic of agency bookkeeping "is that the party reporting would charge himself with the values he became responsible for and discharge himself in the records for every release from responsibility regardless of the cause" [Littleton, 1933, p. 2]. Agency bookkeeping systems were more common before the arrival of the Italian method of DEB. They were gradually abandoned around the middle of the 18th century when the transition from charge and discharge accounting to double-entry accounting, and the integration of the two systems, gained momentum [Jones, 1985, p. 41]. Administrators at the SFC, particularly the cashier, Manoel Nunes da Silva Tojal, were responsible to promoters of the company for the capital resources placed in their hands. They were charged with these resources at the beginning of their administration [ANTT, book 718, pp. 4-8] and discharged at the end

[ANTT, book 720, pp. 192-197], as the opening page of the journal book (*jornal*) shows clearly. The inventory at the beginning of a new administration was important. It helped to establish what was owned by the company, what it owed creditors, and what its administration was accountable for. The words at the top of the inventory account state explicitly “this is the inventory delivered by the former administration to the new administrators Mssrs. Manoel de Sande Vasconcelos, Christian Stockler, and Manoel Nunes da Silva Tojal who will be obliged to pay to creditors, not only the capital but also the interest from now on and these are the *effects*²² [assets] that are being received.” The February 1, 1745 inventory appears as Figure 4 [ANTT, book no. 718, pp. 4-8].

FIGURE 4
Inventory, February 1, 1745, SFC

Dyed silks	6:655\$062
Raw silks	4:712\$606
Silks in foliage	277\$750
Raw silk strand	168\$187
Dyed silk strand	25\$510
<i>Alducar</i> for borders	8\$276
<i>Possolos</i> and waste	108\$021
Gold and silver strand	3:213\$634
General factory expenses	339\$000
Soap	112\$761
Clothes awaiting shipment to Macao to Belchior Araújo Costa & C ^a	3:880\$580
Finished clothes	9:259\$362
João José del Rey (debtor)	1:872\$000
Pedro Villela (debtor)	252\$000
Rev (Priest) José Oliveira da Patriarcal (debtor)	685\$903
Francisco Sparsa Tintoreiro (dyer)	139\$873
	31:710\$525
less what we owe to Mr. Manuel Nunes Silva Tojal by his disbursement	– 12:800\$000
	18:910\$525

payment of the above 18:910\$525 is to be made by this administration to the following creditors:

Dean of the Patriarcal Holy Church	6:000\$000
Eugénia Marianna Gonzaga	600\$000
Mother Abbess and other religious persons, Monastery of St. Marta	1:350\$000
Mother Abbess and other religious persons, Monastery of the Mother of God, Guimarães (...)	4:800\$000
Patricio Pires Quaresma	4:800\$000
Rev. Priest Luís Gonzaga of Companhia de Jesus by the hand of Manoel de Sande e Vasconcelos	1:000\$000
Rev. Priest José Dias of the Oratório Congregation	365\$525
	18:910\$525

²²Nikitin [1990] found the same word used to refer the inventory value of all assets of the Saint-Gobain Company.

The company's inventory account of 31:710\$525 was comprised of inventories of direct and indirect materials, finished goods, and amounts owing from customers. This inventory had been financed through the deposit of 12:800\$000 by the cashier and through loans of 18:910\$525, principally from the Church. It was necessary to resort to such loans to overcome the lack of capital and to help meet the high costs of building the factory and houses. Therefore, the sum of the charge (31:710\$525) exceeded that of the discharge (18:910\$525) and measured the indebtedness of the new administration to the cashier, Manoel Nunes da Silva Tojal. From reading the Cash Account in the ledger, we can ascertain that the cashier deposited 12:800\$000 on February 1, 1745 and received it back on February 28, 1745.

As Lemarchand [1994] points out, the charge and discharge model depended on the separation between capital ownership and management, centered on notions of responsibility accounting, and resembled certain aspects observed in early joint-stock companies. However, it seems that the inability of the single-entry bookkeeping system to cope fully with the complexity of the SFC became evident in the first administration, prompting it to adopt a DEB system in its second administration. As Macedo [1982] argues, this period is characterized by "improvisation" in terms of managerial activities. This change can be understood in a context where DEB began to be seen in Portugal as a system of rational beliefs²³ through which organizational structure is legitimized. As already noted, on July 3, 1745 the government auditor presented his report dated August 31, 1744. He concluded that the losses were a consequence of the large amount of interest the company was paying on the substantial loans it had obtained to finance construction of the factory buildings [ANTT, *Conselho da Fazenda, Maços, Decretos, 1725 e anos seguintes*]. The prospect of changing to an accounting system which facilitated the control of interest costs by charging them to the cost of the products would probably have been appealing.

Salaries and Wages: As with the RTM in Spain [Carmona and Gómez, 2002, p. 233], Portugal had to hire foreign workers to provide technical skills in production and accounting. The salaries paid were very high as the wages for the three months to March 1745, shown below, reveal [ANTT, book no. 720]:

²³The system of rational beliefs is evident in Pombal's [1741b] treatise in which he concludes that the DEB system was being used successfully by merchants in London.

Roberto Godin, factory manager	120\$000	
Nicolao Julio Cortinovis, bookkeeper	50\$000	
Carlos Roland, silk printer	75\$000	
João G. Rebelo	45\$000	
Bento Ferreira, Roberto Godin's keeper (February/March)	12\$000	
Matias Patrão, factory porter	<u>7\$200</u>	309\$200

By the end of the second administration (1747), the salary of the bookkeeper (Cortinovis,²⁴ effectively the SFC's accountant) increased from 50\$000 to 75\$000 for a three month period. The best paid workers, Godin (the factory manager), Cortinovis, and Roland (a silk printer), had foreign names.

Balance Sheet: The balance sheet was very different from its equivalents today; it did not include capital, fixed assets, or depreciation. The accounting system was based on debits and credits not on assets and liabilities. This made it difficult to calculate the net worth of the company. But this did not seem to bother the proprietors of the SFC who were concerned principally with controlling agency relationships. Figure 5 is the October 31, 1747 balance sheet [ANTT, book no. 720]:

FIGURE 5

Balance Sheet, SFC, October 31, 1747

<i>Débito</i> (Debit)	
Shag and raw silks	9:154\$210
Raw silks in foliage	650\$725
Raw <i>alducar</i> for border	27\$312
Raw silk strand	178\$509
Dyed silks	10:322\$525
Colour dyed <i>alducar</i>	5\$550
Colour dyed muzzle	15\$875
Silk wastes	147\$004
Gold and silver strand	1:903\$132
Factory general expenses	413\$530
Dye	599\$095
Soap for silk baking	64\$550
Silk samples	60\$375

²⁴Lourenço Cortinovis was from Venice and was the nominated consul of Portugal in Venice in 1720 [ANTT, *Registo Geral de Mercês, D. João V*, book 84, sheet 117-V]. Our conjecture is that Nicolao Cortinovis was a relative, but we could not find evidence to substantiate this. The earthquake Lisbon sustained in 1755 destroyed documents dealing with foreign affairs matters.

Finished clothes held by sales administration	43:870\$418
[silk retail	42:208\$726
stocking pairs	1:661\$692]
Shipment to Macao held by Caetano da Silva & Co.	2:087\$050
Patriarchal Holy Church and for the Reverend Abbot José Oliveira	83\$653
Cardinal of Motta (Prime Minister)	21\$600
Maurício Henrique and João Andrade Dias	2:322\$595
António Fragozo (debt of the Princes)	151\$250
António José, artisan of this factory	6\$325
Francisco Duarte, artisan of this factory	6\$000
Cash	<u>4:238\$191</u>
	76:329\$474

Crédito (Credit)

Monsignor Mattos	1:600\$000
Dean of the Patriarchal Holy Church	6:000\$000
Eugénia Marianna Gonzaga	600\$000
Rev. Priest Luís Gonzaga of Companhia de Jesus	1:000\$000
Mother Abbess and other religious persons, Convent of Saint Apolónia	2:500\$000
Marcos António de Araújo Coutinho	400\$000
Jozé Rebello Palhares	4:000\$000
Macao Company	17:000\$000
Ana Dorotheia de Sande Vasconcelos	30:540\$700
Maria Custódia do Sacramento and her religious sisters in the Monastery of Saint Marta	1:350\$000
Mother Abbess and other religious persons of the Monastery of God Mother of Guimarães	4:800\$000
Patrício Pires Quaresma	<u>4:800\$000</u>
	74:590\$700
Profit and Loss	<u>1:738\$774</u>
	76:329\$474

The balance sheet was concerned with chargeable values that needed closer control, so fixed assets and capital accounts were not included. Measuring the value of the company was not important.

The debits appear to comprise cash and amounts paid in respect of inventories (direct materials, indirect materials, finished goods in store, finished goods in transit), advances for wages of artisans, and amounts owing from customers and other debtors. Most of the credits comprise amounts owing on capital loans to the Catholic Church which, in this period, was acting as a bank. The excess of the debits over the credits was regarded as profit.

The financial situation of the SFC reveals total indebtedness of 74:590\$700. A large amount of the assets (43:870\$418 of 76:329\$474) was represented by finished goods inventory. There was also an imbalance between inventories of raw materials and goods in process (22:981\$858 or 30.1% of total assets) and

inventories of finished goods (57.5% of total assets). The SFC appears to have been suffering from overproduction and poor marketing.

DISCUSSION

In the SFC's second administration, administrators were faced with a challenging socio-economic climate. Their response, which included enhancements to the SFC's accounting system, offers support to "Fleischman and Parker's hypothesis that accounting innovations were often the product of perceptive businessmen struggling with real problems" [Boyns and Edwards, 1995, p. 48].

Further, the SFC's adoption of more elaborate calculative routines might be conceived as reflecting "specific rationales and ideals of order which the state valued and sought for the governance of society" [Bhimani, 1994, p. 407]. The French mercantilist ideas that were spreading in Portugal prompted the development of industry and state control. The SFC had been granted privileges, monopoly rights and some tax exemptions, from the state, and was to be audited by a government auditor. Because of this, the accounting system of the SFC might be perceived as "enrolled in certain pursuits of the state and as assuming 'its place alongside other practices of Government'" [Bhimani, 1994, p. 407]. King D. João V and Prime Minister Cardeal da Mota wanted to add to the power and independence of Portugal, and attempted to do this by embracing the ideals of French mercantilism, particularly Colbert's ideas. This required the SFC to institute an efficient and modern system of book-keeping which would allow good control and oversight of operations. The calculative routines used by the SFC were capable of improving the company's control of operations, and accorded with the state-sponsored mercantilist ethic of the time.

The development of several of the cost accounting practices evident at the SFC is often attributed to the factory system of the industrial revolution [Littleton, 1933; Johnson, 1981]. The accounting system observed at the SFC, 1745-1747, is consistent with Garner's [1954] argument that the initial impetus for the development of cost accounting was to replace the domestic system of production with the capitalist processes of production, and that the British Industrial Revolution (1760-1830) was not the main stimulus for change but merely accelerated the pace of pre-existing change.

The SFC's accounting system is noteworthy also because

it integrated the cost and financial records in a DEB system that included elements of a charge and discharge accounting (or agency bookkeeping) system. The SFC operated a job-order costing system that allocated overhead costs to products, allowed for direct materials shrinkage, and included interest cost as an indirect product cost. Elements of a rudimentary standard raw material costing system were evident. The SFC's balance sheet did not include fixed assets, accumulated depreciation, or a statement of owners' equity. The profit and loss account included interest costs but not depreciation expense.

The cost and management accounting practices used by the SFC support the contention [e.g., by Fleischman and Parker, 1990, 1991; Edwards and Newell, 1991; Boyns and Edwards, 1997] that many of the cost and management accounting procedures used today had origins and exemplars prior to the British Industrial Revolution, particularly in the first half of the 18th century. The SFC's cost accounting practices are also consistent broadly with case descriptions of the accounting systems that were used in Spain in the first half of the 18th century [Carmona et al., 1997; Carmona and Gómez, 2002; Gutiérrez et al., 2005].

The example of the accounting system at the SFC adds weight to the contention that the development of management accounting was a response to multiple influences, and that it ought not to be explained in terms of any *single* variable alone, such as the level of industrialization, the relative impact of fixed and variable costs, or the organizational structure of business activity [Edwards, 1989; Edwards and Newell, 1991]. The cost and management practices of the SFC are a rich source for further enquiry. The inventory of 34 accounting books of the SFC, listed in Appendix 1, are an under-explored archival resource that merits closer enquiry by scholars fluent in the Portuguese language. Such enquiry might explore the transformation of the SFC into a state-owned company in the 1750s under the leadership of Pombal, perhaps helping us to understand the "inter-relations of accounting and the state" and accounting change [Miller, 1990, p. 316]. In particular, the transition to state ownership may shed light on how ownership structure affects the cost and financial accounting systems of business entities.

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APPENDIX 1

**Inventory of Accounting Books of the
*Real Fábrica das Sedas***

This inventory of 1115 accounting books includes 34 for the *Companhia da Fábrica das Sedas*:

	Period	Book No.
1.1 Accounting		
1.1.1 Main accounting books		
Ledger (<i>Livro Mestre</i>)	1745-47	718
Journal (<i>Livro Jornal</i>)	1745-47	720
Inventory	1745	214
1.1.2 Auxiliary accounting books		
Cash	1746	267
Account of the amount the house cost	1735-44	536
Partnerships entries	1734-42	980
Sheet of the partners' interest	1735-47	303
	1738-47	304
	1735-54	305
	1735-45	306
	1738-50	537
Current accounts of partnerships	1734-45	797
Invoices from abroad	1745-47	516
	1747-49	523
Shipments	1735-45	712
Debtors waste-book	1735-49	520
	1747-48	530
Foremen wages	1745-47	521
	1747-50	290
Several accounts waste-book	1745-47	522
1.2 Crude Silk Warehouse and Materials		
1.2.1 Warehouse		
Entrance and exit of silk and other products	1734-45	1054
	1747-51	1050
Entrance and exit of silk to the socks factory	1747-50	1051
1.2.2 Dye-house		
Dyers account	1747-50	289
1.3 Tint Silk Warehouse		
1.3.1 Warehouse		
Entrance and exit of silk and other products	1745-47	574
	1747-50	1049
1.3.2 Silk clothes		
Computation of the cost of silk cloth (the	1745-46	676
original title of this book was "Invoices book")	1746-47	675
1.4 Sale		
1.4.1 Sale warehouse		
Entrance and exit of silk cloth	1734-45	1020
	1745-47	978
	1747-50	621
1.4.2 Shop of the company at Douradores Street		

Entrance and exit of silk cloth	1747-50	1048
Sales of the shop waste-book	1745-48	758
	1747-50	524

These books are related to the three administrations in the following way, with some common to two or three administrations:

	Administration						Total
	1	2	3	1,2	2,3	1,2,3	
Main accounting books		3					3
Auxiliary accounting books	5	4	3	2		3	17
Crude silk warehouse	1		3				4
Tint silk warehouse		2	1		1		4
Sales	1	1	3		1		6
Total	7	10	10	2	2	3	34