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of the MZA's Operating Account  
(1856-1874)**

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**THE ORIGINS OF THE SPANISH RAILROAD ACCOUNTING MODEL: A QUALITATIVE STUDY OF THE MZA'S OPERATING ACCOUNT (1856-1874)\***

**LOS ORÍGENES DEL MODELO CONTABLE FERROVIARIO ESPAÑOL: UN ESTUDIO CUALITATIVO DE LA CUENTA DE EXPLOTACIÓN DE MZA (1856-1874)**

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**ABSTRACT**

The lack of external regulation about the form and substance of the financial statements that railroad companies had to report during the implementation phase of the Spanish railway, meant that each company developed its own accounting model. In this study we have described, analysed and interpreted the more relevant changes in the accounting information in relation to the business result. Using the analysis of an historical case, we developed an ad-hoc research tool, for recording all the changes of the operating account. The results of the study prove that MZA's operating account reflected the particularities of the railway business although subject to limitations, and the reported information improved during the study period in terms of relevance and reliability.

**RESUMEN**

La falta de regulación externa de la forma y fondo de los estados financieros que debían reportar las compañías ferroviarias durante la fase de implantación del ferrocarril español, hizo que cada ferroviaria desarrollase su propio modelo contable. En este trabajo hemos descrito, analizado e interpretado los cambios más relevantes de la información contable reportada sobre el resultado del negocio. Utilizando el análisis del caso histórico, desarrollamos una herramienta de investigación ad-hoc, para recopilar todos los cambios de la cuenta de explotación. Los resultados del estudio demuestran que la cuenta de explotación de MZA reflejó las particularidades del negocio ferroviario aunque sujeto a limitaciones, y la información reportada mejoró en términos de relevancia y fiabilidad a lo largo del periodo de análisis.

**KEYWORDS:**

*railway accounting, MZA Railway, Operating Account, railway productive process.*

**PALABRAS CLAVE:**

*contabilidad ferroviaria, Compañía ferroviaria MZA, Cuenta de Explotación, proceso productivo ferroviario.*

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## Presentation

At the beginning of the 19<sup>th</sup> century the former glory of Italian accounting was overshadowed by its decline during the 18<sup>th</sup> century, and the literature from France, England, Germany, and other countries took centre-stage. 'Theories of accounts' (rather than 'accounting theories') dominated not merely the early but also the latter part of this century (Mattesich, 2003:125). During the British Industrial Revolution railway companies and the iron and coal industries needed large amounts of capital to make heavy investments. Consequently, there was a significant improvement in reporting practices in the United Kingdom (UK) during the 18<sup>th</sup> century. The era between the second half of the 18th century and the middle of 19th century in Britain was one of particular evolution in accounting (Watanabe, 2007:33).

In particular, railway companies demanded enormous amounts of capital in order to build the infrastructures which took many years. For example, the construction of the *Stockton and Darlington Railway* in Britain took four years, and eight years elapsed between the establishment of the company and the commencement of operations. The ordinary shareholders did not earn dividends and the only way to get dividends was through the issuing of preference shares over ten years<sup>1</sup> (Watanabe, 2007:34). Some companies were pushed into "closing the Capital Account" as soon as the line was in operation, thereafter reflecting in the Revenue Account only the "betterments" or "worsements" as they were called in the railway world (Lardner, 1850:116).

Edwards (1989) affirmed that accounting methods in the UK from 1830 to 1890 were governed, by the considerations of two user groups (shareholders and creditors), with the financial stability and long-term profit maximization being the priority. In 1845, during the "railway mania", parliament passed the *Companies Clauses Consolidation Act*, which provided model regulations that applied to all subsequent statutory companies. Railway companies were required, every six months, to publish "an exact balance sheet... and a distinct view of the profit or loss which shall have arisen on the transactions of the company..." (Napier, 2010:5). Since there was no standard form, the companies do their own thing, although there was a tendency towards some degree of fixed format. The *Regulation of Railways Act 1868* imposed on railway companies the obligation to publish their accounts according to the double account system. The law provided a standard form for these accounts and laid down a fixed format (Edwards, 1986:251). Although recognition and measurement rules were not specified in detail, by this stage a body of best practice had developed on the larger railway companies which provided the norm (not necessarily always followed) for other companies. (Napier, 2010:5).

The regulation of railways was reviewed by a British government Committee in 1910, and this led to *The Railway Companies (Accounts and Returns) Act 1911*. The Act was designed to achieve greater uniformity in the accounts of railway companies and also provide more detailed and relevant information in order to enable comparison and assessment. The

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<sup>1</sup> Evans, G. H.: (1936): *British Corporation Finance 1775-1850. A Study of Preference Shares*, Baltimore, 74-75.

double account format was kept (Edwards, 1986:262). The *Companies Act* 1929 (Art.123) required the presentation of a profit and loss account annually: "The directors of every company shall at some date not later than eighteenth months after the incorporation of the company and subsequently once at least in every calendar year lay before the company in general meeting a profit and loss account for the period..." (Edwards, 1980:50)

On an international level, both in America and in Europe, the accounting history of railway companies is relatively well-known through works such as those of Lardner (1850); Fink (1875); Greene (1892); Mason (1933); May (1936); Pollins (1956); Boockholdt (1977); Glynn (1984); Edwards (1980,1986,1989); Bryer (1991); Lemarchand (1993); Boyns, Edwards and Nikitin (1997); and McCartney and Arnold (2003); and Richard (2006), among others.

In 1850, Dionysius Lardner wrote a treatise on the pioneering practices in European and American railways with a significant level of detail. This treatise was very relevant in the comparative analysis of statistics and cost accounting provided by railways (from Belgium, UK, Germany, France and the United States to Russia, Italy and Spain during the first half of the 19th century) (Lardner, 1850).

In his paper about the American railways, Greene (1892:611) pointed out that the public should, in the annual reports of railway companies, require the inclusion of detailed information of every income and expense item and statistics of trains. Comparing these annual statistics and statements of similar railways, an investor or stockholder, could thereby form a fair judgment about the value of the company's bonds or stock. In this perspective, the report already developed in 1874 by Albert Fink (Fink, 1875), generally known as "*The Fink Report on Cost of Transportation*," is regarded as the foundation stone of American railway economics. At that time, this report was called "the fullest investigation into the cost of railroad transportation ever published in our country or language" (*Railway Gazette*, May 30, 1874).

Boyns, Edwards and Nikitin (1997) pointed out that there is no evidence that double entry bookkeeping was widely used by either French merchants or industrialists in the 19<sup>th</sup> century. The use of double entry bookkeeping by industry was confined to the situation where merchants had moved into textiles (Lemarchand, 1993), but, even in that case, there is no evidence to suggest that they ever used the system to calculate process costs. Lemarchand (1994) says that the use of double-entry was widespread in France during the first half of the nineteenth century. And besides, resulting from various competing interests and a patrimonial vision of the French legislation in the 19th century should be noted the differences in the accounting model of French railways (*Compagnies de Chemins de Fer*). In short, according to Lemarchand (1993:348,628) this is due to the mandatory method of accounting only for railways, in which depreciation practice is banned by the government from 1874, despite being mandatory for other companies by the *Commercial Code* of 1807.

In Germany, according with Richard (2006), these railway companies did not provide significant contribution to the evolution of accounting concepts about the valuation (assessment of assets), notably with depreciation, however they contributed to the development of a new theory of accounting (cost or historical dynamic theory). So, by 1875-1879, a new theory of accounting (historical cost or dynamic theory) had been developed.

This theory had a deep impact on German theorists in the late 19<sup>th</sup> century and in the early 20<sup>th</sup> century, such as Simon, Rieger and Schmalenbach (Richard, 2006:2). Richard synthesizes the sequence of the German case as follows: at the beginning Prussian railway companies produced a special type of balance sheet and had a concept of profit aligned with their needs. This practice had been largely incorporated in the *Railway Act* of 1838. This was improved through various administrative regulations from 1838 to 1862, establishing a systematic practice of depreciation (2006:29)

However, to date there are no studies which thoroughly analyse the accounting model introduced in the Spanish railway companies. There are only works which have dealt with piecemeal approaches, and/or are focused just on the 20<sup>th</sup> century. Some of these works are focused on the specific accounting problems of the MZA workshops (Villacorta and Martínez Vara, 2009); the accounting of MZA staff expenses (Martínez Vara, 2001, 2004 and 2006); or, in a more general or introductory manner on railway accounting (Fidalgo et al., 2006; Santos et al, 2011a; 2011b; 2012a; 2012b; Montoya et al., 2011; 2012).

Moreover, the accounting figures reported by railroads have been used as a database in research on the economic history of railways, so the method of calculating profit could invalidate, or partially undermine, the conclusions of that research. Nowadays, we understand that information is relevant when it is useful for making decisions, this is to say when it helps to evaluate past, present or future events. And the information is reliable when it is free of material errors and is neutral, hence it is free of biases and the users can trust that the information shows the true and fair view of what it is meant to represent.

On the other hand, according to Basu (2003) the accounting problems railroads faced and the solutions they invented are likely to be pertinent in any "new economy." Being large networks, they encountered many of the same competitive and pricing problems faced by today's telecommunications industry. Thus, to the extent that networks are becoming more important in today's economy, studying the early railroads' problems and solutions could be useful in understanding and predicting emerging accounting practices (2003:435). The transferability and importance of the developed skills in administration and the accounts of railway have been described by Chandler (1977), Hoskin & Macve (1986a, 1986b) and others.

Furthermore, Santos et al. (2012a) have already described, analysed and interpreted the changes in the balance sheet of one of the two great companies of this industry, the *Madrid-Zaragoza-Alicante Railway* (hereinafter, "MZA") during the first period of Spanish railway companies (implementation phase), so this motivates the need for completing the study of the accounting model of that railway company, by continuing the research towards other accounting statements.

The objective now is to describe the form and substance of the accounting statement and to explain whether the potential changes in it led to greater relevance and more reliable information about the accounting model, specifically, if the operating account reported more relevant and reliable information about the true economic value of results.

Regarding this objective, the paper is focused on the case of one of the first and main Spanish railway companies, namely the Company Madrid-Zaragoza-Alicante<sup>2</sup> through the study of the operating accounts included in the Reports published by the company during the implementation or creation stage of the railway in Spain (1856-1874)<sup>3</sup>. The research's ultimate goal will be to analyse whether the evolution of the criteria adopted to present accounting information reflects the strategic and management changes at the Company. In order to reach this objective, this paper describes, analyses and interprets the variations, due to exogenous or endogenous changes, in the MZA's operating account during the period 1856 to 1874.

The analysis of an historical case has been the research tool used to achieve the planned objective, since it allows us to answer how and why the accounting and management procedures and practices change. This is the research tool commonly used in other similar researches relating to the accounting model of foreign railways companies (i.e. *Liverpool & Manchester Railway* by Pollins (1952; 1956); *Baltimore & Ohio Railroad* by Previts & Samson (2000); *Eastern Counties Railway* by McCartney & Arnold (2000); *Union Pacific Railroad* by Heier (2009)).

The source documents generated by MZA and used in this research are the *Articles of Association* of the Company (MZA, 1857), the *Minutes of the meetings of the Board of Directors* (1857-1874) and the *Minutes of the General Meeting of Shareholders* (1858-1875) –which are kept in the Historical Archive of the Spanish Railways Foundation (hereinafter “AHF”)- and the Reports published (including accounting statements) by companies – which are kept in the Spanish Railways Foundation Library (hereinafter “BFE”). We have also used bibliographic resources provided by the Cardiff Business School Library (UK).

The first railway companies developed a pioneer business in the development of huge investments in infrastructure with a strong impact on the progress of information systems which had to evolve in parallel and become adapted to the new organisation and control requirements. By studying the accounting model we may draw conclusions on the conceptual evolution of the business, from an organisational and managerial standpoint.

The results of the study indicate that the MZA's accounting model, especially its operating account, shows the particularities of the railway business, although with limitations. However, the accounting model accords with the international approach of this time, regarding the format, content and criteria. Moreover, in this period, there are also important improvements in terms of relevance and reliability, in our opinion due to this moment being

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<sup>2</sup> In the beginning, the main cities covered were: 1) Madrid, capital of Spain, located in the centre of the Iberian Peninsula; 2) Zaragoza, located to the northeast of the peninsula, which acted as a bridge for the company to meet its long-term target of linking the capital city with France; and 3) Alicante, a port city of the Mediterranean coast located to the southeast of the peninsula, which was key to connecting inner Spain to other Mediterranean port cities.

<sup>3</sup> According to the life cycle of the railway companies, Tedde (1978:105) notes that the following stages may be identified in Spain: a) Creation stage (1856-1874); b) Expansion stage (1874-1900); c) Assertion stage (1900-1919); and d) Institutionalisation stage (1919-1935). 1935 is considered the last year of normal operation before the railway nationalisation stage in Spain which became effective in 1941.

the first time that the Company had to consider all the difficulties associated with the construction and of the network starting up.

Lastly, we need to state the problems encountered due to the fact that the MZA internal rules, which govern the accounting procedures for the first nineteen years of operation, and which we know were developed by the *Accounting Regulations* dated December 3<sup>rd</sup> 1857<sup>4</sup>, are unavailable. This constraint forces us, in most cases, to perform a deductive process of the issues regulated by the rules issued by the company through the analysis and observation of the Reports.

Likewise, we should highlight that we did not find any kind of internal document of a strictly accounting nature (accounting books, internal procedure regulations, accounting statements, cost statistics, etc.) which would have enabled us to directly observe the accounting information system and to establish with absolute certainty the existence of an analytical accounting model of the operation. In spite of the foregoing, after analysing the accounting documents available, we deem that the information contained in the published reports is sufficient to allow us to adequately develop, in quantitative and qualitative terms, this empirical research and, consequently, to achieve the previously set goals.

The work has been divided into the following parts: the first section summarizes the interfaces between the business model and the historical context; the second section introduces the MZA railway company as the accounting subject and includes our proposal of the productive process and operating cycle of the company (made after the analysis of primary and secondary sources<sup>5</sup>); the third section describes briefly the MZA's accounting model (1856-1874) and introduces the different accounting statements which are included in the MZA's annual reports; the fourth section describes the form and substance of the operating account in detail; the fifth section presents the methodological tool used; the sixth section examines the main changes in the operating account as the result analysis; and finally, the seventh section displays the conclusions of the research.

## 1. Interfaces Accounting Model & Social Context

The frequent changes in economic policy between protectionism and free trade doctrine due to political instability, contributed to complicate and delay the takeoff of industrialization in Spain in the 19<sup>th</sup> century. Moreover the confiscation (*desamortización*) by the State, first of church property and then that of municipalities, was the most significant decision taken by liberal governments throughout this century. The arrival in Spain of the Borbon dynasty that begins the period of the *Restauración* (1876-1922), contributed to a

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<sup>4</sup> MZA's accounting model was governed from the beginning by the application of its own General Accounting Regulations dated December 3<sup>rd</sup> 1857. Although they could not be located in the AHF there are two sources of evidence: 1) the Minutes of the meetings of the Board of Directors, where we could read that they were passed and the date they came into force (01-01-1858); and 2) article 58 of the Special Regulations of the General Accounting Service of 1889 (located in the AHF) which specifically repeals them.

<sup>5</sup> Special reference is also made to the works by Garcés (1875), Tortella (1973), Wais (1974), Anes (1978), Artola (1978), Comín (1978), Cordero and Menéndez (1978), Mateo del Peral (1978), Tedde (1978), Gómez Mendoza (1981, 1982), Bernal (2004) and Valdaliso (2007).

Frenchification and generated political stability, which provided the basis for the economic transformation of Spain, and the beginning of industrialization: textile industry, mining, iron and steel industry and the railroad industry. The last decade of the 19<sup>th</sup> century was marked by economic crisis, reflecting the global crisis.

In Spain, the expansion of the railroad was delayed until the second half of the 19<sup>th</sup> century by several causes: orographic conditions, economic stagnation, technical backwardness, lack of private capital ready to invest and a state without income. Lardner pointed out that in Spain in 1850 only one railway of eighteen miles in length, connecting Barcelona with Mataró, had been constructed. Others had been projected and even conceded to companies, the principal of which being that between Madrid and Valencia. The political distractions of the country, however, had suspended all such projects (Lardner, 1850: 416)

Considering that the very nature of railway activities involves an impact on the wellbeing of society as a whole, the degree of development of the regions and the progress of the community<sup>6</sup>, the company, as the “accounting subject”, can be considered as a *social entity*<sup>7</sup>.

The railway sector is, above all, a strategic sector of public interest, so that its regulation acknowledges and ensures control by the State. In order to regulate the relationship between railway companies and the State, the mode which was deemed most suitable in Spain was the the concession model.

The concession model has been commonly used by the French and Spanish public administrations to provide for public infrastructures and services for over two centuries. They were used during the 19<sup>th</sup> Century in Continental Europe and Britain, as well as in many countries of Latin America, for the provision of transport infrastructure such as railways. Different historical regulations (both contractual and institutional) on public and private collaboration were published in Spain.

One of the earliest regulations was a *Royal-Decree Law (Real Decreto-Ley)*, published in July 28<sup>th</sup>, 1828, whose objective was to use the initiative of the private sector in the construction and management of hydraulic infrastructures (Colón de Carvajal, 2010). Later, in November 2<sup>nd</sup> 1844, the *Subercasse's Report (Informe Subercasse)* was published, specifically, for the construction and operation of railways.

It was usual to publish general regulations to promote and execute public constructions, among others, for example the *Procedures on promoting and running public works (Instrucción para promover y ejecutar las obras públicas)* in October 1<sup>st</sup> 1845 and finally the *Act on Public Constructions (Ley General de Obras Públicas)* in April 13<sup>th</sup> 1877, establishing a unique and precise regulation of the works contract and the concession. But, these previous basic and general regulations over the public-private collaboration had to be adapted specifically for each type of public infrastructure, as in the case of railway companies (Frax, 1996: 517).

The concession model for railways was introduced in Spain through *Royal Order* dated on December 31<sup>st</sup> 1844, which gathers together the rules for examining and admitting

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<sup>6</sup> In this regard we should highlight, among others, the work by Herranz-Loncán (2006).

<sup>7</sup> This research may be performed from viewpoint of Tua (1983: 688-692).



government proposals to establish railways and which may be seen as the origin of the private-public cooperation models which are currently promoted in the infrastructure sector through the so-called PPPs (Public Private Partnerships), regardless of whether the company is of public or private ownership. However, historically, there is no doubt that the origin of the actual PPP's is found in the United States' regulations due to its historic and political conditions<sup>8</sup>.

Generally speaking, the concept of PPP is widely used for both projects requiring state subsidy and those which do not need it due to its self-financing capacity. In the areas of Latin American influence, the distinction between the PPP and Concession is a recent one.

As the International Monetary Fund (IMF) explains, the difference resides in that generally the concessionaire (the private sector operator) is exposed to the demand risk or potential hazard that all businesses must face during the course of normal operations, but with a PPP the private sector operator pays the State a pre-determined amount and thus it has no demand risk. Internationally the model called Private Finance Initiative (PFI) developed in the UK is considered to be a more advanced model (Hinojosa, 2007).

According to Lardner (1850:107) once the lines were opened, the companies became proprietors and guardians of capital. They were interested in maintaining out of revenue the permanent way and the floating capital; but they were also tenants administering revenue and interested in minimizing maintenance work. In Spain, the system of concessions acknowledges that the State is the owner of the permanent way once constructed and grants the licensee a beneficial interest in the railway, in most cases, with the financial support of a system of subsidies, fee exemptions, direct aids, etc.

From the beginning of the 19th Century until 1845, the Spanish public works were affected by a confusing and wide range of regulations, with differences in relation to their promotion, funding, construction, accounting, control, etc. Later, the legislation evolved according to the political context. Frax (1996:514) analyses the ideological principles that support the public works in Spain for each phase during the 19<sup>th</sup> century. These have been synthesized in the Table 1:

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<sup>8</sup> The great growth in the West of United States at the end of 19<sup>th</sup> Century was possible thanks to the collaboration between private railway companies and the Federal State, until the 1930s when the economic consequences of the Great Depression in 1929 forced to change the public policies significantly. The PPP's collaboration came back through the liberalizing trends in United States and the United Kingdom in the early 1980s (Fuertes, 2007: 17-19).

TABLE 1: FUNDAMENTAL MILESTONES & REGULATIONS AFFECTING THE RAILWAY COMPANIES

<b>1844-1854 Decade of “Moderate ruling” (Queen Isabel II of Spain)</b>	
<i>Social and Political Context</i>	<i>Railways Development Regulation</i>
<p>A New Spanish <i>Constitution</i> in 1845.</p> <p>Liberalist doctrine and constitutional monarchy.</p> <p>Different organic laws were passed, centralizing the political power of the public administration (trying to limit the liberalist influence).</p> <p>High level of corruption, little economic growth, and political manoeuvres in the public system of concessions (in general) and in railway companies (in particular).<sup>9</sup></p> <p>The <i>Joint Stock Companies Act</i> (1848) adopted the <i>Decimal Metric System by Weights and Measures Law</i> (1849), and built the first railroads Barcelona-Mataró (1848) and Madrid-Aranjuez (1851) (Fuentes, 2007:155-185).</p>	<p><i>Procedure to promote and run public works (Instrucción para promover y ejecutar obras públicas)</i> (October 10<sup>th</sup>, 1845). Aim: to unify the current regulations and clarify the confusing legal framework.</p> <p>The Public Administration would be responsible for controlling these initiatives and for regulating the process of executing the works, both in administrative as well as technical aspects.</p> <p>Public works could be executed by the State, regions, town councils, or through a company (concession) (art. 5). Entrepreneurs or private companies could also propose the execution of any public work after fulfilling the requirements of the instruction (art. 8): project planning, cost budgets, report of technical feasibility of a project, construction schedule, etc.</p> <p>Specific laws had to be formulated and adapted to this basic <i>Procedure</i> (depending on the characteristics of each kind of public work), as happened with the railway companies.</p>
<b>1854-1856: Progressive Biennium</b>	
<i>Social and Political Context</i>	<i>Railways Development Regulation</i>
<p>Economic reforms during the progressive era were made, among others: <i>General Desamortización</i> (Madoz's Confiscation May, 1855), <i>General Railway Act</i> (1855), <i>Joint Stock Banks Act</i> (1856) – this last one stimulated investments in railroads and public works.</p> <p>The Bank of Spain is established by the merger between Bank of Isabel II and Bank of San Fernando, promoting financial capitalism in an economic-liberal framework characterized by significant volumes of foreign capital, especially French capital.</p>	<p>The <i>General Railway Act</i> (1855) was published to regulate the construction of lines, and to attract foreign investors. It was an important impulse, and the basic railway layout was configured: the first phase occurred from 1856 to 1866; and the second phase, from 1873 to 1896.</p>

<sup>9</sup> In the political and financial scandals the Government, The Royal Family, capitalists, and speculators as the Marquis of Salamanca were involved (Fuentes, 2007: 173).

<b>1856-1868: <i>The end of the old regime</i> (Until The Glorious Revolution of 1868, and ends with the reign of Isabel II). 1868-1874: <i>Democratic Sexennium</i> with a provisional Government (1868-1871); the reign of Amadeo I (1871-1873); the First Spanish Republic (1871-1874) and The Bourbon Restoration (December 1874)</b>	
<i>Social and Political Context</i>	<i>Railways Development Regulation</i>
<p>After the <i>General Railway Act</i> (1855) many investors invested in railway companies' shares, causing a speculative boom.</p> <p>The profit expectations were exaggerated in relation to the low development of Spain's economy, which caused the collapse of share values.</p> <p>The financial crisis was very severe and affected not only politicians and investors but even the popular class (Fuentes, 2007: 229-233)<sup>10</sup>.</p> <p>The first financial crisis in the history of Spanish capitalism occurred at the beginning of 1866. It was caused by the Spanish railway companies and severely affected banks and credit entities.</p>	<p>On November 14<sup>th</sup> 1868, a decree was passed in order to establish the general basis for the new legislation of public works, and to collect a proper draft legislation (1869). Aim: to reduce the interventionism of the State in Public Works. The State would continue building works and infrastructures when urgently needed.</p>

Source: Based on Frax (1996).

According to the historical evolution, there were many economic and political changes that affected railway regulations. Some of them could explain, and help us to understand, the variations of the accounting documents reported by railway companies: the first important milestone, from 1864 to 1868, was the financial crisis caused by the speculation and the political manoeuvres; and, the second one, after the *Decree* (that set the basis for public works legislation) was passed in November 14<sup>th</sup> 1868, the system of concessions changed; for example, the subsidies, direct aids, and free exemptions were eliminated, and the limits between State and Railway Companies were not clearly defined (so the fulfilment of this decree cannot be evaluated). In relation to the last idea, Herranz Loncán (2003:59) recognized that this decree produced an insufficient control and regulation of State investments, as well as an inefficient subsidies policy.

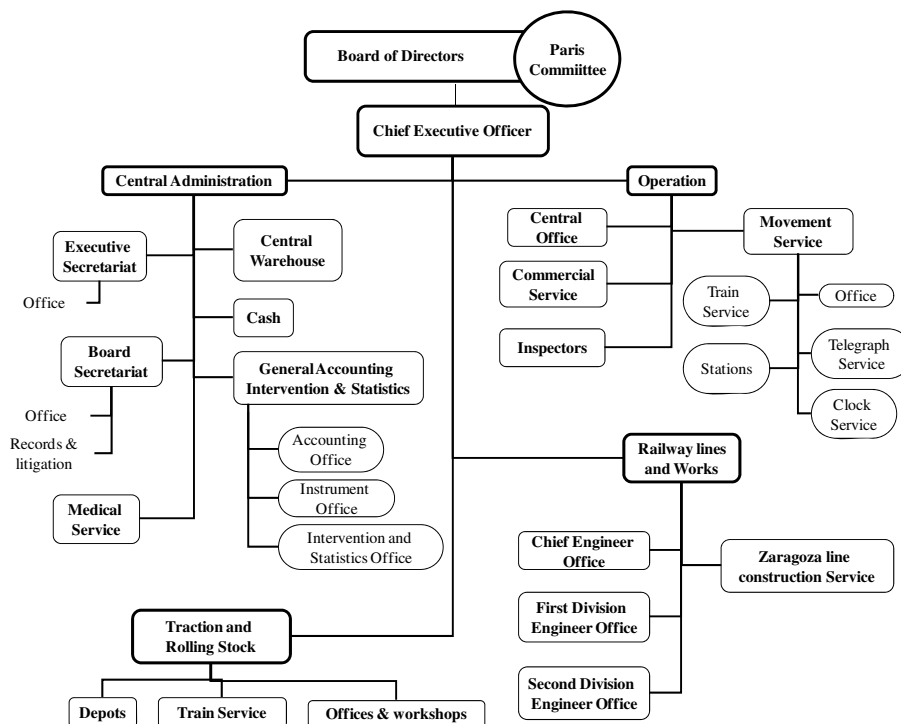
<sup>10</sup> According to Fontana (2007: 330), the panic was spread over all the country. At the beginning, it affected just the credit companies and banks, but then, progressively, it caused important damage to other companies which did not have liquidity. Anyone who had invested his savings in shares and/or bonds of railway companies was in ruin.

## 2. MZA Railway Company as an accounting subject

MZA was, together with the railway company *Caminos de Hierro del Norte de España* (NORTE), one of the two great companies of this industry. The beginning of its operations was sanctioned by Royal Decree dated January 26<sup>th</sup> 1857, and the company was incorporated as a public utility by shares, the legal type of which is the “*sociedad anónima*” (joint-stock company).

Although the organisational structure of each railroad company exhibits its own particular features according to its specific nature and evolution, a common pattern may be identified including, in general, the following sections: Movement and Traffic, Traction and Rolling Stock, Railway lines and Works and General Management. In MZA's case, at the time of incorporation the following were identified [*Minutes of the meetings of the Board of Directors* 1858, numbers 10, 11 and 12]: 1) Central Administration; 2) Operation; 3) Traction and Rolling Stock and 4) Railway lines and Works, as may be observed in Figure 1. In contrast to North American railway companies<sup>11</sup>, MZA's shares were owned by a small number of investors (mainly French) who had direct influence on the decision-making process by the management bodies (Board of Directors, Paris Committee and Chief Executive Officer).

FIGURE 1  
INITIAL ORGANISATIONAL STRUCTURE DETAILING THE “SECTIONS”



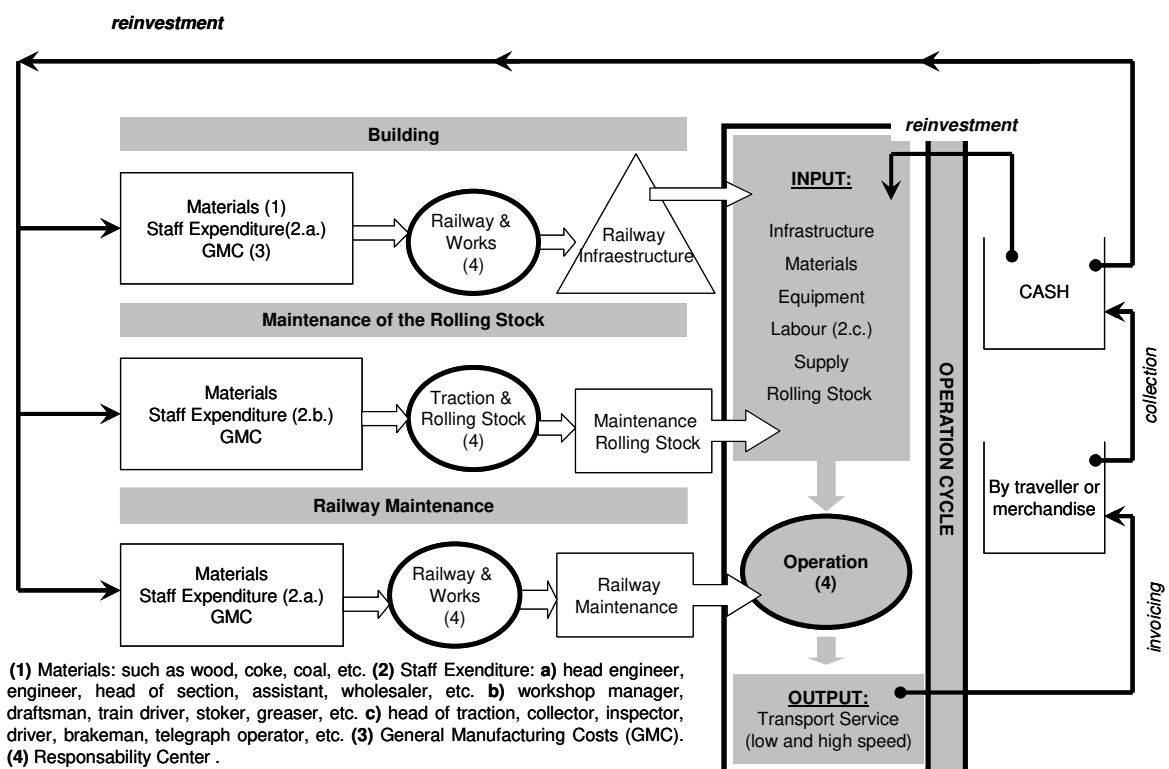
<sup>11</sup> According to Perelman (1997:58), in North American railway companies, the management was relatively free from interference by shareholders, as a large number of them held small stakes.

## 2.1. Description of the business: productive process and operating cycle

MZA's corporate purpose, among others, was to provide transport services and to build the railway line (Article 2 of MZA's *Articles of Association*, 1857). The provision of the transport service requires the necessary infrastructure for its development and, consequently, to make a prior investment in building the railway line and stations, and to manufacture and/or acquire the rolling stock (locomotives, cars and wagons). The numerous activities carried out by a railway require a clear distinction between the main and supplementary activity, in order to understand appropriately the productive process. For this reason, we have considered it important to provide a graphical depiction of how the productive process worked [Figure 2].

FIGURE 2

MZA'S PRODUCTIVE PROCESS



The general operation service is entrusted with the development and proper operation of the provision of the transport service. This service is disaggregated into two sections: Traffic and Movement. The operating activity services (products) are classified as: "High speed" (travellers, luggage and dogs, orders, carriages and cattle, post, diligences (stagecoaches), telegraph and others); and "Low speed" (goods, carriages, cattle and others).

However, other activities alien to the operating cycle need to be developed in order for the company to make the provision of the transport service feasible. These include:

- Building the railway line.

In the beginning of the railway industry, private companies considered that building the railway line was one of their main activities, as there was no railway network until this time, and this implied a large volume of investment which, in turn, conditioned the introduction and expansion of the business.

In our opinion, building the railway line and stations is an acyclic activity alien to the operating cycle and depending on the circumstances of the surroundings (technological innovation, socio-economic development needs, expansion strategies, etc.) this activity may lose, retain or increase its relevance over time. In railway companies, this building activity is entrusted to the Railway lines and Works section.

- Building and repair of the rolling stock.

This rolling stock may be outsourced or manufactured. In MZA's case, in the period analysed, most of it was acquired from French, English or Belgian suppliers. Over time they started to build their own rolling stock, importing the main components from abroad (according to Wais, 1974:125). Therefore, in this first stage, the Traction and Rolling Stock section is limited to maintaining and repairing these kinds of items. We consider both (building and repair of the rolling stock) as secondary, cyclical activities aligned with the operating cycle.

- Maintenance of the railway lines and stations.

In our opinion, this kind of maintenance, the function of maintaining the infrastructure in proper operating order, is also a secondary cyclical activity. This was a liability for railway companies to be met during the term of its concession, being basic to maintaining the primary operation of providing an ongoing transport service. This activity is entrusted to the Railway lines and Works section.

As regards the specification of the main activity or activities, the existence of independent accounting documents to represent the building activity (Establishment Account) and the Transport Service activity (Operating Account) implicitly defines the main business activity of MZA. Hence, the Operating Account states the results arising from the business and, therefore, it is conceived as its main activity. The building expenditure included in the Establishment Account is recorded as a permanent investment in the so-called Capital Account Summary; i.e., as a necessary asset to develop the operating activity. The maintenance of the railway and stations, a secondary and cyclical activity, is accounted for within the "Railway lines and Works" Chapter, which makes us believe that it was considered a direct cost linked to the provision of the transport service and essential for the development of its main activity, as it was obligatory to keep the infrastructure in the best condition.

To finish with, Figure 2 proposes a synthesis of MZA's productive process. We may identify a main activity –the provision of the transport service– and ancillary activities which make the development of the former feasible. Ancillary activities include: building the railway line, maintaining the rolling stock and fixed structure. For each main or ancillary activity, the organisation section entrusted with its proper development is indicated. The

question, among others, is whether the accounting information supplied by MZA was consistent, and representative, of the productive process.

### 3. Descriptive analysis of MZA's accounting model (1856-1874)

As regards the regulation of railway companies' accounting information, the following were applicable: a) external legislation<sup>12</sup> (either referring to the corporate and/or business area, in general, or to the railway area, in particular); and b) the internal rules governing the operation of the Company (developed by Articles of Association, general and specific accounting regulations and classifications of building and operating expenditure<sup>13</sup>).

As regards external legislation, in spite of the fact that the annual preparation of a «general balance of the order» in trading companies by shares was included in the *Code of Commerce* dated 1829, it is in the *Regulations of Companies by Shares* dated February 17<sup>th</sup> 1848 where the obligation to publish it appears for the first time. These regulations also govern the approval and publishing procedure for such accounting statements. Although it required the Balance Sheet to be made public annually by railroad companies, certain works conclude that, at least in the 1857-1862 period, no documents were circulated about the main Spanish railway companies, including MZA (Bernal, 2004:77). We found, exceptionally, in the *Gaceta de los Caminos de Hierro* (1868), a copy of the MZA Notes and Resolutions for the year 1867 but without copies of the supporting documents.

We should highlight as a constraint that "...the legal provisions were, furthermore, too general and technically inaccurate, so that almost any accounting statement would seem to be enough to formally meet the legal requirements" (Núñez and Buendía, 2008: 99). i.e., no rules were established to ensure homogeneity of accounting documents such as submission requirements, indications of contents and format, assessment criteria, time limits, etc. Nevertheless, from time to time there were provisions which, in a tangential manner, established very specific assessment criteria and/or principles (*Regulations 1857* and *Royal Order of 1864*). In this sense, in the year 1865 in the Vilches-Córdoba Section (line "in operation") the operating costs are charged to the Establishment Account (occasionally called Building Account or Capital Account), it being contended that it is not considered a productive line, but rather had been built under instruction from the government (MZA's Report, 1866:19). This could be understood as a violation of the obligation to distinguish between, and separately submit, the Establishment Costs and Operating Costs (*Regulations, 1857*).

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<sup>12</sup> Among others, the Code of Commerce (Código de Comercio) of 1829, the Companies by Shares Law and Regulations (Ley de Compañías Mercantiles por acciones y Reglamento) 1848, General Railway Law (Ley General de Ferrocarriles) 1855, Incorporation of Railway Licensee Companies Law (Ley de constitución de Compañías concesionarias de Ferrocarriles) 1856, Joint Stock Companies Law (Ley sobre Sociedades Anónimas) 1869.

<sup>13</sup> MZA issued Classifications of Operating and Building Expenditure in the following years: 1858, 1886, 1899 and 1918 (all of them located in the AHF except for the first one).

As regards the internal accounting rules and regulation, accounting regulations may be of a “general” nature, including accounting principles and the regulation of the relationship of the accounting service with the rest of the Company; or of a “special” nature, if the purpose is to regulate accounting features specific to one single section or subsection (Garcés, 1875:142). In the Classification of Operating and Building Expenditure, MZA proposes a list of items (with a name that identifies the contents) to which each cost generated by the railway company should be allocated. The classification of each item is twofold; on the one hand, according to the company functions served by the expenditure (by chapter) and, on the other hand, according to the specific nature (by article). This document is equivalent to what at present is called a “chart of accounts”, compliance to which may be crucial in the preparation of the accounting statements so that the information submitted is homogeneous and, therefore, comparable among different financial years.

We should highlight that the Articles of Association (MZA, 1857) govern issues relating to the preparation, approval and publication of the accounting statements (articles 46-51). The Company was liable to close its financial year on an annual basis, on December 31<sup>st</sup> of each year, and to prepare the «statements» and «supporting documents», which should be submitted to be approved by the General Meeting.

### 3.1. Accounting Statements included in MZA’s Annual Reports

MZA’s Reports comprise the explanatory Notes which included as attachments the supporting documents and the resolutions passed by the meeting of shareholders. They include three large sections (see Table 2).

These handwritten Reports included in the Minutes of the General Meeting of Shareholders are kept in the AHF, being a primary source; while the BFE includes printed copies of the Annual Reports published throughout the duration of the Company’s existence from 1857 to 1941.

TABLE 2  
DOCUMENTS COMPRISING THE ANNUAL REPORTS ACCORDING TO THE ORDER OF SUBMISSION

<b>ANNUAL REPORT</b>	<b>I. NOTES</b>		
	<b>II. SUPPORTING DOCUMENTS</b>	<b>a) ACCOUNTING documents</b>	Establishment Account Operating Account General Statement of Accounts
		<b>b) STATISTICAL documents</b>	Statistical detail of traffic Detail of traffic products Traffic by station Detail of collections from operations Special results of the traveller service Statistics of movement of goods [...]
<b>III. RESOLUTIONS PASSED BY THE GENERAL MEETING OF SHAREHOLDERS</b>			



The Notes report in some detail and in a single document the main activities and turnover, as well as building and required infrastructure work, complementing or clarifying the information contained in the supporting accounting and statistical documents attached thereto. It follows from the composition of the Reports that the company conceptually supplies two types of documents: on the one hand, *strictly accounting documents* such as the Operating Account, the Establishment Account (document relating to the building activity and its funding) and the General Statement of Accounts (which performs the function of the Balance Sheet); and, on the other hand, *statistical documents* called "Details of the Operation". These statistical documents on the Traffic activity appear to be supplied on a voluntary basis, since there is no requirement for them contained in the various pieces of legislation affecting the company and its activities. The level of detail and thoroughness found in the contents of these statistical documents relating to the different products transported by the company is striking.

Following the aforementioned and in accordance with the paper's objective, we proceed to analyse one of the accounting statements published in MZA's Annual Reports, namely the Operating Account. The reference timeframe for the analysis of the evolution of this document is set, in MZA's specific case, from the matrix railway lines building stage (1856-1865) until the end of the first agrarian, economic and political crisis (1866-1874).

#### 4. The Operating Account

This is the document that reflects in accounting terms the provision of the transport service, which is the main activity of the railway company. The result of this activity is presented as the difference between the resources generated by the commercial operation of the railway and the costs incurred to provide the service. The document is divided into two blocks: on the left, the "Products" (or revenue items) and, on the right, the "Expenditure" [Table 3]. On the basis of the difference between both blocks we are able to ascertain the excess or shortfall of the former compared to the latter, producing profit or loss, respectively. The debit or credit balance generated is included in the "General Statement of Accounts".

As regards the Operating Account blocks, the "Products" block is structured around two concepts: "Traffic", for income arising from the provision of the transport service, distinguishing between "High speed" and "Low speed"; and "Sundry Income" for non-traffic income. In turn, the "Expenditure" block is divided into Chapters and Articles [See Table 3], complying with the epigraphs defined in the Classification of Building and Operating Expenditure.

The classification of expenses in the Operating Account shows that they are ordered by nature and by function, the latter matching the organisational structure divisions designed for MZA. This may suggest that the company had developed an internal cost control system.

Therefore, the organisational structure is evidenced in the accounting model, as the functional classification matches the divisions of the organisational structure designed by MZA<sup>14</sup>.

TABLE 3<sup>15</sup>  
FORMAT-MODEL OF THE OPERATING ACCOUNT.

LINE a, b, c, (...)  
OPERATING ACCOUNT

Year N		PRODUCTS		EXPENDITURE			
Traffic	Travellers			Chapter 1 Operating Costs	Art. 1° Borrowing interests and reimbursements		
	Luggage and Dogs				2° Shares and sundry interests		0,000
Orders			3° Contribution and patents				
Stagecoaches and cattle			4° Police and surveillance costs				
HIGH SPEED	Mail			Chapter 2° ADM. & MANAGEMENT	Art. 5° Board of Directors		
	Diligences				6° Administration staff		0,000
	Telegraph				7° Sundry administration costs		
	Sundry				8° Management personnel		
<i>Total High Speed</i>		0,000	0,000		9° Sundry management costs		
LOW SPEED	Goods			Chapter 3° COMMERCIAL SERVICE	Art. 10° Staff		0,000
	Stagecoaches and cattle				11° Sundry Costs		
	Sundry			<i>Total Low Speed</i>		0,000	0,000
Sundry Income NON-TRAFFIC	Taffic Total General		0,000	Chapter 3° (duplicate) MOVEMENT	Art. 10° Staff		0,000
	Sundry interests				11° Sundry Costs		
	Non-traffic rents, sales and income			Chapter 4° RAILWAY & WORKS (maintenance and surveillance)	Art. 12° Staff		
<i>Total non-traffic sundry income</i>		0,000	0,000		13° Sundry Costs		
			14° Railway Maintenance				0,000
			15° Maintenance of levellings				
			16° Maintenance of infrastructures				
			17° Maintenance of buildings				
			18° Maintenance of fixed stock				
					Chapter 5° Traction and Rolling Stock	Art. 19° Staff	
				20° Sundry Costs			
				21° Driving of machines			0,000
				22° Machines consumption			
				23° Maintenance of rolling stock			
				24° Maintenance of workshop material			
				Chapter 6° General Expenditures	Art. 25° Contentious and judicial costs		
					26° Advertising		
					27° Insurance		
					28° Reimbursement		0,000
					29° Sundry Compensation		
					30° Rents		
					31° Sundry Costs		
					32° Closed financial years		
<b>TOTAL GENERAL PRODUCTS</b>						<b>0,000</b>	
					<i>TOTAL</i>	<b>0,000</b>	
					<i>Excess products over expenditure, or viceversa</i>	<b>0,000</b>	
					<b>TOTAL EQUALS</b>	<b>0,000</b>	

<sup>14</sup> In the work by Santos et. al (2011a) we may see how each section of the organisational structure (“Rolling Stock and Traction”, “Movement”, “Railway lines and Works”, “General Administration”, etc.) had its own Chapter in the Classification of Building and Operating Expenditure.

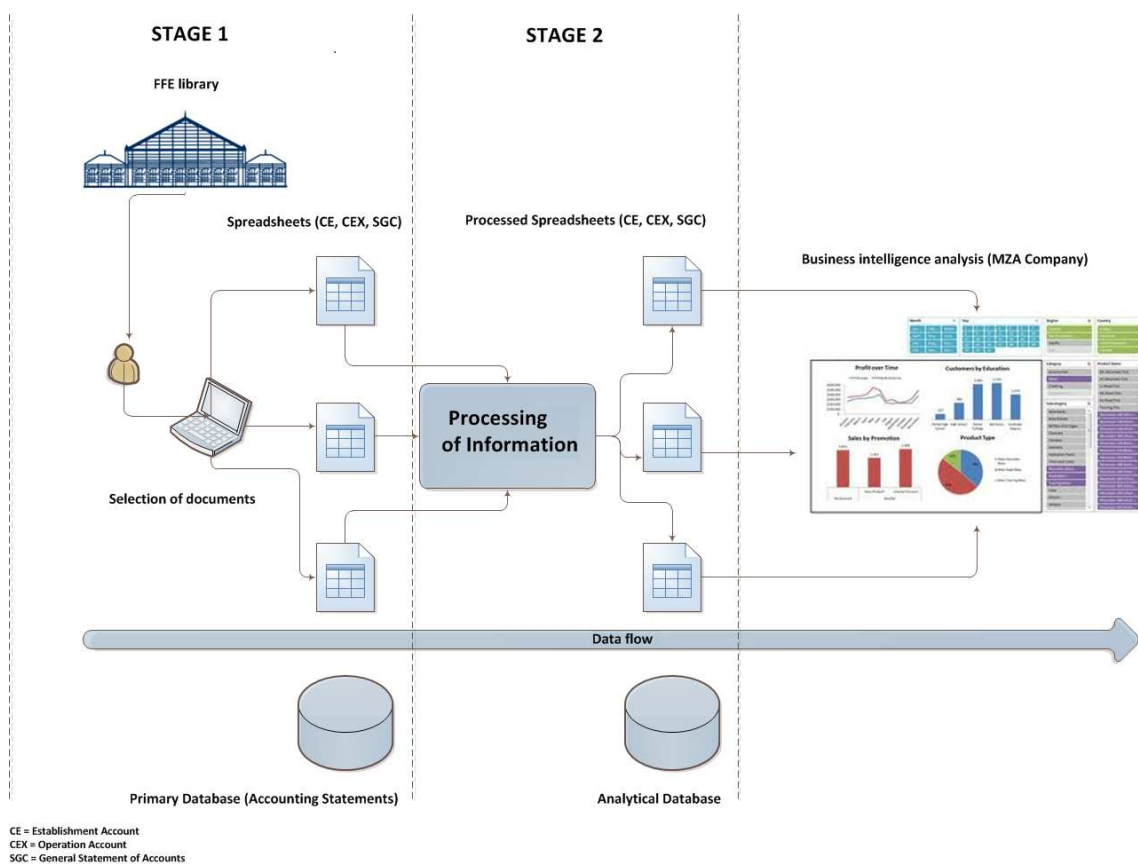
<sup>15</sup> Due to the dozens of changes in the operating account, it is not possible to show a valid and exact format for all the years of the analysed period. This table tries to present a model format of the statement for the period 1856-1863.

### 5. Methodological tool to process and detect changes in the accounting model

After directly observing MZA's accounting statements we may see that there are numerous changes during the period analysed. In order to establish and interpret these changes, in addition to assessing their impact, at least on a qualitative basis, we need to identify: (1) what these changes are; and (2) their level of temporality, i.e., whether they are exceptional (one-off or short-term) or if they remain over time. With this purpose in mind we developed a tool to analyse the processing and detection of changes in MZA's accounting statements, which could be extrapolated to other contemporary accounting models of other companies.

The ad-hoc research tool developed is useful, in general, for gathering together all the changes in the form and substance of accounting statements regardless of the entity and time, so this is to say, it could be absolutely extrapolated. Its main advantage is to show if a change in an accounting model was temporal or permanent, so identifying inflexion points which can provide evidence of the evolution of the model in terms of relevance and reliability.

FIGURE 3  
FLOWCHART OF THE METHODOLOGICAL PROCESS OF ANALYSIS



The analytical tool is sequential and comprises two stages [Figure 3]:

*Stage 1* may be deemed an initial screening-stage of the documents for analysis, as the purpose is to capture only those whose contents are solely of an accounting nature. This stage starts by collecting the information published in three documents (Establishment Account, Operating Account and General Statement of Accounts), in the relevant spreadsheets (CE, CEX and SGC), which comprise the (unmodifiable) Primary Database.

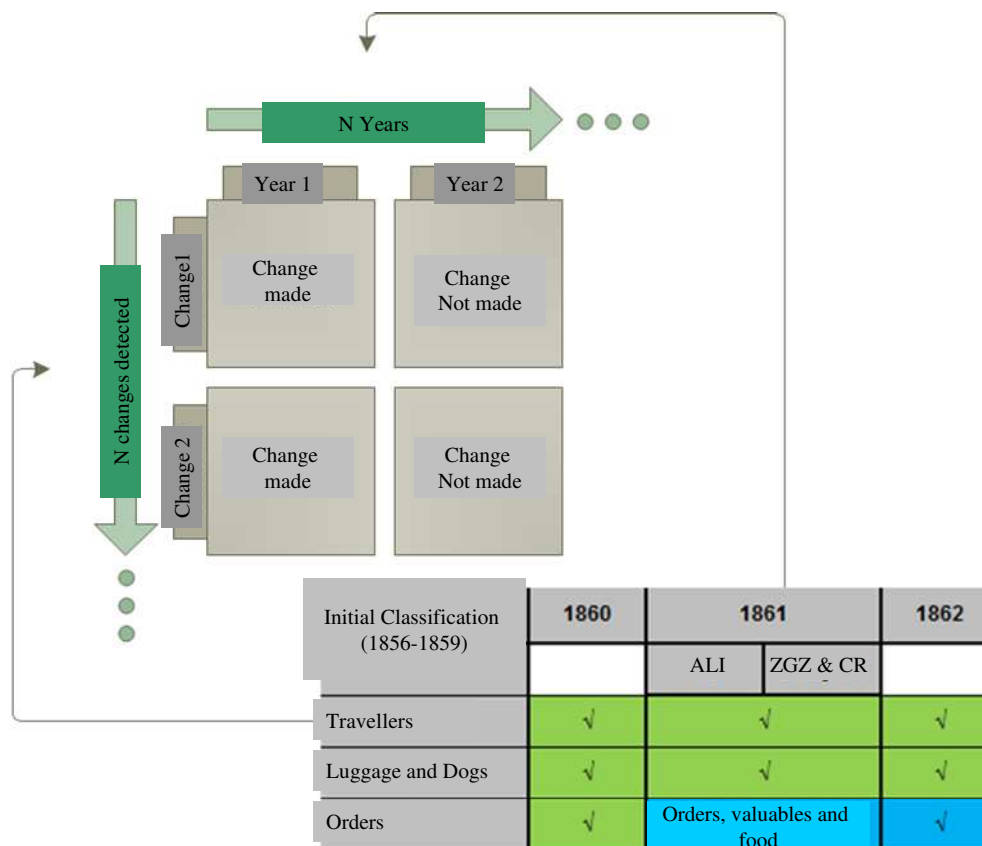
In addition, as these historical documents, in some cases, include mistakes in the quantification of data, the user also needs, as an additional task at this stage, to detect the errors and the corrections deemed appropriate. Some changes were detected during the process of building the Primary Database. In order to organise these changes around the factors that we considered crucial for the financial and economic information of the company, we developed the second stage which continues with the flow of information.

In *Stage 2* we analyse, process and select the information arising from the foregoing spreadsheets (CE, CEX and SGC), in order to create an Analytical Database (comprising spreadsheets  $CE_N$ ,  $CEX_N$  and  $SGC_N$ ), with information that may be selected, analysed and modified for further use in any Business Intelligence System. The subscript N is the number of spreadsheets that can be created in the Analytical Database. Each spreadsheet gathers different kinds of changes that can be produced on the statements.

A Business Intelligence System provides for global or focal analysis of different parts of a company and, in our case, it will focus on the accounting area. With the information provided by the Analytical Database we may analyse the data from the study period (1856-1874), and predict future data, for example, through the analysis of temporal series, trends, predictive statistics, simulations of future cases, etc.

The processed spreadsheets are built on the basis of qualitative information and make up the Analytical Database. They supply, in a double-entry table, information on the changes detected, as may be seen in Figure 4. On the one hand, in the first column on the left the changes detected are identified and specified, and classified, among others, according to key factors [items]. On the other hand, the years of analysis are stated by columns. In this way the critical data to be analysed can be identified by the intersection of certain rows and columns. Thus, as indicated in Figure 4, in 1861, we can see that the original classification 'orders' was changed to 'orders, valuables and food'.

FIGURE 4  
CHANGE SELECTION PROCESS IN PROCESSED SPREADSHEETS



## 6. Analysis of results

### 6.1. General considerations of the accounting model

Firstly, in order to establish the accounting result, we should highlight that we did not find any specific allocation of expenditure to sinking funds. Rarely some allocations from the results from operations are reflected as “reserve funds to update fixed assets” and, in others, according to the Articles of Association, as “reserves for unforeseen events”. This all produces uncertainty as regards the potential overvaluation of the annual results and, also, of the property, as it is increased by reserves which, functionally, lose their freely available nature. To sum up, this could result in the replacement of a process of amortisation of investments with a process of self-financing of maintenance, improving the image of the company. Nevertheless, the railway was the first large-scale investment business driven by the public sector, and railway management had to face for the first time the problems of valuing structural assets and the resultant effects upon the quantification of the result (Edwards, 1986:252). The occasional allocation to reserve for updating fixed assets by MZA may be considered an advance of that time.

Secondly, financial charges are distributed between the investment reflected in the Establishment Account and the costs of the Operating Account, respectively, and according to the use of the resources that generated them, pursuant to *Regulations for the exercise of the functions corresponding to the provincial governors and special delegates of the Government about Companies by Shares dated December 12<sup>th</sup> 1857*. This allocation of financial cost, depending on whether it is generated by investments of the period or, as the case may be, funding of the operating process, is significant, as it will allow for greater accuracy to ascertain the result of the main activity which may not always be obtained, even at present, with highly formalised models.

## 6.2. Variations in the Operating Account

Before we start our analysis, we should highlight that the Report of the year 1857 includes an Operating Account for half of the previous year (from July to December 1856). The results of the year 1856 are included because MZA founders had originally incorporated the company with the name *Compañía de Ferrocarriles de los Pirineos a Madrid y al Mediterráneo* and, after reforming its Articles of Association, it became the *Compañía de los Ferrocarriles de Madrid à Zaragoza y à Alicante* (Royal Order dated January 26<sup>th</sup> 1857). The data from the year 1856 had to be included, together with the data from the year 1857, in the Reports, to support the results of the Company since its creation, that is to say July 1856 (when the MZA's operations had started although under another name).

As regards the submission, contents and format, from 1856 to 1863 (both years included) an Operating Account is prepared for each section or line open to traffic and, in this way, we may have the "Products" and "Expenditure" linked to each line in operation, offering a thorough detail of both concepts in connection to each route. The drawback of this way of submission was that it did not offer the global result of the Company. For the year 1863 four Operating Accounts were prepared, one for each active line.

In 1864, the Company decided to present the results of the whole operation in just one account and, for that purpose, they decided to apply to the Operating Account the presentation applied to another accounting statement (the Establishment Account). The solution was to submit in just one document, on the one hand, the global result of the Company operations and, on the other hand, the detail of the individual Products and Expenditure of each line in operation.

From 1865 to 1874, the Company prepared and published one sole Operating Account called "General", which displays the Company's activity as a whole, without including the traffic details of each line open. Nevertheless, in the accompanying statistical documents, synthesised information is given about the operation "By lines", which does show the detail of "Products" and "Expenditure from Operation" for each section of railway line in operation, providing information on how each line individually affects the global result of the Company.

### 6.2.1. Modifications in the “Expenditure” Block

Although there are no great modifications regarding the expenditure, we may affirm that those made result from changes in the organisational structure and the most remarkable ones were made, in turn, during the 1864-1869 term, an era of economic, political and social crisis in Spain.

i. As regards the treatment of financial charges, we find significant changes. Thus, from the year 1856 to 1863 the “Borrowing interests and reimbursements” and the “Share and sundry interests” were included as another cost of operation. Nevertheless, in the 1864-1874 term, these financial charges are extracted from the corresponding chapter, and even disappear from the block of Operating Expenditure, and are presented separately on the lower side of the Operating Account. To extract these items from the operating results means to display the profit margin itemised: “Net product” (“Products” less “Operating Expenditure”) and “Net Profit” (“Net Product” less “Financial charges”).

Therefore, we may confirm that two result margins were created, distinguishing between the operating result and the financial result.

ii. In the “Expenditure” block, the first and only time that the “Total budgeted by the Operation Management” appeared as an informational referent was the year 1866, perhaps to serve as (budgetary) control of expenditure in the year of the onset of the economic crisis.

iii. As regards the changes in valuation or classification criteria, as an exceptional case, we observe that the Payable Expenditure is included in the “Central Management” chapter (equivalent to the “Administration and Management” chapter in Table 3) in 1868, while in the previous year it had been quantified under “Management of Operation”. This change is revealed through a footnote in the Operating Account of the corresponding year [See Figure 5].

FIGURE 5<sup>16</sup>  
A FRAGMENT EXTRACTED FROM THE ANNUAL REPORT (MZA, 1869)

<i>Total de los servicios de la Direccion de la explotacion.....</i>		46.567.009	88
<b>Total general de los Gastos.....</b>		<b>46.567.009</b>	<b>88</b>
(1) NOTA. El gasto de la Pagaduría figura en este total, y el año anterior figuró en Direccion de la explotación.			
.....	105.949 209,60		
.....	46.567 009,88		

Source: MZA's Annual Report, 1869 (AHF)

<sup>16</sup> Translation: “Total general Expenditure” 46.567.009- 88.

(1) NOTE. The Payable expenditure is included in this total, while it was included in Operation Management in previous year”

This change of method is highly significant as it is a change in the functional classification of costs that may have effects on the valuation of different items. Nevertheless, and by contrast, it is remarkable that all the information is supplied by adding a note that reveals the change of method, which is really innovative for that time.

### **6.2.2. Modifications in the “Products” block**

- i. The items corresponding to the “High speed” division from 1857 to 1874 generally include the following: “Travellers”, “Special trains”, “Luggage and dogs”, “Orders, valuables and food”, “Mail”, “stagecoaches”, “Funeral transportation”, “Telegraph and miscellaneous”, “Carriages (wagons) and animals” and “Miscellaneous”. These items are usually merged with one another, or else they disappear, change names, etc. In principle, there does not seem to be a clear reason for these changes. It may be due to the lack of an internal document that governs the presentation of items of income, as there was for the expenditure, which leads to a lack of homogeneity in the items submitted and, therefore, affects the level of comparability. However, the statistical documents provide useful information to managers and owners in great detail (quantity, volume, value, etc.).
- ii. For the year 1858 there are sums that reduce the income. These items are called “Tax reliefs and Litigation (Mail Administration)” and “Miscellaneous Tax reliefs”. We understand that these items act as discounts. The MZA provides mail transport services to the Administration, and then the MZA gives a discount to the Administration for high volume. But, at the moment we are not sure about the purpose of them, and the fact that they do not appear in the accounts in subsequent years made us qualify this change as extraordinary.
- iii. In 1859 and 1860, for the Zaragoza line, and in the latter for the Ciudad Real line as well, a footnote details information on the expenditure directly attributable to the line and the general expenditure and administration expenditure which are indirectly attributable thereto.
- iv. In the 1864-1866 period we find the item “To deduct 10% levied by the government upon the travellers’ product”, a concept that decreases the “Products” directly arising from transportation. From its name it follows that there was a state tax levied upon the income arising from the transportation of travellers at this time. Such a tax, however, is not referred to until the 1873-1874 period when a footnote provides information of the amount, though this is no longer recorded as a reduction of the revenue of the traffic products.

### **6.2.3. Modifications in the Classification of Operating and Building Expenditure**

As the document detailing the Classifications of Building and Operating Expenditure prior to 1886 could not be found in the archives, the study of the evolution of the expenditure classification criteria has been carried out through direct observation of the Operating Accounts included in the Reports.



**A) Variations in the Expenditure Chapters**

- i) According to the reported Operating Accounts during the period, there were numerous changes in the name of Expenditure Chapter (usually “number 3”), which included the expenditure relating to the Transport Service (Table 4):

TABLE 4

TERM	1856-1857	1858	1859-1865	1866-1869	1870-1877
Name of Chapter 3	Operation	Commercial Service and Movement	1. Commercial Service 2. Commercial Service: Movement	Operation Service	Operation Service: a) Traffic b) Movement

- ii) Chapter 2 “Administration and Management”, from 1866 to 1869 is itemised in two Chapters: “Chapter 1: Central Management” and “Chapter 2: Operation Management”. This change clearly seems to be an attempt to distinguish between the expenditure incurred by the general management of the Company and those relating to the Operation Service management.
- iii) The Chapters “Commercial Service” and “Movement” change frequently; however, the items included therein are always “Staff” and “Sundry Expenditure”. From 1866 to 1869 these Chapters are consolidated in one chapter called “Traffic, Movement and Intervention”.

**B) Variations in expenditure by Articles**

- i) The evolution of the name of any article relating to personnel moves towards greater specification detail. For example, “Sundry Administration Expenditure”, in force from 1856 to 1869, is changed in 1870, and from then and until 1874, appears as “Sundry Management and Secretariat, Health, Warehouse, General Accounting and Intervention Personnel Expenditure”.
- ii) “Management Staff” and “Sundry Management Expenditure”, in force from 1856 to 1865, are two Articles that disappeared from the “Administration and Management” Chapter. This is because, from 1866 to 1869, an additional Chapter is created under the “Operation Management” heading and from then on includes the two former articles. Consequently, it is a reallocation of these expenditures to other Chapters.
- iii) “General Expenditure of the Central Management” is an item that appeared in the year 1866 and disappeared again in 1869.
- iv) The Railway lines and Works Chapter includes several variations, among which we should highlight greater detail as regards Staff or the needs to renovate or replace railway lines, used rolling stock, etc.
- v) The only change detected in the “Rolling Stock and Traction” Chapter is the disappearance of the “Maintenance of Workshop Rolling Stock” item in the year 1864.
- vi) The “General Expenditure” Chapter includes several variations: a) the “Contentious and Judicial Expenditure”, “Advertising”, “Insurance”, “Reimbursements”, “Sundry

Compensation”, “Rents” and “Sundry Expenditure” disappeared as from 1865; b) the “Operation Management” item is occasionally reflected in the 1866-1869 period; c) the “Closed Years” item is included in the year 1861, and in the 1863-1874 period it was included continuously. We may infer that accruals accounting was usually applied, as on an extraordinary basis it distinguishes the expenditure corresponding to the year from the expenditure from previous years; d) the “Extraordinary and Complementary Expenditure (new works in several lines)” item appeared in the 1868-1874 period; and e) an additional item called “General Expenditure for all Services” appeared in the 1870-1874 period.

## 7. Conclusions

**Regarding the level of legal compliance of the MZA' accounting model** with external legislation, although it required the Balance Sheet to be made public annually from the start of the Company, MZA did not publish this document in the required gazette.

On the other hand, as all of the MZA'S annual reports are kept at the BFE, we can confirm that the company fulfilled the obligations of its Articles of Association, which required it to prepare and provide them to the shareholders.

Although the requirements of legislation were too general and technically inaccurate, some of them set forth very specific valuation criteria; however we have detected some failures affecting the valuation of investment and the quantification of results.

**Regarding the level of representativeness of the Operating Account**, the definition set forth in the Articles of Association of MZA, about the corporate purpose of the company (namely to build the railway line and provide transport services), seem to consider both activities as equally important, but the MZA's accounting model for these first nineteen years distinguishes perfectly between the accounting information of the main business (Operating Account) and the building activity (Establishment Account), according to the observed productive process.

**Regarding the capability to reflect the evolution of the business strategy**, we may affirm that the Operating Account is flexible in configuration terms, given that as the railway company expanded its business, this statement was adapted to include more complete accounting information, opening a specific account for each operating line, which gave rise to as many documents relating to operation as there were lines in operation. While in the first few years this was the standard style of presentation, in later years it changed to include all the operating information on a global basis, with a different layout.

From the study of the operating account it clearly follows that MZA developed an expansion strategy, at least during the 1856-1864 term. From 1864 onwards, when the Operating Account became a single composite statement, it is no longer possible to deduce, through strict observation, whether this strategy continued. The relevant data, however, is available in the accompanying statistical documents.

**Regarding the recognition and measurement criteria**, we may contend that, in general, MZA measured property items at historical cost; in addition, the accruals basis and the matching principle seemed to be respected, although we were only able to confirm this in some cases.

**Regarding income computation** we did not observe any specific allocation of costs to sinking funds in the net income. All of this could lead to an overestimation of the results of the entity, which means alterations of the matching principle, and accruals.

An advance for the era can be also found in the procedure of functional allocation of financial charges which should lead to a high degree of accuracy of the result as regards this aspect.

**Regarding the homogeneity and comparability [of financial information]**, there are no significant changes except for the name of some terms, and the variability of contents and format on some occasions.

So, we could establish 1864 as a significant date, from which year onwards one general operating account of the company is prepared, while in previous years there was one account per line in operation. We believe this is a major evolution vis-à-vis the availability of an holistic image of the business, by means of publishable accounting information. A different issue would be the implication of this change for internal business management which may involve a backward movement of the model intended for segments profitability analysis. Nevertheless, this information deficiency is filled by the disclosure of statistical documents that include detailed information per line and that prove the existence and availability of a cost information model for management.

**Regarding the comparability of accounting figures**, the fact that no rules or regulations are available governing the format and content for mandatory published accounting statements, is a constraint that conditions the analysis of intercompany and intra-company economic and financial trends. In spite of this, we may say that the consistency and compliance, throughout time, of the document entitled Classification of Building and Operating Expenditure is what, ultimately, provides a uniform configuration and structure in the Operating Account, thus favouring the comparability of figures, which may be effected between different years, at least for MZA.

**Regarding the disclosure of segment information**, the Establishment Account and the Operating Account provide for the availability of differentiated financial information regarding the two main activities of the company. This information by activity segments offers the reader the possibility of making more informed judgements on the company's overall results.

**Regarding the flexibility of the model**, the most remarkable changes in the classification made of expenditure items in the operating account were made during the 1864-1869 term, this is to say at an era of economic, political and social crisis in Spain. It proves the flexibility and capability of the accounting model to adapt to changes in the environment.

To conclude, we may affirm that the Operating Account, during the first stage of the company's operations, does not represent the result of the business due to the following deficiencies: the failure to recognize depreciation expense in the operating investment; and, with respect to the investments in buildings, no applied resources are recognized (these are directly recognized in the "Establishment Account"), thickening the value of assets in building.

Overall, in order to know the global earnings of the business, it is necessary to examine two documents: the Operating Account and the Establishment Account. The joint

vision of the earnings of both activities is reflected into the balance sheet, indicating the systemic focus of the accounting model and the unity and interrelationship of the set of publishable accounting documents. This questions the utility of an isolated study of some of these documents, with particular emphasis upon the introduction and expansion of the company.

Finally, the ad-hoc research tool developed in this study could be extrapolated to other researches about the changes on the style of accounting reports along time. It could be useful to collect all the changes in the items in a systematic way, and to show whether the variations were temporal or permanent. This would be an option for identifying possible evolutions of the accounting model in qualitative studies.

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