

# An Argument for the Implementation of Triple- Entry Bookkeeping

ADVISER: HANS HENRIK BERTHING

PETER SKOLE-SØRENSEN

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Peter Skole-Sørensen

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## Abstract

Bogføringsteknik er statisk, konservativt, og i de store træk uændret over de sidste 500 år. Mens den basale metode for rapportering af virksomheder er uændret, så er de virksomheder som bliver rapporteret på uigenkendelige. Det er hellere ikke bare virksomhederne som har ændrede sig drastisk. Ikke kun virksomheder har gået igennem drastiske ændringer. I takt med at virksomheder er blevet større er deres ejerskab også blevet diffunderet.

For bedst at kunne tilgodese den moderne økonomiske verden, bliver der i denne opgave undersøgt en alternativ bogførings metode, nærmere sagt: "triple-entry" bogføring. Opgaven gennemgår nogle svagheder ved den klassiske dobbelt bogholderis princip, videre introduceres, beskrives og analyseres "triple-entry" metoden.

Gennem disse handlinger kommer det frem til at "triple-entry" er på et meget tidligt stadie af sin udvikling, og meget yderligt arbejde er krævet for at man kan nå til et tidspunkt hvorved man realistisk kunne implementere den i erhvervslivet. Det vurderes yderligt at nogle af de svagheder som kan findes i det dobbelte bogholderis princip kan bekæmpes ved udvikling af denne metode, uden at man er nødsaget til at genopfinde den dybe tallerken.

Det findes at "triple-entry" er meget stærk på vise områder af bogførings rollen, specifikt giver den en bredere befolkning af eksterne brugere af et firmas eksterne rapporter, specielt individer som ikke kan termes som professionelle investorer. Disse ikke professionelle får et bedre indblik i firmaets livscyklus. Metoden vurderes herved som et skridt i retningen af udvide den mulige brugergruppe af firmaers regnskaber.

Det konkluderes at "triple-entry" er en metode som fortjener yderligere undersøgelse, dog den information som bliver givet vurderes som værende yderst relevant for bruger af et regnskab. Set i et bredere perspektiv vurderes det videre at ændring af bogførings metode kan være en positiv udvikling i kampen mod de problem som ses af visse som endemisk inden for regnskabs verdenen.

## Introduction

Over the past 500 years, few things have changed more than the corporation, from bazaars to firms valued in the billions with next to no assets to their name.

Despite massive changes, the accepted central accounting policy used across the globe has seen no updates. The policy of double entry bookkeeping, which helped propel the city states of Italy to their peaks of wealth in the renaissance is equally at home in the 15<sup>th</sup> century as in the 21<sup>st</sup>.

The changes the corporation has gone through in that time can hardly be described, and no single company can be said to encompass them all. Despite these differences, diverse companies seek to report their results using the same underlying methods, can a 600 year old model really achieve such a lofty goal?

What explains the lack of alternative accounting methods and the absence of any real change in the application of double entry bookkeeping? Given that one the core issues that inspired double entry accounting was the restriction to nonnegative numbers, a restriction that is no longer relevant, this lack of evolution becomes even more suspect.

Upon diving into proposed updates for the method, one in particular sticks out, if for nothing else than its name: Triple entry accounting. Yuji Ijiri the author of this method, holds the distinction of being the youngest person to become a certified public accountant in Japan, aged 21, before going on to serve as president of the American Accounting association and professor of accounting and economics at Carnegie Mellon University.<sup>1</sup>

The name triple entry suggests adding a third dimension to the classic double entry method, and this is no coincidence. Ijiri found inspiration in the world of physics, specifically movement. The method seeks to shift from a two dimensional point based system of accounting, focused on reporting states and flows at discrete intervals of time as a deviation from a null state, to a three dimensional vector based method, which emphasises the presence of a continuous underlying steady state and focuses on deviations from this state.

Seeking to tackle the limits of the standardised double entry method in describing increasingly diverse businesses, companies have resorted to increasingly length qualitative descriptions in their financial reporting, resulting in an explosion in the length of reports. In 1996 the average length of a company's report was 45 pages, today it's

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<sup>1</sup> [https://en.wikipedia.org/wiki/Yuji\\_Ijiri](https://en.wikipedia.org/wiki/Yuji_Ijiri), 26-11-2016

over 100, with some larger firms releasing novels of upwards of 500 pages.<sup>2</sup> This indicates that many of the classic measurements warranted by the double entry method fail to succinctly communicate the state of the company. However, companies are required, either by legislation or common practice, to include such ineffective measures, if a new system such as triple entry accounting could remedy this lack of quantitative description, the benefits would be unambiguous, how it might achieve this therefore warrants further investigation.

While double entry accounting increasingly treats a company's results in an increasingly theoretical manner, through such methods as depreciation and perceived increases in values of assets, triple entry has maintained a clear focus on the cash flow of the firm. This can be said to simplify the results of the reporting of firms, it becomes clearer for a reader to understand the degree to which liquidity has left or joined the firm.

We will therefore embark upon an investigation into the strengths and weaknesses of triple entry accounting in relation to standard double entry, with focus on how it may remedy the perceived ineffectiveness and lacking accuracy of the double entry method.

#### Problem definition

*An argument for the implementation of triple-entry momentum based accounting*

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<sup>2</sup> Vause B. Guide to analyzing companies

## Method

Due to the niche subject of this paper, the sources of the information available have been exclusively academic papers. It would have been in the author's wishes for further practical examples to be included, but the existing literature is almost exclusively theoretical. However, as this is an argument for further study to be conducted into the subject, it is to be expected that the back catalogue of research would be thin.

That being said, an effort has been made to draw parallels between areas in financial reporting which, based on empirical evidence, can be viewed as needing improvement, and the theoretical exposition in order to provide sketches at practical solutions for implementation. This has been done primarily through the use of contemporary financial news articles as well as some historical events.

By outlining problems with contemporary reporting and proposing triple-entry as a possible solution to many of these issues, recommendations as to the widespread implementation of triple entry are outside the scope of this report. The goal is instead to claim that effort should be exerted to study and develop the method, and that practical implementations warrant investigation as a possible solution to the problems in question.

This paper is primarily focused on two sources: "Accounting research # 31- Momentum accounting and triple-entry bookkeeping: exploring the dynamic structure of accounting measurements" and "Making accounting decisions". These were chosen in order to compare and contrast the possibilities of triple entry against a classic study into what is required in order to for at accounting change to be implemented, taking into account not only the perceived theoretical strengths and weaknesses of the methods. But also such parameters as cost of implementation and speed of reporting and other real-world inquires that have to be made.

Further sources have been used to provide arguments for the stances taken in this report. Given the sparse amount of sources in general to be found on the subject there has been taken no conscious decisions on excluding certain sources. With the notable exception of a discussion of triple-entry based on performance and wealth orientated accounting models. This area has been left out due to difference in triple versus double entry, as such it was concluded that it would not give a useful indication on the strengths and weaknesses of the theory by imposing a paradigm which is not suited to the theory being explored. Further, as will be mentioned several times during this report, triple entry is a system in its infancy, and in order to attempt to slot it in one of these paradigms it must be allowed time to evolve. The focus here is to analysis if it should be

allowed to evolve towards an eventual implementation, not imagine what a possible future incarnation would look like.

Finally, it should be mentioned that this report will focus on the entire accounting ecosystem, both from the side of auditors, internal and external as well as the producers of the accounts. This report deals mainly with the societal implications of an eventual shift to a new reporting standard, as such all areas of the accounting process are included.



## Accounting from a societal perspective

Accounting can be split into two major categories: internal and external accounting. Internal accounting is sometimes referred to as management accounting and is focused on relaying information within a company for the benefit of the owners, in order to improve the company's business practices. External accounting on the other hand, also referred to as financial accounting, serves the purpose of informing society as to the performance of a given company.

The purpose of external accounting is to allow for resource allocation by the market as a whole. By producing accurate and up-to-date financial reporting, investors and stakeholders are able to best decide where to invest capital or whose products to consume, as well as which industries are seeing growth, and which are seeing decline.

It is important to outline the different user groups of financial reports. Broadly speaking one can characterize the users in two main groups: the shareholders, or the stakeholders.

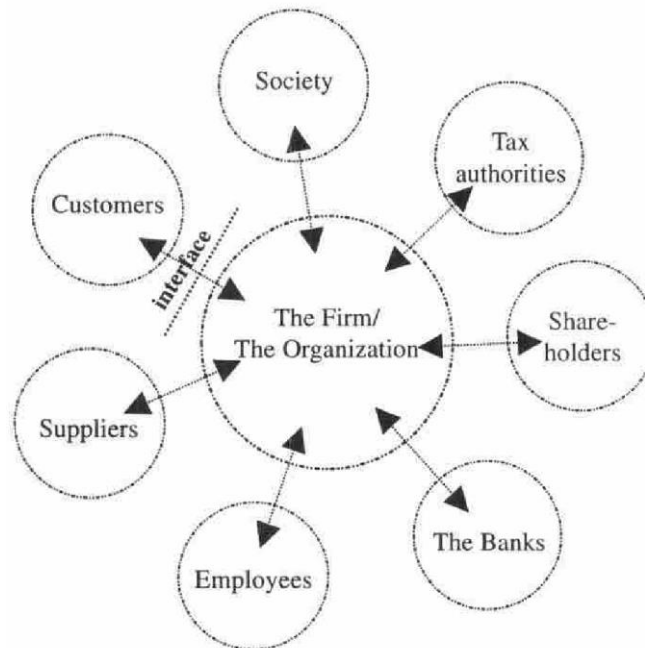
The shareholder perspective, prevalent in the Anglo-American world, is one of putting the owners of a company in the limelight. Under this perspective it is argued that the purpose of a company is to generate value for that company's owners. From the perspective of financial reporting this results in the users of a firm's reports being mainly investors, who use the reports in order to best decipher where to invest their limited resources.

The stakeholder view (seen in central Europe as well as the East Asia) argues that a firm not only serves its owners, but also the wider market. As such a firm does not only have shareholders, but also stakeholders. These stakeholders include the firm's customers, lenders, employees, suppliers and society. From this perspective, financial reporting has a much broader implication than just to inform prospective and current owners of a company.<sup>3</sup> A good illustration of this view comes from the coalition model of firm interaction (shown below).<sup>4</sup>

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<sup>3</sup> Anthony R. N. Management control systems pg. 74-75

<sup>4</sup> Kirkegaard H. The logic of double-entry bookkeeping



The method by which external accounting is conducted is therefore subject to distinct criteria depending on which viewpoint is considered, in either instance, the role of the auditor and the expectations thereof form the primary channel for this assessment.

The role of the auditor in performing an audit is described by ISA 200 as increasing the confidence a user can have in the reported financial statements of a company. The ISA's as such do not define whom the user is, but instead seek to provide the user, whomever this may be, with a high standard of reporting. Looking at national legislation the United States Federal Law, the Sarbanes-Oxley Act of 2002, Title 1, opens as follows:

*“ESTABLISHMENT OF BOARD. - There is established the Public Company Accounting Oversight Board, to oversee the audit of public companies that are subject to the securities laws, and related matters, in order to protect the interests of investors and further the public interest in the preparation of informative, accurate, and independent audit reports for companies the securities of which are sold to, and held by and for, public investors. The Board shall be a body corporate, operate as a nonprofit corporation, and have succession until dissolved by an Act of Congress”*

Analyzing the wording of the above section, it is apparent that the chief focus is on protecting the investors of publicly traded companies. As mentioned earlier, the shareholder view holds a strong position in the English speaking world, and the Sarbanes-Oxley act is no exception. It must however, be noted that this legal document

was produced under a great deal of political pressure after a period of great uncertainty in the accounting world, with companies such as Waste Management having to restate their earnings by huge amounts, and the collapses, following years of questionable accounting, of both Enron and Worldcom. Collapses like this always have the most pronounced effect on those who own shares in the given companies and as a result are exposed to a liability. However, employees also lose jobs, customers lose services and society loses out on revenue. As such, legislation such as this may not be the best at defining the role of financial accounting. Given the politically charged period of the writing of this document it would seem safe to assume that a larger than normal focus will be put on the effects of non-investor stakeholders, these do also warrant a mention in the legislation, however the focus remains squarely on the protection of public investors.

In the Danish law governing chartered accountants: "Revisorloven": in § 16 auditors are described as being society's representative. There is no direct reference to shareholders in this description of the auditor's job, he/she is not to be held responsible towards them, but instead, society as a whole. This puts focus on the stakeholder view. Further evidence of the stakeholder view can be found through the auditing of public companies, such as local legislators or in some countries, universities. When auditing public companies the concept of shareholders cannot be said to mean the same thing as in private entities. Public companies, as a rule of thumb, are not driven with the express purpose of generating revenue, nor to seek direct investment, protecting shareholder interest in this case cannot be aligned with the shareholder view of accounting focus.

### Auditing

While the practices of accounting have been used and developed over millennia, those of auditing have only a little over a century of history behind them. The need for independent auditors came following the industrial revolution, during this time companies began to rapidly increase in size, just as their ownership base began to dilute. Owners of companies were no longer living under the same roof, but instead spread out over entire countries. When the owners of an entity no longer have the possibility to personally keep tabs on the performance of said entity, an impartial third party was needed to verify the information that the company was reporting regarding their status. The role of auditor is formally that of an independent third party to verify the information given by a company as to its own performance.<sup>5</sup>

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<sup>5</sup> Langsted L. B. Revisoransvar pg. 19

The Andersen committee of the AICPA (American Institute of Certified Public Accountants) described the role of the auditor in society as follows:

*“assuring the integrity of the financial information upon which our capitalistic society necessarily depends”*<sup>6</sup>

This information asymmetry which is sought combated is perhaps best described though the principal-agent relationship. This relationship is one which often enters conversation when discussing management. The basic premise of the relationship is that in a company you have a principal (owner) and an agent (manager), the principal hires the agent and provides him/her with capital to manage the resources of the company. The agent is therefore accountable to the principal and provides financial reports to inform the principal of the choices made and the performance of the company. On the surface this relationship seems simple enough, until you add one final factor, the owner in this relationship is absent, meaning he/she does not have the ability to personally verify the reports he/she is receiving. Therefore an information asymmetry arises between the two parties.

To combat the resulting information asymmetry the auditor acts as an impartial third-party, verifying the reports given to the principal by the manager. The auditor will oversee the reports and gather information in order to verify their accuracy.<sup>7</sup> It is not within the scope of this paper to discuss the role of the audit or auditor in great detail, it is; however, important to maintain an at least cursory understanding of the auditor, and specifically what he/she attempts to safeguard, namely the principle that information should be understandable, relevant, reliable and timely.<sup>8</sup>

Whilst the classical definition of an auditor revolves not around creating accounts, but instead scrutinizing them, the role of the modern auditor is characterized by a much wider influence. For smaller firms, who may not be subject to sufficient economies of scale to produce their own accounts, and who are not subject to the same oversight as larger firms, it often is efficient to hire auditing firms to produce their reports. Furthermore auditors hold significant sway over which accounting practices are applied in the accounts of larger firms. During the entire process of accounts production, auditors maintain close contact with the finance departments of large firms, providing consultation on what the law necessitates is in the reports as well as how a company's accounts best can give a clear and correct picture of a firm's result.

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<sup>6</sup> Flint D. Philosophy and principles of auditing: an introduction, pg. 11

<sup>7</sup> Eilifsen et. Al. Auditing and assurance services, pg. 7

<sup>8</sup> Ibid, pg. 3

Jens O. Elling defines financial reporting as “external accounting by a company”, which he argues can be viewed as internal accounting from a societal perspective.<sup>9</sup> He goes on to claim that societies, in the same manner as investors, wish to best allocate their resources, their chief goal in using financial reports is therefore identical to that of private investors. Evidence to support this claim comes from society’s regulation of accounting standards, through both local GAAP and IFRS standards. IFRS and local GAAP rules can be roughly summed up as requiring firms to provide a true and fair view of their finances to the general public, meaning that the users of the finances in theory should be able to trust the released information. As will be discussed in detail later, accounting information should also be presented in a way which does not unduly confuse the users, the reports have to be easy to read.

Elling’s views are congruent with those expressed in the coalition model (see Figure 1). This model shows the different relationships a company has with external groups. These groups are the ones which Elling sees as the users of the firm's external accounts.

Another view on the public interest in firms activities comes courtesy of C. Richard Baker. He starts from the same position as Jens O. Elling, constituting the role accountants play in the decision-making process of third-parties, providing opinions and advice to allow for a better understanding by the aforementioned third-parties of the firm’s financials. Baker goes on to break this description of the accountant's role into three distinct implications. Firstly, that accounting professionals seek to serve the public good; secondly, that the public good constitutes the interest of third-parties, and finally, that these third-parties rely on the opinions and advice given by accounting professionals. This means that the accountant’s self-image of public service relies on service through consultation with third-parties to the entity in question. Baker’s definition of these third-parties focuses on shareholders and creditors, which is understandable as these are the groups which must be viewed as those whose interest in the firm is most directly quantifiable.<sup>10</sup>

Where Elling takes a positive view towards the role of accounting professionals in serving the public goal, Baker is more pessimistic. It is possible that there is a discourse in the relationship between accounting professionals and society. What this means is that the accounting “*profession*” has an interest, not only in being viewed as a group of practitioners in the same field, but as an accepted form of social control. If an accepted social control gains such prominence that it can be viewed as institutionalized, it moves towards creating a monopoly, one which benefits, above all, the interests of its

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<sup>9</sup> Elling, J. O., *Finasiel rapporting*, pg. 20

<sup>10</sup> Baker, C. Richard, in *Accounting for the public interest* pg. 143 - 149

professionals. Finding backing for this line of thinking in the accounting world is not difficult, given the focus that the EU recently has put on limiting the power of the big four, by for example requiring non big four firms to be included in the offer rounds of potential auditing clients. Further, requiring firms to be independently audited in the first place guarantees the existence of an industry, which, it can be claimed above all favor the accountants, whose job is now legally required.<sup>11</sup>

IFAC (International Federation of Accountants) has in the working document “*IFAC Policy Position 5*” defined the public interest as follows:<sup>12</sup>

*“IFAC defines the public interest as the net benefits for, and procedural rigor employed on behalf of, all society in relation to any action, decision or policy”*

Looking at the above definition, one quickly notices the use of the phrase: “net benefits”, this implies a certain degree of cost-benefit analysis. One can question the reason that this would be included in what is essentially an ethical statement. P.F. Williams continues this line of thought, while he believes it is laudable to attempt to connect accounting to the betterment of society as a whole, he claims that the definition seems based more on legitimizing the role of accountants instead of establishing an ethical standard to which they can be held against.<sup>13</sup> He goes on to claim that:

*“The role that accounting has to play in promoting the public interest must be understood in terms of the function that accounting performs, not necessarily in what the profession deems accounting needs to be to serve is commercial interest.”<sup>14</sup>*

This sentence encapsulates the arguments against the privatized, for profit, oversight industry, which accounting presently can be viewed as. Many have raised questions as to how auditors, especially external ones, can manage the cognitive dissonance that can emerge from having to keep both the customer happy while trying to provide rigid oversight of the very same client.

When IFAC discusses the role of accountants, it is important to realize they view accounting as a profession, as demonstrated by their description of themselves in the “*About IFAC*” portion of their website, where they describe themselves as a global organization for the accounting profession.<sup>15</sup>

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<sup>11</sup> Baker C. Richard, in *Accounting for the public interest*, pg. 143 - 149

<sup>12</sup> IFAC, *Policy position 5*, June 2012

<sup>13</sup> Williams Paul F., in *Accounting for the public interest*, pg. 161 - 173

<sup>14</sup> *ibid*

<sup>15</sup> <https://www.ifac.org/about-ifac> (27-09-2016)

## Accounting as a Profession

Can accounting be viewed as a profession?

When discussing their role in society this is an important evaluation to analyze, given the connotations that accompany a role being viewed as a profession.

Firstly, what is a profession? Whilst there is no universally accepted definition of a profession, Carr-Saunders and Wilson argue that certain characteristics have been accepted; three such characteristics are: continuing development of skill and knowledge, a shared code of conduct, as well as a wish to serve the public interest.<sup>16</sup> The concept of a profession is of course not bound to accounting, but seen in many jobs; lawyers, priests and doctors to name but a few. *Source probably also needed here.*

The American Medical Association (2011) Code of Medical Ethics reads:<sup>17</sup>

- *“continue to study, apply, and advance scientific knowledge [and] maintain a commitment to medical education,”*
- *“View the principles as standards of conduct which define the essentials of honorable behavior for a physician,”*
- *“be honest in professional interactions,”*
- *“recognize a responsibility to participate in activities contributing to the improvement of the community and betterment of public health.”*

Similar requirements can be found in practically all “classic” professions, for example lawyers.<sup>18</sup>

Qualifying accounting as a profession and establishing its societal role will in this particular case go hand in hand. However, that accountants work to serve the public interest is by no means a universally accepted sentiment. Saying that accountants have the knowledge to be viewed as a profession is not nearly as contentious, due in large part to the required exams to become chartered accountants. The GAAP and IFRS rules previously mentioned serve, among many other documents, to constitute a qualified code of conduct. Describing what accountants are required go through in order to complete their task.

The International Federation of Accountants’ Code of Ethics for Professional Accountants state the following:<sup>19</sup>

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<sup>16</sup> Carr-Saunders Sir A. M. & Wilson P. A., The professions

<sup>17</sup> Mintz S. et. al. Accounting for public interest, pg. 83

<sup>18</sup> Carr-Saunders Sir A. M. & Wilson P. A., The professions

*“A distinguishing mark of the accounting profession is its acceptance of the responsibility to act in the public interest”*

Many accounting publications use similar rhetoric when describing the role they play. When reading these descriptions, it is easy to believe that there is no question as to the accountant’s loyalty to the public good; however, looking at the actions of accountants this understanding can have a tendency to evaporate.

In contrast, the recent growth in the use of non-financial measures in financial reporting does show an understanding of the role of the accounts by the public. EU rules have come into effect governing reporting for larger companies, these include disclosure of a company’s policies regarding:<sup>20</sup>

- Environmental matters.
- Social and employee aspects.
- Respect for human rights.
- Anticorruption and bribery issues.
- Diversity in their board of directors.

Whilst the degree to which companies describe these factors in their reports can vary greatly, their inclusion speaks to a greater focus on society as a whole, not just investors.

External auditors aid in the production of the reports, but in doing so they often help the company by doing more than simply producing the most accurate representation of the firm, they instead seek to present the most positive view of the firm possible within the existing regulation, due to the leniency of the regulation these two goals are not consistent.

You run into a situation in which the external auditors can follow the letter of the law while still failing to produce the most accurate representation of the firm, that there exists a discrepancy can be in the interest of the current ownership and management, but not in the interest of society as a whole.

IFAC goes as far as to acknowledge the problem with serving the client and society simultaneously.

Certainly not something that can be claimed of internal accountants, and even a trait that can be questioned when discussing external auditors. Autonomy often refers to the ability and acceptance of a profession being at least to a degree, self-regulating.

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<sup>19</sup> IFAC 2010, General applications of the IESBA Code, section 100.1

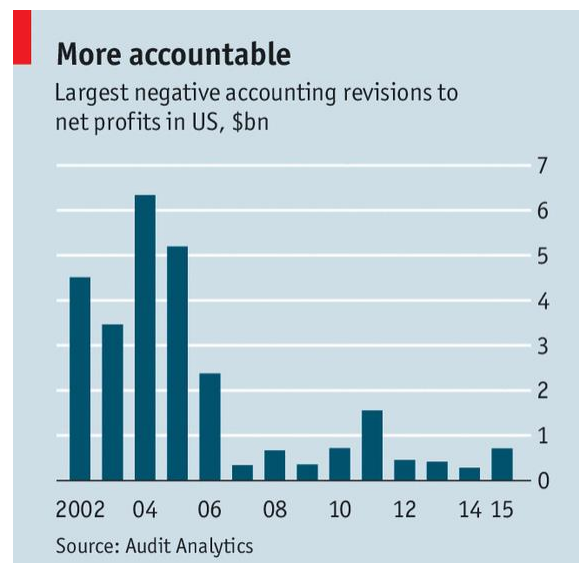
<sup>20</sup> [http://ec.europa.eu/finance/company-reporting/non-financial\\_reporting/index\\_en.htm](http://ec.europa.eu/finance/company-reporting/non-financial_reporting/index_en.htm), 26-11-2016



The ability of the accounting profession to act independently of regulation has been called into question.

Evidence to this effect is the plethora of legislation passed with the purpose of regulating the market, Sarbanes-Oxley, Dodd-Frank to name a few.

The ability of accountants and auditors to understand complex financial maneuverings used to manipulate an entity's results has been called into question, as well as their ability to put the public interest ahead of personal gain.



Economist.com

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That being said losses as a result of accounting fraud have fallen drastically in recent years, and are at the moment at historically very low levels. In 2015 the losses to corporate profits as a result of accounting scandals was at \$2,7 billion dollars; 0,3% of corporate profits during that period.<sup>22</sup> Although public opinion far from always follows the statistics, a consistent glut of accounting scandals should better the public's view on accountants.

Whether or not accounting serves the public interest seems to be very subjective question, however there is evidence that accounting professionals seek to, in their perspective, guard the public interest. The challenge of serving the public interest in its

<sup>21</sup> <http://www.economist.com/news/business/21706555-rich-world-not-suffering-outbreak-accounting-fraud-box-ticked>, (25-9-2016)

<sup>22</sup> <http://www.economist.com/news/business/21706555-rich-world-not-suffering-outbreak-accounting-fraud-box-ticked>, (25-9-2016)

wider definition, as well as the much narrower group of direct owners of the entity is the main area of contention in respect to defining and complying with the public good.

## Choosing accounting methods

In *'Making Accounting Decisions'*, George J. Staubus<sup>23</sup> sets out seven major criteria which must be considered when making a decision on how to produce the accounts for a firm. According to Staubus, any decision on accounting practices which is considered must be viewed through the lens of these seven criteria and it must be considered to what degree each of these criteria is fulfilled. An overall decision on the feasibility of the given accounting change must be made thereafter.

### Attribute relevance:

As a rule of thumb all measurements presented in an entity's accounts should be relevant; however, the degree to which they are relevant can vary greatly. The best way of measuring relevance is by considering to what degree knowledge of any given information would affect the users of the accounting information.

*"An attribute of an object or event is relevant to a decision if knowledge of its quantity, degree, or existence will help the decision maker (a) identify promising alternative courses of action and indulge their feasibility, or (b) identify and evaluate possible outcomes of available courses of action."*<sup>24</sup>

When looking at the relevance of a measure as described above, it is important to establish whom the decision maker is. Who the decisions maker is will often fall into one of two categories, either it is the management of a company or it is the shareholders (owners). Often times these two groups needs for information will overlap, but not always. It is therefore important to, when analyzing the relevance of a measurement, look at it from both viewpoints.

### Reliability:

Reliability is to be understood from an accounting perspective, that is to say reliability based on accounting standards. The value of an asset can be reliable, even if it is not the price you could get for it in a free market situation, if it adheres to relevant accounting principles. For example, internally developed non-material assets, which may be exceedingly valuable, despite having no book-value, their zero book-value is still to be considered a reliable measure.

*"Reliability is that quality which permits users of a datum confidently to depend on it as an accurate representation of the specific phenomenon it purports to represent."*<sup>25</sup>

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<sup>23</sup> Staubus, G. J. *Making accounting decisions*, pg. 42

<sup>24</sup> *ibid*

<sup>25</sup> Staubus, G. J. *Making accounting decisions*, pg. 43

Due to the different accounting principles which govern the accounting profession it can be very difficult to ascertain the reliability of an accounting measure. Several sources of unreliability play a role when analyzing accounts. Firstly, the predictions which companies have to perform when producing their accounts, examples of these could be the expected lifetime of an asset or its scrap value. Different companies and different accountants can arrive at widely different conclusions. Secondly, the question of allocating expenses and incomes to given assets, an example of this is the allocation of overhead to products or assets. This is also prevalent if costs or allocations are predetermined from a management accounting perspective. The final and largest source of unreliability is that of the evidence gathered by accountants when valuing an asset or liability based on its current market value. An example of this would be when setting a value to long-term assets designated for sale.

Having constituted that accounting practices in their current form are inherently unreliable under specific circumstances, it is then important to establish what any given change in accounting principle can result in, as far as being viewed as more reliable than its alternatives. Staubus stipulates, based on several other authors, that there are three main components that have to be viewed when measuring to what degree an accounting principle gives reliable measurements: verifiability, bias and accuracy.

#### Verifiability:

Verifiability is the degree to which accounting results can be substantially duplicated using independent measures, as well as the same measurement methods. What is meant by this is that accounting results should be able to be replicated by other accountants using the same data and the same method for calculating accounting results. It is therefore preferable to limit the amount of accounting estimates involved in decisions.

#### Bias:

Bias, this point could also be called objectivity, as this is the ability of an observer to record measurement from a company without any undue influence external or internal. Bias often results from some kind of personal bias, for example a personal stake in the firm that is being accounted for, or at times, systematic bias, if for example an accepted measurement method is inherently biased. As an example of an inherent bias ISA 540 refers to subjective management decisions.<sup>26</sup>

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<sup>26</sup> IFAC, International standard on auditing 540: Auditing accounting estimates, including fair value accounting estimates, and related disclosures

### Accuracy:

Accuracy in this context does not, as one could imagine, refer to whether or not the numbers reported are correct. This is the expectation; incorrect numbers would always disqualify an accounting method. Instead, accuracy refers to any estimates made regarding future results.

As this attribute discusses estimates regarding the future it is difficult to verify exactly what defines a high degree of accuracy. While acknowledging this, Staubus contests that the best measure, while being far from perfect, would be to have several practitioners make the same estimates and aim for a low variance in the results achieved.

### Comparability:

For accounting data to serve its purpose with the greatest degree of success it needs to be comparable to other accounting data. Observers of accounting data need to be able to use it to compare firms and assess their performance. Non-comparable information lacks almost all the informational value that is expected of a company's accounts. This is because performance is inherently relative, within an economic sector performance is good, only if the given company can outcompete its competitors. For an accounting method to be considered comparable, then, whenever identical events are reported on, the results must always be identical.

Staubus identifies five separate types of comparability which are significant:

1. Interperiod comparability. It is of great importance to account users that, year on year, or period on period, the same accounting principles are used, in order to allow these users to observe changes in the company's performance. If it is necessary, as it sometimes is, to change accounting principles, these changes should be clearly documented and explained, as well as used in all areas of the firm's accounting.
2. Intercompany comparability. One of the great strengths of having legislative and industry wide GAAP rules is that it allows for analysis of companies against each other, allowing for users of accounts to compare and contrast firms to establish their relative performance.
3. Interline comparability. The measurement units of accounts should be identical, the same currency, at a constant value, must be used entirely through a company's accounts. As an example one could imagine a international company recording results in several different currencies, without a reconciliation of these currencies, compatibility would become rather difficult.

4. Intraline comparability. All aggregated measurements should be comparable, for example when calculating a company's weighted average cost of capital (WACC), the cost of equity and cost of debt should be in identical units.
5. Comparability of the lengths of the reporting periods. Comparing results is not possible if the time period used to attain said results is not itself comparable. Time periods used within firms, and within industries should as such also be identical.

#### Effects via other parties:

As mentioned earlier, the process of accounting is, at its very core, a question of communicating information on the performance of a company. The communicated information is used by external parties to plan their actions, be it allocation of capital or changes to legislation and everything in between. As such, it is important to consider the effects of changes in accounting practice on the users of the accounts, both those who use them directly (analysts, employees) and those whom are merely affected by them (the public and the economy as a whole). One example where effects via other parties is relatively simple to grasp is the aforementioned principal-agent divide. If a company's management is presented with two, both legal, ways of presenting their accounts; where one method communicates strong, yet unstable growth in the current period and the other presents slightly smaller yet stable growth, outside pressures, such as those stemming from the impact on the cost of lending, may be the deciding factor in determining which presentation of the firm will be chosen.

In the above mentioned example it is the belief of Staubus that management will choose the stable growth model, as this is expected to reduce both the cost of equity and debt for the firm, as well as increase an eventual share price, if the company is listed. This is; however, ignoring the possibility of incentive programs which reward management disproportionately better for strong results one year, then stable results over several years.

There is also the example of "bottom line fixation", whereby investors appear to use the same price/earnings calculations when valuing a company regardless of the accounting principles used to generate the year end result, it is therefore in the company's interest to attempt to max out this measure, for example by choosing a more liberal interpretation of income. The classic example of this would be to include income before it is secure, and deferring expenses as aggressively as possible.

The impact of choices regarding accounting methods does not only have an effect on the classical principal-agent theory. Changes in measurement techniques can have many and far ranging effects, for example, companies can understate their growth if they are about to go into negotiations with employee unions, thereby strengthening their

bargaining position. A current example of companies attempting to show weaker results and understate their true size can be seen in the American banking and insurance sector. As of this writing the American insurer Metlife is in a legal battle with the American government over whether or not it must be classified as “too big to fail”. Being designated “too big to fail” entails further scrutiny, regulation and oversight, as such it is in the company’s best interest not to appear on this list.<sup>27</sup>

When the company controls the production of accounts and has their own incentives as to present these in a given fashion, then the accounting methods chosen can add to the disharmony between these two parties (producer of the accounts and the users). The most pronounced disharmony often created through accounting choices is that of shareholders versus management, as discussed above. Here the purpose of the communication of accounting information needs to be evaluated. As discussed earlier, the goal of external accounting must be to combat the information asymmetry that is present between a companies and at the very least, its shareholders (an argument could also be made for the views of the company’s stakeholders). An accounting system must therefore seek to create harmony between these two or more parties. Put in simple terms, any accounting method should strive to incentivize management to make decisions which maximize the value of the company, in line with the assumed wishes of the shareholders.

So far, the lion share of the discussion on accountings effects on others has been dedicated to the management and the owners of a company. However, management is not the only entity that makes decisions on accounting principles, organizations such as the IAS, EU or local governments also add too accounting principles through policy decisions.

#### Intelligibility:

When presenting financial information, it is of the utmost importance that this information is understandable and readable, not only by the internal user of the report, but also by external users. Accounting practices must therefore seek to effectively communicate financial information. The accountant must also acknowledge the strengths and weaknesses of the accounting decisions which are made. Decisions on intelligibility do not only focus on the rather complex matters of decisions made based on the numerical communication of results, but also on something as simple as the visual set-up of reporting. Attention should be paid to aspects of reporting such as headings; which provide easy access to information in the report, and draw the reader’s attention to important information. Related information should also appear close to each other to allow users to juxtapose connected information.

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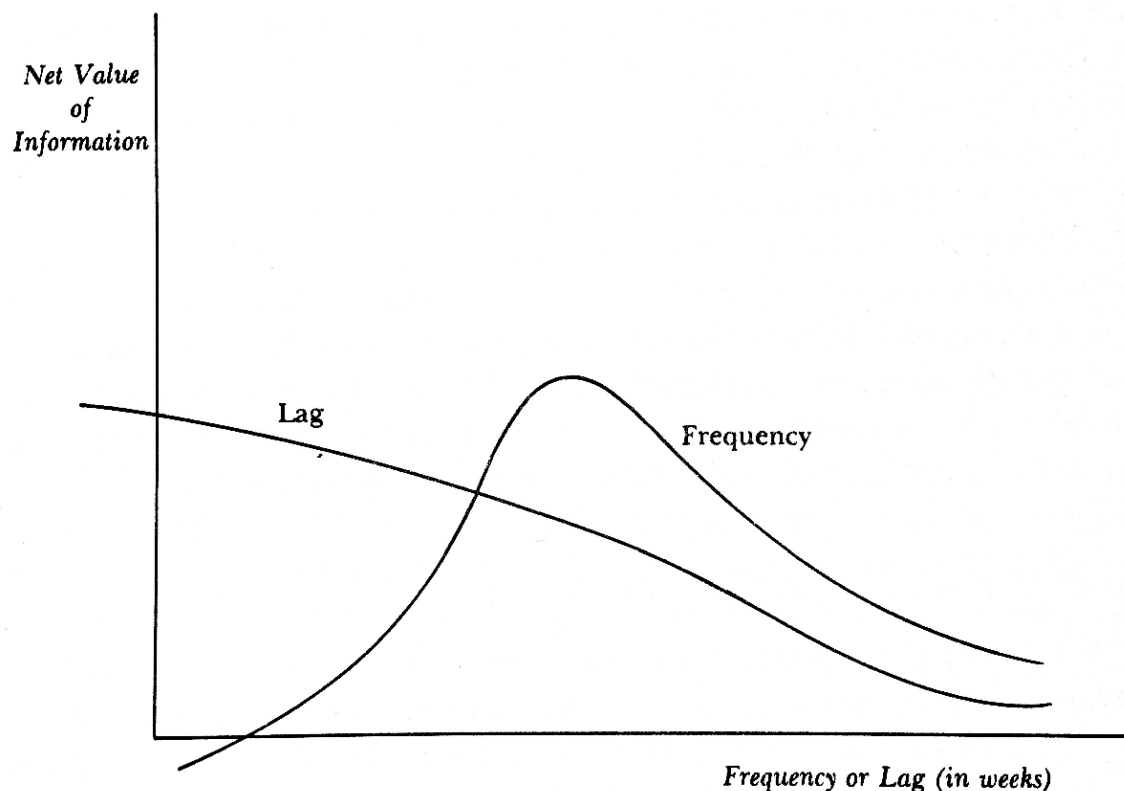
<sup>27</sup> <https://www.ft.com/content/a4fd0cc6-fcdd-11e5-b5f5-070dca6d0a0d>, 16/9/16

### Timeliness:

The timeliness of reporting boils down to two main factors: the lag and the frequency. The lag is the time between the close of books for the company and the release of the financial report. The frequency refers to the frequency of financial reports; be it yearly, quarterly, monthly, etc. One primarily needs to consider the following two questions when considering the timeliness of any given financial reporting:

- How much lag can we afford, while still maintaining the informational value of the reporting?
- Can you have too frequent/infrequent reporting?

While these questions at face value seem rather simple, one also needs to take into account the costs of very frequent, low lag reporting, as this requires a huge workload from both accountants and auditors. <sup>28</sup>



The above shown graph shows Staubus' take on the value of financial reporting information in relation to the frequency and the lag of reporting, forming a guideline for optimal timeliness based on the above questions. We see that very frequent financial reporting does not yield the largest possible informational value to the user. When frequency reaches very high levels (daily, weekly) the information has a tendency to be

<sup>28</sup> Staubus. G. J. Making accounting decisions, pg. 63



too heavily influenced by seasonal variations, random factors or one off events. The high frequency and small data set size creates unreliability and unnecessary variance in the results period on period, leading to reports which are not worth the user's time. On the other hand, too infrequent reporting can lead to users having to wait too long for the information to appear, the company will also be able to perform without scrutiny for increasingly long periods of time. Questionable investments and the like can be held for longer periods of time than is in the interest of the investors. As was mentioned when describing the weaknesses of too frequent reporting, single events can be given too much focus, the opposite is true when frequency becomes too sparse, single events can end up being indistinguishable, given the large data set. The simplest way to illustrate this is through the use of graphs and other types of visualization, if a graph covers too few events, each event provides spikes in the data which can easily be over analyzed, to many events, and the events bleed into each other and are indistinguishable.

Despite these limited problems regarding frequency, the rule of thumb is that less lag is always preferable, the limitations here are that very small lag times are expensive to attain. However, it will be in the best interest of accounting timeliness to strive for as little lag as possible, without blowing the bank on accounting expenses.

As can be assumed from both the graph and the description of timeliness there are no concrete suggestions for frequency or lag that apply universally.. These criteria need to be looked at from the perspective of a specific company and the needs of the users of the reports from that company. It could be argued that the more diverse a company's ownership structure is, the higher frequency the reports should become, in order to provide the maximum amount of information to a very large owners group.

#### Optimal Quantity:

The quantity of information relayed should also be considered, this is to avoid information overload. While information is good; too much, irrelevant information can reduce the overall information value of the financial report.

*“How far should the accountant go in providing detailed data the value of which may not exceed the cost of producing and utilizing it”<sup>29</sup>*

Staubus sets up three questions that must be considered when planning the quantity of information which should be reported:

- To what degree should base data be aggregated?
- How much additional, descriptive information should be added to the base data?

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<sup>29</sup> Staubus. G. J. Making accounting decisions, pg. 63

- To what degree should information that does not meet the requirements to be included as an asset or liability be reported on?

These questions can be seen as guidelines to determining to what degree the accountant should aid in the understanding of the company's health. From the perspective of the users of the accounts, especially the external users, any further information on the health of the company, especially predictive information, will increase the informational value of the report. However, this increase in information comes with a corresponding increase in the cost of producing the report. One also has to remember the wish of some firms to keep aspects of their business confidential. While striving towards a completely open market is a noble endeavor, it is important to maintain a company's ability to maintain certain aspects of its business a secret, to give an incentive for evolution.

#### Costs of producing accounting data:

The cost of producing accounting data is not negligible, both the cost of internally producing said data, plus the cost of having the data audited must be considered. As such one should always consider the cost of any accounting decision, and this cost should be weighed against the possible benefits of changing accounting policies. Often any change in accounting policy will bring a large up-front expense in the form of costs accompanying education of staff and lost routine. However, the benefits of changing accounting policies can often outweigh these costs, and unfamiliarity with a policy should not negate its potential use.

*“The costs of accounting must be taken into consideration without being used as a bat to club down any proposal for change”<sup>30</sup>*

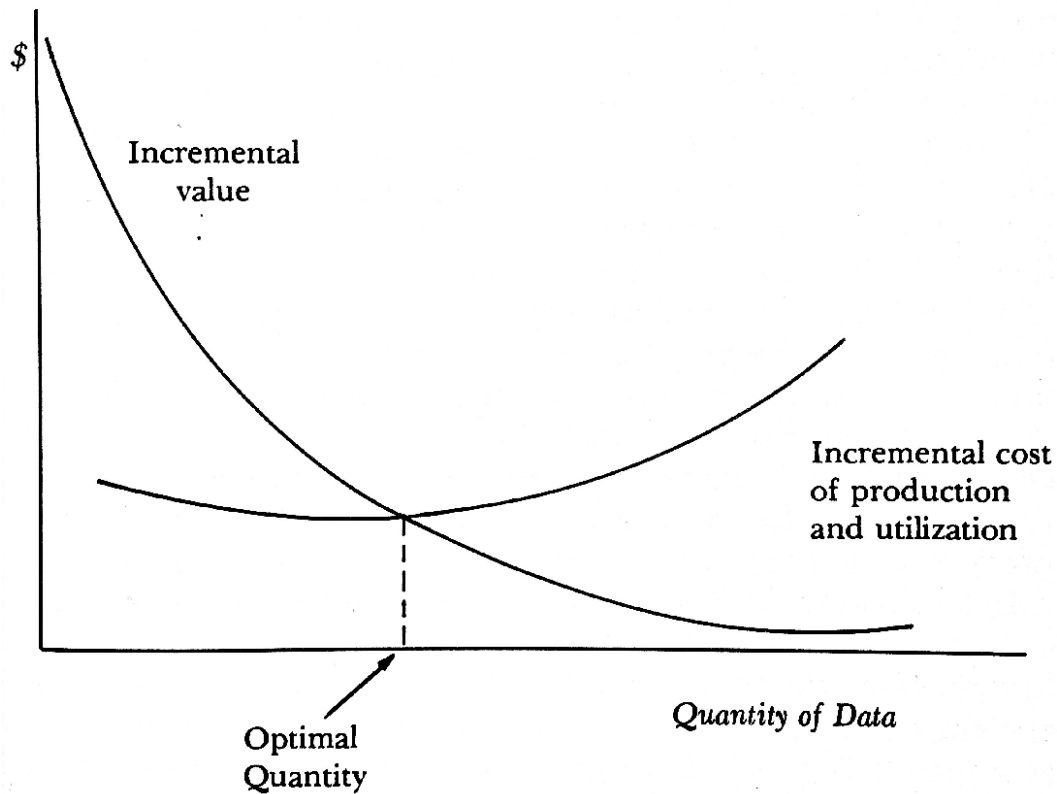
#### Costs of utilizing accounting data:

The cost of utilizing data is the cost to users of analyzing the data that is reported. As a rule of thumb, providing that the data provided is of a high quality, the more information that is given in the financial reports, the cheaper it is for the users of that data to work with it. The less information that is given in turn increases the costs to users. This cost consists of the expenses of having to calculate the values that are needed, as well as the time cost of having to find the necessary information, for example, the reports can be presented in a confusing manner, making expedient searching challenging.

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<sup>30</sup> Staubus G. J. Making accounting decisions, pg. 67

## VALUE AND COST OF DATA INCREMENTS



31

Above is shown an example of the relationship between the value of and the cost of data provided. Observe the incremental value line, it shows the diminishing returns on reporting an ever increasing amount of information. Starting at no information included, only the most valuable information is reported on, as we increase the quantity of data decreasingly relevant evidence is added to the financial reporting. At the point when this decreasing line crosses the incremental cost of creating this data, the optimal quantity is reached, giving the maximum value of information in relation to the cost of information.

#### Predictive Power:

The predictive power of accounting methods revolve around their ability to provide a glimpse at the future performance of a firm. Staubus comes to the conclusion that whilst it is important to have an understanding of the predictive power provided by accounting decisions, it is not an aspect that should be taken into account when making accounting decisions. Other authors are not in agreement with this conclusion. Notably Ijiri, who takes the position that:

<sup>31</sup> Staubus, G. J. Making accounting decisions, pg. 67

*“If a model is an accurate representation of empirical phenomena, it has predictive power”<sup>32</sup>*

This is an example of the problem of induction, and one's stance on this issue will invariably reflect the weight one ascribes to whether predictive power should serve as a principle for evaluating accounting methods.

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<sup>32</sup> Ijiri Y. Theory of accounting measurement, 1975 p. 7

## Overview and problems with double-entry bookkeeping

### Double entry bookkeeping:

In order to provide cogent arguments extolling both the strengths and weaknesses of triple entry accounting one must first establish the gold standard of contemporary accounting; namely double entry. In this section, the history as well as mathematics of double entry will be discussed, whereas the critical analysis will be saved for the analysis section of the paper.

### History of double entry:

The seminal work on the subject of double entry bookkeeping is Luca Pacioli's 1494 work *'Summa de Arithmetica, Geometria, Proportione et Proportionlita'* (Everything Concerning Arithmetic, Geometry and Proportion).<sup>33</sup> However, references to double-entry stretch as far back as 1340, the fundamentals of accounting have therefore not changed for at least 500 years.

During this time the theory of double-entry bookkeeping has become viewed as something sublime, and as such has not seen a great degree of evolution. Authors and scholars alike have praised the theory and the logic behind it. Johann von Goethe wrote:<sup>34</sup>

*"What advantage does he derive from the system of bookkeeping by double-entry! It is among the finest inventions of the human mind"*

Arthur Cayley describes double-entry as follows:<sup>35</sup>

*"like Euclid's theory of rations an absolutely perfect one"*

The faith held in double-entry bookkeeping can appear strange when some of the reasons for its early adoption are brought into the light.

The oldest form of accounting we recognise is that of the unsystematic, random, collections of memoranda; memories of merchants.<sup>36</sup> The great strength of this approach to accounting is its simplicity, for each transaction you have one piece of information to define it by (namely, the memoranda). When transactions occur in small numbers with a small numbers of individuals, as was the case in small historic societies, then providing that the data does not need to be sorted or aggregated in any way, this system of accounting provides sufficient recording.

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<sup>33</sup> Ijiri Y, Accounting research nr. 18, pg.1

<sup>34</sup> ibid

<sup>35</sup> ibid

<sup>36</sup> Ijiri Y. Accounting research #31, pg. 13

Another manner of describing this method is single column accounting.<sup>37</sup> To understand what this means, imagine an excel sheet where you are only able of using one column to record transactions, if you have perhaps 20 transactions to account for, this should not be a problem, as the information need to track such a limited number of transactions as well as the need for aggregation is limited.

As the number of transaction increases, so does the need for being able to aggregate the data involved (for the sake of argument it is imagined that only one type of information can be searched for in each column), based on allowing for easy sorting and searching of information.

Allowing for additional columns, you could record the date, account and amount, still retaining our column describing the transaction. Having this information will allow you to sort the information present in more ways, allowing for further uses of the ledger, but also look at the total income and expenses from transactions. Essentially you have at your disposal a general ledger.

Man's understanding of negative numbers has played a huge role on the development of accounting. One of the greatest strength of double-entry bookkeeping in its early days was its ability to avoid negative numbers. Upon the creation of double-entry bookkeeping negative numbers were not yet accepted in mathematics. Thomas Harriot (1560-1621) was the first mathematician to accept fully the concept of negative numbers, with other mathematicians such as Pascal (1623-1662) believing the idea of negative numbers as being one of complete nonsense.<sup>38</sup> Interestingly the first mention of negative numbers does not come from mathematics, but instead commerce, in first century China red rods were used to show what was owed to an individual and black rods were used to show what said individual owed to others.<sup>39</sup>

Due to being constrained by nonnegativity the previously discussed columns no longer allow for correct accounting as there is only one amount column present, and the numbers contained in this column must be positive. There are two main ways of dealing with this conundrum, one method is to build a positive or negative distinction into the description of the accounts. For example through having an accounts receivables increase account as well as an account receivables decrease account. This method however brings with it a large degree of complexity. Instead one could add a fifth column, that of a second account. This second account will function as a place to store negative records without having to use negative numbers, if a number is included in the

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<sup>37</sup> Ijiri Y. Accounting research #31, pg. 13

<sup>38</sup> Peters R. M. & Emery D. M. The role of negative numbers in the development of double-entry bookkeeping

<sup>39</sup> Ibid.

first amount column it represents an influx of capital, and if an amount is recorded in the second amount column records an outflow of capital.

These two columns need names, there are several theories on why debit is called debit and likewise for credit, suffice to say that debit records increases and credit records decreases.<sup>40</sup> Originally transactions were recorded solely in one column, either as a debit or credit, as the system had not yet evolved past its single entry roots. It quickly became evident that some transactions, by their very purpose, affected two separate accounts, for example, collection from debtors, which will increase the firm's cash, while decreasing the company's accounts receivable. Likewise for liabilities taken on by the firm, a loan taken will not immediately provide matching positive and negative posts if recorded only for the current year, as paying back the loan may take several reporting periods. The transaction as such needs to be viewed over a longer period allowing for proper reporting of the financial health of the company.

It is concluded that the easiest way of recording transactions that have two effects on a company's accounts is if those two effects can be viewed as equal. To give an example of this way of thinking imagine an investment in a company truck, a well-known anecdote is that when you drive a car of the lot it loses half its value.

This gives a problem when producing the accounts. If there is a difference between the value an asset is purchased for and the value the asset has when added to the books the resulting gain or loss must be recorded in a separate account. The complexity of accounts is therefore greatly simplified when equality can be established between the value of transactions and their cost, this may well be a large part of the reason for the practice of recording exchanged items at the same value, unless strong evidence can be brought to the describe the opposite, otherwise known as the historical cost principle.<sup>41</sup>

For many transactions there is no obvious second account to be recorded for, especially if the accounts used by a firm are rather primitive. As such it would help to have a form of plug whereby debits and credits can be balanced. It is from this line of thought that the post of owner's equity, which can also be explained as the capital owed to the owners of the company, finds its niche.

Ijiri sets up his hypothesis on exactly how he believes double entry accounting evolved based on the above explained steps:

1. A need for two account columns to avoid using negative numbers.

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<sup>40</sup> Ibid

<sup>41</sup> Peters R. M. & Emery D. M. The role of negative numbers in the development of double-entry bookkeeping

2. Once the two columns were established, certain transactions which pertained to both positive and negative numbers were able to be recorded together, clearly showing the link between to changes in capital resulting from a single transaction.
3. Once certain transactions began to be recorded in two accounts, those which did not require a second account became included in a residual account.
4. This residual account evolved into what we now know as owner's equity.
5. Had negative numbers always been accepted then double entry likely would not have evolved as it has, as a single column for transactions essentially is capable of containing twice as much data when negative numbers are included.
6. Evidence for this hypothesis can be found in the near absolute absence of the double entry feature in business or science since the wide acceptance of negative numbers.
7. A number system capable of handling negative numbers does not need to function in two columns, and as such will not have a residual value which artificially must be accounted for.<sup>42</sup>

#### Mathematics of Double entry:

The math underpinning double entry bookkeeping is very simple, adding to the beauty of the concept. As mentioned above the crux of the concept can be explained as that of equality.<sup>43</sup>

However it is equality without the use of negative numbers. As described in the history of double entry, the method came to be prior to the acceptance of negative numbers by the mathematical establishment. David Ellerman (2014) instead refers to debits and credits in terms of fractions, in order to avoid negative numbers the debit is seen as the numerator, while the credit is viewed as the denominator. While in double entry, bookkeeping equality is reached by adding debit-to-debit and credit-to-credit, equality in fractions is based on cross-multiplying the numerators with the denominators, if this action can be simplified down to 1/1, the two fractions are equal. Much in the same way two T- accounts are equal if and only if:

$$([x//y]=[w//z]) \leftrightarrow x+z=y+w$$

Where  $x//y$  stands for a T account with x debit and y credit. Much like fractions, T-accounts too can be simplified will still maintaining their mathematical informational value.

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<sup>42</sup> Ijiri Y. Accounting research nr. 31, pg. 19-21

<sup>43</sup> Ellerman D. On double entry bookkeeping: the mathematical approach



Take the account and fraction [500//200] and 28/42. Just as the fraction can be divided by 14 to give 2/3, so can the T-account subtract 200 from both sides leaving [300//0]. While this action can be said to subtract from the informational value of the account given that the size of the single transactions is no longer given, the change to the value of the entity is still present.

Given the isomorphism inherent to double entry bookkeeping, it is evident that two or more transactions presented in T-accounts will be additive inverses. After adding T-accounts together and simplifying they will give zero:

$$[x//y]+[y//x]=[0//0]$$

It is in this manner the system avoids using negative numbers; the isomorphism of the transactions allows, in this case, two positives to give a zero sum.

It is at this point of the explanation important to clarify that the choice to use double entry is not a mathematical one, given that correct accounting double entry and single entry bookkeeping will give the same result. The belief that what sets double entry bookkeeping apart from single entry is that two or more accounts are affected by any given transaction is false. This will also be the case for single entry, as can be quickly illustrated through a minor thought experiment. If money from a company's cash account is used to purchase assets, both parts of this transaction would need to be recorded, if not, the single entry method would not simply be different, but also wrong. The main difference is instead that single entry results in a signed system, whereas double entry is unsigned, allowing for accounting in the absence of negative numbers.

Moreover, double entry bookkeeping allows for an easy method of checking the correctness of the accounts.<sup>44</sup>

A strong argument can be made for the main strength of double entry is the very human component of making mistakes easily visible, the digital disruption seen so often in the financial services world is reducing the need for this type of self-check. Computer based accounting programs, while often showing the user a picture of double entry bookkeeping, do not necessarily function in that way. Computers function with signed numbers, as such computers will often perform single entry accounting, only to then show the accounts as double entry using either a debit or credit isomorphism.

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<sup>44</sup> Ellerman D. On double entry bookkeeping the mathematical treatment

## Triple-entry bookkeeping

The concept of triple-entry bookkeeping, also known as momentum accounting, was first presented by Yuji Ijiri as the logical next step in accounting, the very same logic that caused double entry to evolve from single entry, would serve to inspire the creation and widespread use of triple entry accounting (adding further information). While double entry explains what has happened and why it happened, triple-entry also wants to explain at what rate things are happening. Income momentum and forces illustrate the tendency for both revenues and expenditures to recur in following periods. This can for example happen because customers continue purchasing products, interest accrues or taxes are paid. The idea of momentum based triple entry accounting comes from the physics of motion. Newton's first law of motion states that a moving object continues its linear movement with the same velocity in the absence of any force being put on it. In momentum accounting, momentum is thought of as the deceleration or acceleration of income or expenses. In contrast, we can view double entry as simply reporting the speed (income) and location (wealth) of an object, here our company.

It is here the difference with double entry bookkeeping is at its largest, double entry gives you the speed (income) and location (wealth) of an object (company). Mr. Ijiri's logic is to treat recurrence as the rule and non-recurrence as the exception. This would be in contrast with the status quo of accounting, in which there is no recurring income and all income is treated as novel. In momentum accounting however, the status quo is no change in the rate of income per time period. Thus, the user's attention is automatically drawn to period on period changes, in a way not yet achieved.

Momenta in the context of momentum accounting refer to recurring revenues or expenses. An example of this could be salary, or interest expenses. These expenses are going to repeat themselves in following years with a great deal of certainty. Similarly, while it is unlikely that sales amounts will be identical in subsequent years, it does not seem unreasonable to compare them to last year's sales, from either an internal or external perspective. Ijiri explains the difference between momentum accounting and wealth accounting as akin to the difference between last-year and zero-based budgeting. The concept of expecting expenses and revenues to resemble those of the prior years is not one that only Ijiri subscribes to, analysis on changes in values also forms the cornerstone in almost all areas of auditing. When auditors first look at results, the difference from last year is analyzed, and an explanation is sought for any large changes. Ijiri simply seeks to build this test of, for lack of a better word, realism, into the DNA of accounting, as opposed to having users add this information, either explicitly or implicitly.

Impulses are changes in momentum, in the same way that a change in the wealth must be explainable based on an income, so must a change in momentum be explained by an impulse. The term impulse comes from engineering, where it is used to explain a change in momentum. Impulses within accounting have the weakness that they can be very difficult to accurately determine . Even within classical wealth accounting it can prove difficult to ascertain the precise asset from which a given revenue originated. When working with impulses, this process becomes even more challenging. Not only does one have to locate the origin of a revenue, but now also the reason as to why that revenue, originating from a given location, is changing in a positive or negative direction. Ijiri counters this claim by explaining that impulse accounts need time to evolve and grow as practitioners and lawmakers become accustomed to the concepts of momenta and momentum as well as changes in these. The structure of modern accounts is the result of years of evolution, and highly contingent on the double entry method. Triple-entry bookkeeping accounts would first reflect the same quality, consistency and ease of use of modern accounting reports after being given time to mature through real world use, despite the argued advantages.

Below is shown one of Yuji Ijiri's own examples of a simple momentum income statement.<sup>45</sup>

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<sup>45</sup> Ijiri Y. Account research nr. 31, pg. 48

Table A

	19x0	19x1	Change 19x1		19x0	19x1	Change 19x1		19x0	19x1	Change 19x1	
				Momenta (Debit)	\$/mo	\$/mo	\$/mo		Impulses (Credit)	\$/mo	\$/mo	\$/mo
				Revenue	30	52	22					
				Depreciation	-10	-20	-10	Owner's				
				Operating				Contribution	3	3	0	
				Expense	-9	-15	-6	A Computers	7	5	-2	
				Interest Expense	-1	-2	-1	B Computers		7	7	
				Net Momenta	10	15	5	Cumulative				
								Impulses	10	15	5	
				Wealth (Debit)								
Cash	244	226	-18	Revenue	360	852	492					
Equipment	240	460	220	Depreciation	-120	-300	-180					
				Operating								
Loans Payable	-100	-200	-100	Expense	-108	-252	-144					
Capital Stocks	-300	-300	0	Interest expense	-12	-30	-18					
Dividends	36	84	48									
				Cumulative								
Earned Wealth	120	270	150	Income	120	270	150					

The example is based on a firm which leases out computers. All of the information available in a classic double entry report is available, albeit sometimes in a different manner than usual, and we have introduced the main extensions, namely momenta and impulses. Below we cite a description of the transactions which XYZ computer company has had over the two years shown above (please note that the dates are shown in American format):

*'On 1/01/19x0 XYZ Computer Company was established. Owners of the company contributed \$300 which carried interest at the rate of 1 % a month payable monthly.*

*On 1/02/19x0, the company borrowed \$100 from a bank for 3 years at the interest rate of 1% a month and sold all of the bonds for \$300 in cash. Then, the company bought, in cash, 3 computers, called "A computers," for \$360 total (to be depreciated under the straight-line method over 36 months with no salvage value). The company immediately leased the computers for a total rental of \$30/mo (dollars per month). Operating expenses other than depreciation were estimated to be \$ 9/mo. Under an agreement with owners, dividends at the rate of \$3/mo were to be paid to the owners. All revenues, expenses (other than depreciation), and dividends were to be received or paid in cash at the end of each month and no interest was to be earned on cash on hand. (Neglect income taxes; also neglect the one day already passed in January in all computations since the two different dates in this month were used merely for ease of identification.)*

*After 18 months of operation, on 7/01/19x1, the company borrowed from the bank an additional \$100 under the same term as the first loan. Then it bought, in cash, 2 new computers, called "B computers," for \$400 in total (to be depreciated over 40 months with no salvage value). The company leased these computers immediately for a total rental of \$28/mo. The rental of A computers was cut down from \$30/mo to \$24/mo. Operating expense other than depreciation were increased from \$9/mo (all charged to A computers) to \$15/mo (\$7/mo to A computers and \$8/mo charged to B computers). Imputed interest on owners' contributions (\$300 at 1%/mo or \$3/mo to B computers). Dividends were also increased from \$3/mo to \$5/mo.*

*On 12/31/19x1 the company signed a 3-year contract with labor unions which will result in a continual increase in operating expenses because a wage increase of \$0.5/mo will take place at the end of each month in which the contract is in effect. A computers share 40% of the increase in operating expenses and B computers share the remaining 60%.<sup>46</sup>*

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<sup>46</sup> Ijiri Y. Accounting research nr. 31, pg. 49

The above example was reproduced ad verbum from Mr. Ijiri's own explanation of momentum accounting, as it provides a great example of a company's changes in momentum providing a greater information value than the years naked results. Due to the nature of a leasing company, a large portion of its revenue is recurring, and as with most companies, this is also true for their expenses.

The first income statement illustrated shows the relationship between wealth, income, momentum and impulses. In order to best explain the relationships of these different factors an explanation of the firm's performance is shown above.

Moving chronologically through the firm's performance over the two years in question, the measurements can be explained in the simplest manner. Table A shows the tersest illustration of the firm's performance in a partial triple entry balance sheet, while table C below shows a month to month perspective (for the sake of brevity only months with transactions in them are shown).

At the beginning of year one, the owners set up \$300 of bonds to help start the firm. These bonds carry an interest rate of 1 %. As such \$300 are recorded under the wealth account, however, as the \$300 under the wealth account are not income, they are debited and credited under the wealth account, and as such, their value reached zero. At the same time, the interest payment with a value of \$3/mo. is recorded both under the impulse and momentum account. In the momentum accounting section the value is added under its relevant subsection: interest revenue. However, under the impulses section the relevant subsection is not a matter of what type of revenue is in question, but instead where the revenue is from, in this case: owner's contributions.

Already based only on this transaction, one can start to get an understanding of the manner in which momentum based accounting seeks to report on a firm's performance. The focus is mainly on how a firm in real-terms has been affected by instances that have occurred during the period.

To illustrate how each of the described transactions have affected the company through the two years in question, an overview of each transaction has been recorded in table B below.<sup>47</sup>

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<sup>47</sup> Ijiri Y. Accounting research nr. 31, pg. 53

Events	Wealth accounting		Momentum accounting			
	Accounts	Wealth (\$)	Income (\$)	Accounts	Momenta (\$/mo)	Impulses (\$/mo)
i. (01/01/x0) Owners' contributions	Bonds Receivable Capital Stock	300 -300		Interest revenue Owners' Contribution	3	3
ii. (02/01/x0) Borrowing	Cash Loans Payable	100 -100		Interest Expense A computers	-1	-1
iii. (02/01/x0) Sale of bonds	Cash Bonds Receivable	300 -300		Interest revenue A computers	-3	-3
iv. (02/01/x0) Purchase and leasing of A computers	Equipment Cash	360 -360		Depreciation Rental revenue A computers	-10 30	20
v. (02/01/x0) Hiring of employees				Operating expenses A computers	-9	-9
vi. (30/06/x1) Operations during the 18 months period from 01/01/x0 to 30/06/x1	Cash Equipment Dividends Rental revenue Depreciation Operating expense Interest expense	306 -180 54	540 -180 -162 -18			
vii. (01/07/x1) Additional borrowing	Cash Loans payable	100 -100		Interest expense B computers	-1	-1
viii. (01/07/x1) Purchase and leasing of B computers	Equipment Cash	400 -400		Depreciation Rental revenue B computers	-10 28	18
ix. (01/07/x1) Reduction in A computer rental				Rental revenue A computers	-6	-6
x. (01/07/x1) Operating and interest expense adjustment				Operating expense A computers B computers	-6	4 -10
xi. (31/12/x1) Operations during the 6 month period from 01/07/x1 to 31/12/x1	Cash Equipment Dividends Rental revenue Depreciation Operating expenses Interest expense	180 -120 30 312	-120 -90 -12			

Moving chronologically through the chart, and the transactions, the next one to be considered is the borrowing of \$100 for a three-year period at an interest rate of 1%. This transaction carries with it momenta of  $-\$1/\text{mo}$ . As the borrowed assets were used to buy A computers, this impulse is accounted for under the account relating to A computers, at a value of  $-\$1/\text{mo}$ . as this is the actual size of the outflow of liquidity per month. The cash and debt accrued through the loan are both recorded in the wealth section as no income has resulted.

The company hereafter chooses to sell the bonds it acquired primo year x0. The bonds are sold in order to finance the purchase of A computers, as such the negative impulse of no longer receiving the associated interest payments is recorded on the account of A computers, whereas the momenta of losing the income is recorded under interest revenue.

The purchase discussed above is carried through, with this purchase a depreciation expense of  $-\$10/\text{mo}$ . begins, which is charged directly to the A-computer's momentum account. As the computers are leased out, they generate a rental revenue of  $\$30/\text{mo}$ . accounted for under the momenta of rental revenue. The operating expenses from the leasing contract stemming from new hires is  $-\$9/\text{mo}$ . Which is added as an operating expense under A computers.

Whereas momenta are split out by type of revenue or expense, impulses are instead based on the object/transaction/contract etc. which leads to these aforementioned revenues and expenses. As such the different revenues and expenses attached to an impulse are added together before being accounted for. Hereby the speed of revenue and loss generation is given both in terms of objects generating these in and outflows as well what types of revenues or losses have occurred.

The cumulative results of the first 18 months are shown in order to illustrate the central mathematical principle of triple entry:

$$\text{Income} = \text{momentum} \times \text{duration}$$

Provided that there is constant momentum, although most often it will be a matter of integrating momentum over time, if you integrate momentum over time there is no need to multiply by duration.

In the example text it is mentioned that the company has a deal with the owners whereby  $\$3/\text{mo}$ . (increasing to five) are to be paid in dividends, meaning in the first 18 months  $\$54$  are paid in dividends. In the context of triple entry, dividends occupy a strange position. They are not driven by revenue or expense momenta, they are instead agreed upon in a somewhat independent manner from the financial results of the firm. Given that dividend payments have no effect on the income of a company they are not recorded in terms of momentum. They are still recorded in the firm's wealth accounts,



however only as an inter-account transaction, much like collections of accounts payable.

Following the first 18 months in the company's lifetime further transactions begin to occur. Two B computers are purchased for \$400 and leased out for \$28/mo, in order to finance this purchase; further debt of \$100 is taken on, with associated interest payments of \$-1/mo. The depreciation expenses associated with the purchase are \$-10/mo. There has therefore been create a rental income momentum of \$28/mo. as with the transactions in the previous months, all of these momenta are recorded under the impulse of B computers, but separately under momenta accounts.

With the addition of B computers the overhead operating expenses have increased from \$9/mo. to \$15/mo., moreover, prior to the addition of the B computers, this entire sum was charged to the A computers impulse. With the addition of B computers, this allocation of costs is to be changed so that \$7/mo. are charged to A computers and \$8/mo. are charged to B computers. This reallocation can of course be made based on any number of principles giving vastly different results. Further, the interest on the owner's contribution must be divided out over the now two impulses; it has on this basis be chosen to allocate \$1/mo. to A computers and \$2/mo. to B computers. This means that A computers impulse must be adjusted by \$4/mo. and B computers by \$-10/mo.

On the following page is shown the relationship among wealth, momenta and impulses.<sup>48</sup>

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<sup>48</sup> Ijiri Y. Accounting research nr. 31, pg. 50

Relationships among wealth, income, momenta and impulses						
	19x0			19x1		
	1/01	1/02	12/31	6/30	7/01	12/31
Wealth accounting						
Wealth (debit)						
Bonds	\$ 300					
Cash		\$ 40	\$ 244	\$ 346	\$ 46	\$ 226
Equipment		\$ 360	\$ 240	\$ 180	\$ 580	\$ 460
Loans Payable		\$ -100	\$ -100	\$ -100	\$ -200	\$ -200
Capital Stock	\$ -300	\$ -300	\$ -300	\$ -300	\$ -300	\$ -300
Cumulative dividends			\$ 36	\$ 54	\$ 54	\$ 84
Earned wealth	\$ -	\$ -	\$ 120	\$ 180	\$ 180	\$ 270
Income (credit)						
Rental revenue			\$ 360	\$ 540	\$ 540	\$ 852
Depreciation			\$ -120	\$ -180	\$ -180	\$ -300
Operating expense			\$ -108	\$ -162	\$ -162	\$ -252
Interest expense			\$ -12	\$ -18	\$ -18	\$ -30
Cumulative income	\$ -	\$ -	\$ 120	\$ 180	\$ 180	\$ 270
Momentum accounting	(\$/mo)					
Momenta (debit)						
Interest revenue	\$ 3					
Rental revenue		\$ 30	\$ 30	\$ 30	\$ 52	\$ 52
Depreciation		\$ -10	\$ -10	\$ -10	\$ -20	\$ -20
Operating expense		\$ -9	\$ -9	\$ -9	\$ -15	\$ -15
Interest expense		\$ -1	\$ -1	\$ -1	\$ -2	\$ -2
Net momenta	\$ 3	\$ 10	\$ 10	\$ 10	\$ 15	\$ 15
Impulses (credit)	(\$/mo)					
Owners' contribution	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3
A computers		\$ 7	\$ 7	\$ 7	\$ 5	\$ 5
B computers					\$ 7	\$ 7
Cumulative impulses	\$ 3	\$ 10	\$ 10	\$ 10	\$ 15	\$ 15

Now that it has been shown how transactions are recorded, the mathematical basis of the system relies on the fact that changes in wealth can be explained through the net impulses or momenta in the given period. Below is shown the balance and change sheets for the year 19x1 and their associated relationship.<sup>49</sup>

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<sup>49</sup> Ijiri Y. Accounting research nr. 31, pg. 53

Wealth accounting		Momentum accounting	
Balance sheet		Balance sheet (\$/mo)	
(\$)			
	01/01/x1		01/01/x1
Cash	244	Rental revenue	30
Equipment	240	Depreciation	-10
Loans payable	-100	Operating expense	-9
Capital stock	-300	Interest expense	-1
Dividends	36		
Earned wealth	<u>120</u>	Net momenta	<u>10</u>
Change sheet		Change sheet	
	x1		x1
Rental revenue	492	B computers introduced	
Depreciation	-180	Rental net of depreciation	18
Operating expense	-144	Operating expense increase	-6
Interest expense	-18	Interest expense increase	-1
		Expenses transferred-in	-4
		Impact on A computers	
		Rental reduction	-6
		Expenses transferred-out	4
Net income	<u>150</u>	Net impulses	<u>5</u>
Balance sheet		Balance sheet	
	31/12/x1		31/12/x1
Cash	226	Rental revenue	52
Equipment	460	Depreciation	-20
Loans payable	-200	Operating expense	-15
Capital stock	-300	Interest expense	-2
Dividends	84		
Earned wealth	<u>270</u>	Net momenta	<u>15</u>

**Actions:**

Once momentum and impulses have been determined, the third dimension of triple entry accounting can be revealed. This is the third account corresponds to wealth and income, that of actions. Actions in short show the amount managerial and external decisions are responsible for in the company's performance to date. The company's results are broken down in terms of total monetary value per impulse. The impulses earlier calculated are multiplied by the number of months the existed impulse for. The results from this multiplication should then equal the earned wealth and cumulative income.<sup>50</sup>

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<sup>50</sup> Ijiri Y. Accounting research nr. 31, pg. 60

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	19x0	19x1	Change 19x1		19x0	19x1	Change 19x1		19x0	19x1	Change 19x1
				Momenta (Debit)					Impulses (Credit)		
					\$/mo	\$/mo	\$/mo		\$/mo	\$/mo	\$/mo
				Revenue	30	52	22				
				Depreciation	-10	-20	-10	Owner's Contribution	3	3	0
				Operating Expense	-9	-15	-6	A Computers	7	5	-2
				Interest Expense	-1	-2	-1	B Computers		7	7
				Net Momenta	10	15	5	Cumulative Impulses	10	15	5
				Wealth (Debit) [\$]				Income (Credit) [\$]			
											Actions (Tdebit) [\$]
Cash	244	226	-18	Revenue	360	852	492	Owner's Contribution	36	72	36
Equipment	240	460	220	Depreciation	-120	-300	-180	A Computers	84	156	72
Loans Payable	-100	-200	-100	Operating Expense	-108	-252	-144	B Computers	0	42	42
Capital Stocks	-300	-300	0	Interest expense	-12	-30	-18				
Dividends	36	84	48								
Earned Wealth	120	270	150	Cumulative Income	120	270	150	Cumulative actions	120	270	150

Ijiri chooses to term the third accounting column “trebit”, although the actual input is actions. In its simplest incarnation, this third column gives a better understanding of where revenue and expenses are generated, and provides a further failsafe in verifying accounts, as there are now three distinct accounts which have to equal each other.

### Force accounts

Force is another term borrowed from the world of physics, mechanics more precisely. To calculate the force of an accounting post, one takes the time derivative of a continuous accounting measure, or put differently, an accounting measure expressed in dollars per month in other words, the dollars per month, per month ( $\$/\text{mo}^2$ ).

In the case of company xyz, ultimo 19x1 they sign a contract with labor unions which entails that operating expenses will increase by \$ 0,5 per month over a three year period. When this contract is put in terms of force accounting, this means that the company has a force of  $\$-0,5/\text{mo}^2$  applied to it, split between computer A and B. Ijiri suggests illustrating this force in the following manner.<sup>51</sup>

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<sup>51</sup> Ijiri Y. Accounting research nr. 31, pg. 67

				2011-5535							
	19x0	19x1	Change 19x1		19x0	19x1	Change 19x1		19x0	19x1	Change 19x1
									Forces (Debit) [\$/mo <sup>2</sup> ]		
								Owner's Contribution			
								A Computers		-0,2	-0,2
								B Computers		-0,3	-0,3
								Net Forces		-0,5	-0,5
				Momenta (Debit)					Impulses (Credit)		
					\$/mo	\$/mo	\$/mo		\$/mo	\$/mo	\$/mo
				Revenue	30	52	22				
				Depreciation	-10	-20	-10	Owner's Contribution	3	3	0
				Operating Expense	-9	-15	-6	A Computers	7	5	-2
				Interest Expense	-1	-2	-1	B Computers		7	7
				Net Momenta	10	15	5	Cumulative Impulses	10	15	5
	Wealth (Debit) [\$]				Income (Credit) [\$]				Actions (Tdebit) [\$]		
Cash	244	226	-18	Revenue	360	852	492	Owner's Contribution	36	72	36
Equipment	240	460	220	Depreciation	-120	-300	-180	A Computers	84	156	72
Loans Payable	-100	-200	-100	Operating Expense	-108	-252	-144	B Computers	0	42	42
Capital Stocks	-300	-300	0	Interest expense	-12	-30	-18				
Dividends	36	84	48								
Earned Wealth	120	270	150	Cumulative Income	120	270	150	Cumulative actions	120	270	150



These are the core sections of triple entry accounting, and what is proposed as giving it value. The sheet can be divided into three sections: past, present and future. The bottom row refers to the past results, much like contemporary accounting. The middle row focuses on the results during the year in question, under the assumption that they will continue into the future. Finally the top row explains future events which can be agreed upon.

## Analysis

Looking at traditional accounting, it is evident that it shows a snapshot of the financial well-being of a firm at a given time, as well as providing a historical context for this condition. In its current state accounting is focused on measures which do not attempt to look forward, and while this assures an empirical basis, it also fails to explore any benefits that may be gained from looking forward. Furthermore, modern accounting is focused on discrete intervals of time, ratios such as ROTA and ROE give information at a point, not a rate of change, or return by period.<sup>52</sup>

Adding the rate of change aspect of triple entry attempts to remedy the static focus of contemporary reporting. While this addition serves many purposes, one important addition is to allow for more forward looking management, the classical point-and-period reporting is not well suited for the forward-looking management style which has become standard in modern firms.<sup>53</sup>

When triple entry not only shows the growth of wealth, but the rate of this change in growth, growth no longer needs to be viewed as a lump sum, either added or subtracted at the end of a given period, instead growth can begin being looked at as a process, happening over time.

An important fact to understand before analyzing the strengths of triple entry, is that it is impossible to read from any financial statement the rate of change of wealth in that company for any period smaller than the period between reported statements. As such we can calculate the rate of change per year for almost all companies, and for large companies, even the quarterly one.

In order to attempt to get a handle on the strengths and weaknesses of Ijiri's triple entry bookkeeping, we will evaluate it using Staubus' criteria for making accounting decisions.

### Attribute relevance:

Hatherly<sup>54</sup> claims that accounting techniques need to explain how value is created. Ijiri's proposed additions to classic accounting, in broad strokes, add the element of time to standard bookkeeping.

If you imagine a chain of retail stores selling cosmetics, their revenue figures will fluctuate with the seasons, for example, sales will most likely peak in the winter holiday

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<sup>52</sup> Melse E. Accounting for trends: triple entry

<sup>53</sup> *ibid*

<sup>54</sup> Hatherly D. The failure and the future of accounting

season. From an investor's point of view, it is of course important to know when a company expects to generate a larger than average amount of income, and just as important to know when the company expects to generate a smaller than average income. Currently this information is often given in the management report for larger firms, whereas smaller firms will not always provide this information as it is not necessary for any information to be given, periods of worse than expected performance may therefore be omitted, at least as much as they can whilst still upholding the rules on reporting. The company is only required to include information which it sees as relevant, meaning that the included information varies greatly from company to company, reducing its usefulness.<sup>55</sup> Adding momentum to the mathematical aspect of financial reporting requirements could mean that information on the time and rate of income will have to be included. As an investor this increase in objective information will allow for a better understanding of a company. Based on the quote provided in the explanation of attribute analysis, information is relevant if it can help decision makers identify a promising alternative or recognize and evaluate possible outcomes for a course of action. Having an accurate understanding of the pace that a company operates at, both in terms of sales, but also in terms of production, allows an investor to better compare different companies to find the best investment.

From the perspective of a company's management team, having increased knowledge on the revenue generated in different periods can also lead to a better platform for making decisions. Having momentum in the daily accounting procedures could provide management with a greater amount of information on which to base their decisions on a day to day basis. Often, at present, when information on the speed at which revenue is created or costs generated is needed, external consultants will be hired at great expense to produce an analysis on the flow of business. Theoretically, the cost of establishing a more expensive accounting system could create savings down the line in potential consulting costs. The increased level of information will, all else being equal, allow better decisions to be made.

We can boil down triple entry's contributions as adding three new attributes to classical accounts: momentum, impulses and forces.

As momentum and impulses are two sides of the same coin they are here discussed together. The rate at which revenues and expenses have been created per month over the previous period allows for an understanding of the rates of growth a company has gone through over the year. It allows the reader to easily spot at what times during the year a company has seen large and small sales, as well as when the firm's expenses

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<sup>55</sup> Dahl A. S. Håndbogen for ledelsesberetning

are at their highest. The firm's product cycle is elevated to the view of users; times of investment become more visible as well. Knowledge of these factors is to be expected to be able to qualify the opinions of users of the reports with focus on their strategies for investment. To give an example of how this knowledge could affect the opinions of a user, one could imagine a company which, on the surface, has strong results seen on a year-to-year basis. However, upon learning of the company's momenta and impulses it is discovered that the revenue generated by the firm is disproportionately created in a department which is considered to be approaching obsolescence and will as such experience a strong decline in the not too distant future. At the same time, it also becomes painfully clear that the areas of the firm designated to secure its future are unable to generate revenue at anywhere near the rate expected.

The information described above is not impossible to obtain through current accounting principles; and often, larger firms will freely divulge the information. One of the greatest strengths of triple entry is that some of this information, which previously may only have been available to professional investors with the possibilities to arrange meetings with management or able to travel to investor days and the like, is not freely available in a concise manner. This information is presented in a way that makes it unavoidable for the well-informed reader of an annual report, thereby, at least in theory, spreading information to a larger group of possible investors and other coalition members of the company.

Forces are essentially provisional payments that are presented through their monthly effect on momentum. Even when contracts are signed it can prove an issue, the example of company xyz has been given; in this instance, perhaps the perfect basis for a force calculation is given, that of a labor contract increasing in steady increments. Even with a legally binding contract such as this, there is no guarantee that the contract will be followed through in whole, and more than this, it is not only possible, no probable, that a contract, like the one mentioned, would have a degree of legal wriggle room, based on such parameters as interest rates, or growth in the firm. The problem therefore becomes correctly measuring force accounts. This is not only a problem that affects force accounts, but this will be discussed in detail later.

For the sake of argument it will momentarily be assumed that force accounts can be correctly calculated. In this case, it is an attribute of great importance to the users of the reports and can have a huge effect on where users choose to invest their limited assets, in the same way that information on provisions does at present.

## Reliability

In terms of reliability the main question is whether or not it is possible to implement triple-entry in a manner which will result in the same results being reached every time. Seeing as triple entry creates another level of accounting data, there is an innate increase in the difficulty of creating accounts. At face value this could put a strain on the reliability of accounts. On the assumption that this increased complexity would result in an increase in the capital expended on accounting, this will mean the quality of accounting, across its entire spectrum, will increase, in accordance with the relevant figure.

Staubus defines reliability in terms of verifiability, bias and accuracy.

## Verifiability

The verifiability of Ijiri's theory can only be viewed as a question of the mathematical correctness of the proposed theory. Given the same data several different accountants should reach the same results. The method must therefore be viewed as verifiable.

## Bias

Much as with verifiability, the easiest way to assure unbiased reporting is to ensure that the math that underlies the accounts is correct, providing, at face value, objective results. The one area that could theoretically affect the bias of the system would be an increase in the amount of estimates that must be made. This is also a relevant consideration for verifiability. Strictly following the implementation of momentum and impulses there is no increase in accounting estimates, the issue is the estimates associated with the force accounts.

The resulting increase in estimates will have a negative effect on the bias of the system. Whether or not there is talk of increasing the bias in relation to contemporary accounting is not as clear cut. Reporting on provisions is not a phenomenon that comes exclusively with triple entry accounting. IAS 37 contains the current rules on accounting on provisions. It is assumed that these rules will be expected to be carried over, it must therefore be concluded that the bias in the system will not increase, nor decrease in relation to contemporary techniques. So strictly because we have provisions today then the two methods have equivalent bias? But provisions hardly form a core of the double entry system, and triple entry is based upon an expectation of future results aligned with present results, so I fail to see how one could possibly justify that they have the same degree of bias. Also, a practical implementation is relevant to consider here, so just viewing the "theoretical" case does not seem sufficient.

### Accuracy

A cornerstone of this requirement is that calculations made based on the accounting information provided are unbiased and verifiable, following the description given above. As triple entry can be viewed as an evolution, adding to the DNA of classical accounting, many of the same estimates can be made. The issue is the analysis based on the new measurements. The main question hereby becomes whether or not these new measures can be viewed as accurate. Here Staubus' idea of performing a variance test on these new measures must come into use. The measures must be put through quantitative testing and the results must be critically analyzed in order attain their accuracy and usefulness. Accuracy could be tested through test trials involving a group of accountants using the same data.

### Comparability

Comparability of momenta in financial reporting is of the utmost importance, without it, the perceived advantages are all for naught. If the methods used differ from company to company, the reported results do not give an accurate representation on the performance of the company in question. If an entity decides to change to triple-entry there will likely be some short-term difficulties concerning inter-period comparability. However, seeing as the original double-entry system is still present in triple-entry these problems should end up being minimal. Adding momenta, impulses and force accounts too previous year's results can prove difficult; however as long as precise monthly accounts are kept, it should be possible, if more expensive.

When it comes to intercompany comparability, if a single company changes to triple entry, this will not in and of itself improve the ability of users to compare the performance of firms. If however, an entire economic sector changes accounting policy, then the increased amount of information which is provided by triple entry will logically increase the amount of information which can be compared, and as such the information which can be gleaned from comparing companies. This sets first movers at a disadvantage, adding to the difficulty of convincing producers to implement such changes.

Intraline comparability is not hurt by adding further information to financial reporting, instead it creates a possibility to improve on the amount of aggregated measures that can be calculated, as a larger amount of information is prevalent.

The comparability, it must be concluded, is not drastically changed under triple entry. Any change in accounting principle will provide short-term problems regarding

comparability; however, these will rapidly diminish, especially if adoption increases throughout the corporate world.

### Effects via other parties

It is in this category triple-entry has, in theory, its strongest arguments for implementation. By viewing a firm's revenue and operating streams as continuous, triple-entry accounting allows for greater detail. When these aspects of a firm value generation are described in greater detail, the company accounts will better reflect its performance over the given time period. The effect that this can have on a third party must be assumed to be that of giving the user a greater degree of information, and as a result, in the hands of a competent investor, creating better opportunities for creating value.

As accounts more accurately reflect the permutations that a company has gone through during a recording period, changes made with the express purpose of altering accounted results, termed non cash-flow changes, become easier to spot. An example of this sort of accounting maneuver is the "Big Bath"; in this maneuver, a company artificially creates worse results in one period. While on first pass this may seem counter intuitive, it serves a very specific purpose, especially in publicly listed companies. A "Big Bath" will often be taken when a company is facing already poor results, these poor results will thereby be further increased and the company will report even worse results.. In a publicly listed company, it is viewed preferable to take the cumulative effect of poor results in one period as opposed to spreading it out over several periods; the stock can thereby take one severe dip. Investors memories are short, improved results in the following periods (which are boosted by the lack of expenses already accounted for during the big bath) will mean that the stock more than rebounds to its original price. It can also be used as a tool for new management teams to post disproportionately poor results while said results can still be ascribed to the previous management, in order to benefit from stronger future growth (which may be personally lucrative in the form of incentive programmes tied to these measures).

Taking the "Big Bath" as an example, an unusual increase in operating expenses and cost of goods sold in a certain month or period would signal to the market that, unless outside forces can be identified, that this was an intentional drop in income for a given period. The intelligent investor may well already be able to deduce such changes, however any outlining of these movements to the wider market would help reduce overreactions from the market to such news. Any increase in the information provided by firms, which brings internal and external knowledge closer together, which in turn improves the mechanisms of the market, will play a role in further aligning management

incentive programs to the will of the owners. Payout should also become more representative of the value that has truly been created.

The focus on cash flows in the new system is an example of the attempts to move away from the concept of theoretical value added, demonstrated by the owners' equity account. As has previously been pointed out equity is not a value that can be empirically observed, instead it is a filler value, and a firm will not be able to withdraw its equity in cash. Moving away from this value and the connotations it brings with it can be argued as having both a negative and a positive effect. Starting out with the positive, the change moves reporting in an empirically provable direction. The values that a firm reports on will be useable for the firm in order to finance its operations as well as pay dividends and the like. From the point of view of an individual not accustomed to the ins and outs of reporting standards, this may well mean that the reports become more understandable. Being able to point at specific cash transactions as the backing for a firm's transactions may help explain a firm's reports.

Further, the focus on movement of values, and how these movements have resulted in the change in wealth accounts, once again provides a practical backing for the firm's reports. As Ijiri is quoted as saying when discussing predictive power, the possibility of predicting future events based on accounting data relies only on the accounting data used being empirically provable. You can here sense the longing to move away from some of the more abstract aspects of accounting and bring it instead firmly into the area of real values.

Viewed on the basis of the stakeholder and the coalition model, changing accounting policies allows for this wide basis of users to better understand the cash flowing in and out of a company, without having to perform liquidity calculations or other analysis to understand the actual payment strength of the company in question. While some may argue that triple entry is itself more difficult to read and understand than double entry. At the same time, it can be argued that in many respects triple entry accounting is more intuitive than contemporary accounting. Where contemporary accounting has needed to invent an account, just to fill a hole, which then becomes viewed as, to a degree the value of the firm. On the other hand triple entry bases itself on the very intuitive idea that the money that flows in and out of a company in a given period, must, by its very definition, be the change in the firm's wealth for the period. Where in contemporary accounting the value of the firm is based on the difference between a firm's assets and liabilities. The value of a firm is therefore often dictated through the value put on assets and liabilities, something the average stakeholder can find difficult to understand.



One can also view the users of the accounts exclusively as the shareholders, and adhere to the philosophy of accounts being exclusively prepared for informed readers. For this user group the reports play a substantially different role. This user group's main need, for the reports is to use in order to find where best to invest their limited resources. Therefore, they are not only viewed as being entirely capable of understanding report, but also of providing their own analysis there upon. The company's ability to create value is the main concern for this user group. The value creation which is sort after by this group cannot easily be defined in terms of cash in and cash out.

To illustrate the ability of firms to create value based on expected future growth opposed to actual cash flows one needs to look no further than Walmart's 2016 purchase of Jet.com, a shopping website. Jet.com was never able to create a profit, still, it was purchased by the world's biggest employer for \$ 3.3 billion.<sup>56</sup> The valuation cannot be reached based purely on empirical data. Whether or not one agrees with the valuation is of course up to discussion, yet this type of transaction is not entirely unusual.

While contemporary accounting is far from the best at discovering, or drawing attention to the synergies or especially internally constructed goodwill that can lead to valuations many times above the sum of the firm's assets.

This juxtaposition in the intended user base of a company's reports leads to an interesting discussion as to whom should garner most use from the firm's reporting. It is in the belief of this author that reports cannot both serve the quote unquote public good, whilst also serving the professional investor. Trying to accomplish both only serves to create a form of reporting which essentially plays to none of its strengths and requires massive analysis to serve either user's needs.

A useful analogy for this problem in the sports commentator, any whom have truly amassed a deep understanding of a sport will find that commentators fall into two camps: the play by play and the analysts. For the purpose of this example, the play-by-play commentator appeals to the coalition's user and the analyst to the professional investor. The play-by-play commentator tells what is going on; whom has the ball, distance to the pin, required run-rate. The analyst on the other hand will instead focus on what needs to be done or has led to the current events; the oppositions sweepers position, the grain of the greens, the movement of square leg. For the analysts, what is

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<sup>56</sup> <http://www.economist.com/news/business/21704840-walmarts-acquisition-jetcom-heats-up-its-battle-amazon-boxed-unicorn>, 12-11-2016

going on is obvious, it does not need to be touched upon. An example of this in business terms can be found in the previously mentioned cosmetics company, while triple entry accounting will draw attention to the increase in revenues come Christmas season, this does not need to be mentioned to the competent professional investor. This investor will know that this is the case, and analysis will take this, to them obvious, information into account. However, the coalition member without a background in company analysis may not be aware of this fact, and most likely not aware of the degree.

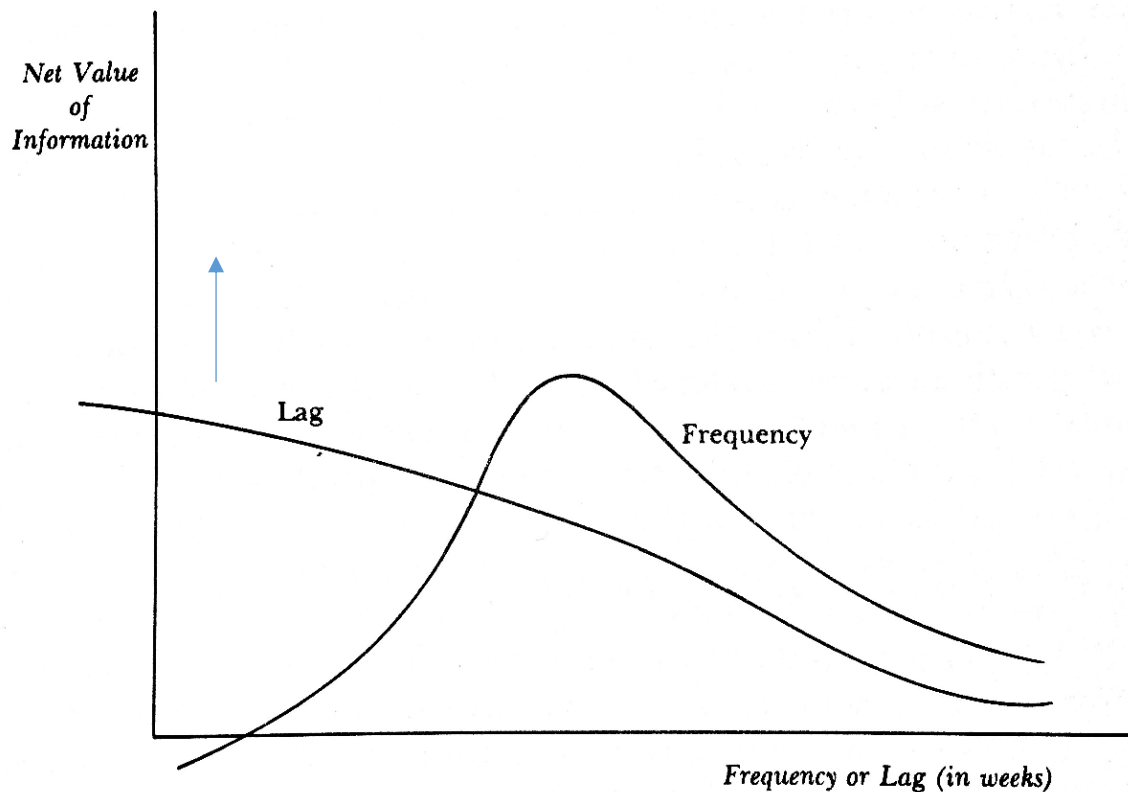
As such information can be given in two separate ways, and to two different user groups (in broad strokes), the simple and the complicated. Depending on which way information is chosen to be conveyed, this can have a great effect on the information's effect on users. It is hard to say if a move to triple entry would be a move in the objectively correct direction. What can be said is that it is a move in a more intuitive direction, a direction which better explains the classic aspects of a company's business cycle. Thus broadening the reports user base, and making the reports easier to understand for the new groups of users.

#### Intelligibility

Adding to the information given in in the financial report does not necessarily have to reduce the intelligibility of said information. Through competent explanation as well as through thorough presentation, it should be simple to create a very readable and understandable report. The new concepts of force, momentum and impacts, may a first seem unintuitive to the reader, however after having gained an understanding of them they should add to the intelligibility of the reports.

#### Timeliness

Whenever you increase the amount of work that has to be completed on a project, the time taken to complete that project must therefore increase as well (time taken in FTE terms, not necessarily time taken absolutely). Based on the premise that an increased informational value of the report will increase the lag of financial reporting, one has to weigh the benefits of that increase in information against the increased lag faced by the users of the financial reports. Graph x; Net value of information vs. Frequency and lag, shows that an increase in lag will produce a decrease in the net value of information; however, given that the information that is produced is viewed as having a greater degree of informational value, this will result in a shift upwards of the lag line.



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As a result, providing that the added lag can be kept to a minimum, the net value of information may well increase following the application of the new accounting method.

<sup>57</sup> Staubus G. J. Making accounting decisions, pg. 63

## Optimal Quantity

There is no correct answer regarding the optimal quantity of information, it is instead a very subjective measure, with many factors having an effect on what can be viewed as optimal. One such factor, which is likely to be very relevant, is the size of the company in question. As a company grows in size and that company's stakeholders become more dispersed and varied, it would be fair to expect more information to be included in the companies reporting. This is in line with international accounting rules, whereby increases in size and ownership result in increased requirements for what is to be included in a firm's financial reports.

## Costs of producing accounting data

This question is strongly linked with the question of optimal quantity. As should come as no surprise, an increase in produced information comes with a greater price tag. Not only will almost any change end with a short-term increase in costs as the changes are implemented, the increased difficulty of recording momenta in the firm's bookkeeping will most likely also mean that expenses for producing financial reports will permanently increase.

These increases in costs could be rather drastic, as firms accounting departments will need to hire or develop new skills. For all the positives of triple entry, it must be said that it is objectively more complicated than double entry. As has been discussed above, this increase in costs points to triple entry being more realistic for larger companies to adopt, companies that perhaps already have accounting departments capable of implementing these changes.

## Costs of utilizing accounting data

The cost to the user of utilizing accounting data is viewed as being, to a degree, inversely related to the volume of the data given by the company in their accounts. This is of course assuming that the data provided are also the data that are wanted by the user. As more complex data are provided, more complex analysis is also possible, which in turn, may well increase the cost of utilizing data. Only time will reveal the cost to the user of changing accounting methods, although it is concluded that no increase to cost will come without also increasing the value of the information available to the users.

## Predictive power

While Staubus eventually comes to the conclusion that it is unnecessary to consider the predictive power of accounting systems when discussing them, his discussion on the

subject, together with Ijiri's claim of what defines the predictive power of accounting principles, means that the subject is here regarded as meriting discussion.

Triple entry is based on Ijiri's conclusion that a model's predictive power resonates from its ability to be an accurate representation of empirical phenomena, to what degree this assumption holds true is subject to debate. As has been discussed under the section regarding reliability of data, there are several innate sources of unreliability in accounting detracting from its empirical accuracy. On this basis, the way to increase the predictive power of companies financial reporting is to reduce the number of accounting estimates that are required.

The move from classical to triple entry does not inherently change the total of accounting estimates required, as these, for the most part, are contained within accounting legislation, such as depreciation rates or activation policy. Therefore, based on this definition, triple entry is not considered to be more subject to considerations regarding predictive power than classical double entry.

## Discussion

This thesis set out with the goal of providing an argument for the implementation of triple entry bookkeeping. Throughout the analysis many of the strengths and weaknesses of the system have been laid out. It is now up to this chapter to attempt to compare and contrast these advantages and disadvantages in order to articulate a holistic argument for or against the implementation of triple entry bookkeeping as an alternative to contemporary accounting.

The analysis above was based on Staubus' principles for making accounting decisions, this was done as a result of the conservative nature of many in the accounting field. The biggest barrier to implementation is as such concluded as being the transient difficulties of implementation. The conclusion was among other things made on the basis of the history of double entry. The one unequivocal problem with double entry is that the method does not recognise the existence of negative numbers. This is despite the fact that negative numbers have been an accepted mathematical concept for at least three hundred years. On the basis of what has been studied while writing this text, the reason for not doing this can only be concluded as being as a result of conservatism. This conservatism is not surprising; one can quickly imagine the logistical problems of having to change accounting methods. These problems come principally from the large group of parties that use or play a role in the creation and use of a company's accounts.

If you imagine a factory that runs a certain product cycle, and upon the discovery of new information, it is decided that the company will benefit from changing production methods. The company is in this example free to change methods at its leisure and any change will for the most part only effect the company making the change. If; however, the same company decides to change accounting policies, as they feel this will better reflect the company's business cycle, this change will be stifled not only by tradition, as may very well also be the cause for the factory, but also by legislation as well as outside pressure from users of their reports, whose use proves increasingly difficult.

Company reports are like a type of language, and as has been seen repeatedly through history, changing a country's language can be almost impossible and is usually only realistic if massive top down pressure is applied in the form of governmental pressure.

Yet just because something is difficult to implement does not mean that it never should be considered. Aspects of the difficulty of implementing changes to accounting principles are included in Staubus' points of discussion when making decisions on accounting policy. As such his questions were used in order to frame a discussion on if

triple entry has enough strengths to overcome the difficulties of implementing the system.

Having outlined the reason for employing Staubus' principles on making accounting decisions, the discussion will move onto what degree the analysis based on Staubus provides backing for triple entry.

As triple entry is considered to encompass double entry bookkeeping, it holds the capacity for objectively more information than any application of double entry to the same instance. The question therefore becomes, is this increase in information useful - and if so, does it outweigh the costs.. In accounting for trends,<sup>58</sup> the conclusion is reached that information on the rate and stability of a company's earnings can suitably be disclosed in the ratios used in triple-entry. This conclusion is viewed as plausible. If accounts can be created whereby the firm's incomes are presented per month this reduces the static nature of a company's reporting. There is no question in the opinion of this report that this is information that is of relevance to the users of the reports. Thereafter the question becomes, do the costs of implementing these ratios outweigh the benefits, and is the accurate implementation of force accounts feasible.

Force accounts contain an innate unreliability in that they regards payments or income in the future. Here; however, one must remember Ijiri's principle of repeating revenues and expenses. As such forces are not to be understood as what is going to be the future in and out-flows of a company, but instead already known events which will change the income of a firm in the next period. Seen from this perspective force accounts may be viewed more favourably. Rather than being an effort to tell the future, they instead provide known changes to the firm's earnings. This all goes back to the movement analogy, whereby we gain a greater understanding of an object when we consider not only its location and speed, but its acceleration.. Force accounts are an attempt to catalogue the best possible understanding of any imminent changes to the speed a company generates income/expenses.

The focus of reporting on this information is to provide better predictions as to future growth. As previously mentioned Ijiri views predictions as possible purely on the basis of empirically provable prior events, it is therefore this assumption that must be the crux of any criticism.. Triple entry requires far more study if it ever is to be implemented, and it could be imagined that a large share of the study would need to be focused on force accounts. As these accounts are under the terms of the principles, they would have to

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<sup>58</sup> Melse, E; Accounting for trends: relevance, explanatory and predictive power of the framework of triple-entry bookkeeping & momentum accounting of Yuji Ijiri

be empirically provable, necessitating that current rules on liabilities would have to be altered to only include present obligations as a result of past events, in other words the amount must be empirically provable.

Now that the discussion has gravitated towards the topic of what needs to be done in order to implement triple entry, it is a good time to move to the second major question raised; do the benefits outweigh the costs of implementation.

The benefits have been discussed at length but can essentially be boiled down to an increase in information, mainly focused on the speed of business and how it has evolved. Can this increase be said to be worth the extra cost? The cost of implementing an entirely new accounting system would be substantial: through updated accounting systems, new knowledge, increased auditing costs to name but a few. These are only the internal costs, those accrued by second and third parties could dwarf the internal ones. The entire business of financial reporting would have to be updated. Could this business need an update?

Much is made of the needs of accounting in the accounting literature, not surprisingly, it's not intelligent to argue against your own livelihood. However, is this focus justified, and if it is, shouldn't everything possible be done to increase the information that reaches users?

The societal role of accounting has been discussed, and the conclusion has been that it serves an important purpose. It is as such in the view of this author that more should be done to proliferate the information to the general public. Robert Merton, professor at the Harvard Business School, describes the perceived wants of the users of financial reports not merely as wanting an update on the health of a company, but also a glimpse into the future of the company. Something which contemporary accounting is notoriously poor at. He describes using company reports to predict the future as: "asking a plow horse to gallop on a race track."<sup>59</sup> The increasing amount of information that is expected to be produced by companies has led to accounting standard becoming a strange patchwork of minor changes, which has also led to the high level of complexity which now defines the profession.

From the side of the media, there has for over a decade (since the accounting scandals of the early 2000s) been called for comprehensive reform of accounting standards, rather than quick fixes to problems that occur. If such a total overhaul could ever be

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<sup>59</sup> <http://www.economist.com/node/1730918>, 07-12-2106



agreed upon, an unlikely event, it would be a natural time to consider further study into the underlying concepts of accounting.

Assuming that any major change to accounting would be focused on more complete reporting to the user, triple entry momentum based accounting exhibits many strengths for this purpose.

When reporting through triple entry, there is, as discussed earlier in detail, a heavy focus on cash in and cash out. This is a great measure of what you could call the “worst case scenario” health of a firm. When one views some of the high profile cases of corporate collapses one common theme in them (see Enron, Nordisk Fjer, Worldcom etc.) is the misevaluation of assets, often valued at many times higher than their liquidation value. This led to the value of the firms in question being grossly overstated. If the focus of accounting moves from valuation of the assets which generate value to the value generated the ability to over value assets becomes more difficult.

To take the stance that companies reports serve the purpose of educating and protecting the members of the coalition surrounding the company producing them is perhaps the greatest reason to consider the implementation of triple-entry momentum based accounting. Henning Kirkegaard views one of the central strengths of double entry accounting is the symmetry it shows between two parties. A transaction will be mirrored for both the seller and buyer in the transaction.<sup>60</sup> Thus these accounts function as an arbiter if any doubt as to the payment of the transaction were to arise. Mr Kirkegaard hereby calls for evolution in double entry, he in the same vein as Ijiri points to the inherent ambiguity of terms such as owner's equity and that by shackling both practitioners and theorists to these terms evolution in reporting does not seem possible. He finishes his paper by musing on the topic as this author has.

Is it in fact of greater importance to focus on the real term values of cash flow or as Kirkegaard puts it: solvency vs. insolvency. While highly educated professional investors may be able to make do with viewing the firm's abstract wealth, the bonus pater familias, aware of his moral duty to the public would chose to report based on real world values, those of solvency vs. insolvency, and in the long term explaining if firms have enough money coming in, to cover the costs of money going out.

In a manner of conclusion, triple entry, the study, explanation and possible implementation of it, would herald a change in the focus of accounting, away from its

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<sup>60</sup> Kirkegaard H. The logic of double entry bookkeeping.

historical roots and narrow user base, towards a more conservative reporting style, simpler build up and wider potential user base.

Given how accounting is connected so deeply in business across every specter of the economy, such a change in policy would not only affect accountant and auditors, but a far wider base of professionals. The costs therefore become practically impossible to estimate with any semblance of accuracy.

## Conclusion

In this report triple entry accounting has been explained, both how it functions and how it could be implemented. The main focus has been on whether it is possible to implement triple entry, based on Staubus's "Making accounting decisions". Further, an overview of the societal role of accounting has been provided. This has been done with the purpose of attempting to provide an argument, from a theoretical standpoint, for further study to be conducted into the area.

The conclusion reached in this paper can be neatly summed up as: yes, this is indeed a method which deserves further study. Giving a more detailed description begins with quickly mentioning the societal role of the accountant. In this report it has been decided to view accountant's role towards society as a whole. This conclusion is both based on the accountant's role as a provider of information the world outside the company, but also that an increase in the amount of information provided will mainly benefit the external users of the reports, as the information which is added via triple entry is already available in large part, in the internal accounts. While small improvements to the internal accounts can be produced through triple entry, the payoff does not seem to validate the cost of implementation. However seen from the external users perspective, the strengths become more apparent. The focus of the report has therefore been on the external users of the accounts.

Upon going through the mathematical background of triple entry it became clear that the two biggest changes/ additions of the method were an increased focus on cash flows and speed. As mentioned above, these two focus areas were viewed as mainly benefiting the outside, and especially non-professional users of financial reports.

Through analysis based on Staubus, the strengths of the theory are laid out against the costs. The costs and strengths are difficult to accurately ascertain, as the system has not seen high profile implementation. The discussion therefore remains entirely theoretical. Due to this limitation, the conclusion of this report must be that this method shows promise, specifically regarding expanding the possible users of financial reports.

The argument for study and implementation of triple entry accounting is that it may provide increased readability of reports and increase the possible user base of said reports. The costs however, could be disproportionate to the gains. It is therefore only possible to recommend further study into the subject.

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