

**BRIDGING THE GAP BETWEEN  
ACCOUNTING RETURNS AND ECONOMIC RETURNS  
WITH NEW SOFTWARE**

**Bartley J. Madden and Donn DeMuro**

**Florida Atlantic University and  
independent researcher**

**Abstract**

Accounting returns, computed from balance sheets and income statements, differ in complex ways from the ‘cash-out and cash-in’ reality of economic returns achieved on the firm’s investments. The complexity increases with either substantial investments in intangibles assets or an environment with significant inflation. We explain how new open-source software—the Translator—enables users to gain hands-on experiences in order to bridge the gap between accounting returns and economic returns. Users will, in general, learn about accounting adjustments that can improve the accuracy of their accounting returns, with a particular focus on experimenting with the capitalization and amortization of intangible outlays. Should not CFOs be held responsible for both an ongoing learning experience about intangibles and related improvements in the calculation of their firms’ accounting returns. Improved resource allocation decisions would follow such improvements. The evolution of the New Economy (intangibles) accounting system may well begin at the firm level.

**INTRODUCTION**

A fundamental principle in economics and finance is that a proposed investment should be greenlighted if its expected economic return exceeds its opportunity cost of capital. The economic view says that the greenlighted investment is expected to be a justified use of resources and therefore socially beneficial, while the finance view says that such an investment creates value.

The economic return has a precise description. For an investment with known cash outlays and cash receipts over the investment life, it is the internal rate of return (IRR). However, the accounting return is a snapshot in time, derived from accounting statements that average ongoing investments initiated over many previous years, each with differing economic returns over time.

The challenge of mathematically describing differences between accounting returns and economic returns has a long history.<sup>1</sup> Past academic work provides mathematical insights typically using highly simplified models of the firm. In more recent years, the increasing importance of intangible assets further obfuscates measurement of economic returns. As a consequence, the spotlight has shifted to

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<sup>1</sup> Kenneth V. Peasnell. 1996. “Using Accounting Data to Measure the Economic Performance of Firms.” *Journal of Accounting and Public Policy*. 15(4): 291-303.

empirical analyses demonstrating the need for accounting reports to incorporate intangible assets.<sup>2</sup> This paper bridges the gap by introducing a practical software tool—the Translator—that enables users of accounting information to get hands-on experience with interrelated data that ultimately drives differences between accounting and economic returns, <https://MD-Translator.com>. The software can be downloaded for those wanting to build more advanced versions of the Translator.

The primary objective of this paper is to explain how the Translator software simulates a firm whose known economic returns generate accounting statements that then enables accounting returns to be calculated. The Translator facilitates experiential learning via adjustments to accounting data, such as the capitalization and amortization of outlays for intangible assets, that in turn will bridge the gap between economic returns and accounting returns. This improves the measurement of life-cycle performance variables—economic returns approximated by accounting returns (versus the cost of capital) and reinvestment rates over time.<sup>3</sup>

The paper has four sections. Section 1 briefly discusses the research on accounting returns vs. economic returns. Also highlighted is a research program at Callard, Madden & Associates which produced, in the early 1970s, a highly useful accounting return—CFROI® (cash-flow-return-on-investment).<sup>4</sup> This metric uses gross assets, capitalizes intangibles, and adjusts for inflation to enable more accurate historical comparisons and cross-country comparisons. The CFROI helps construct long-term life-cycle track records of firm performance and demonstrates the benefits from more accurate accounting return calculations. Section 2 explains how the Translator incorporates inflationary environments for running simulations, plus a wide range of variables including those that specify the characteristics of new investments, such as an uneven pattern of cash receipts over the investment life. The importance of gaining necessary improvements in accounting information is put in the context of a life cycle of economic returns and reinvestments rates. Section 3 identifies the initial benefits that managements and boards of directors can obtain from the explicit handling of intangibles and the related improvement in the accuracy of their accounting return metrics. We argue that this should be the first step in the evolution of the New Economy (intangibles) accounting system. This section discusses how life-cycle track records, keyed to improved accounting returns versus the cost of capital, can be effectively utilized for performance measurement, compensation, and the net zero transition. Finally, Section 4 summarizes the main conclusions and discusses how the ideas in this paper promote long-term value creation.

## 1. Accounting Returns vs. Economic Returns

From the mid-1960s to the mid-1980s, a substantial number of journal articles mathematically demonstrated that accounting returns differ significantly from economic returns. Academic interest in this line of research was encouraged by Geoffrey Harcourt’s 1965 article, “The Accountant in a Golden Age.” Harcourt introduced investments having different patterns of cash receipts over time and noted that (p. 80):

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<sup>2</sup> Baruch Lev. 2019. “Ending the Accounting-for-Intangibles Status Quo.” *European Accounting Review* 28(4) 713-736. Anup Srivastava and Shivaram Rajgopal. 2022. “The Case for Reinventing Financial Reporting in the 21<sup>st</sup> Century.” *Journal of Applied Corporate Finance* 34(4) 8-15.

<sup>3</sup> Bartley J. Madden. 2020. *Value Creation Principles: The Pragmatic Theory of the Firm Begins with Purpose and Ends with Sustainable Capitalism*. Hoboken, NJ: John Wiley & Sons.

<sup>4</sup> CFROI® is a registered trademark of Credit Suisse HOLT.

It had been hoped that some rough 'rules of thumb' might be developed; and that these would allow accounting rates of profit to be adjusted for the lengths of life of machines, the patterns of quasi-rents, rates of growth, and the method of depreciation used. However, it is obvious from the calculations that the relationships are too complicated to allow this.<sup>5</sup>

The above conclusion was echoed in a highly cited 1983 article by Franklin Fischer and John McGowan (p.90):

There is no way in which one can look at accounting rates of return and infer anything about relative economic profitability. ... The economic rate of return is difficult—perhaps impossible—to compute for entire firms. Doing so requires information about both the past and the future which outside observers do not have, if it exists at all.<sup>6</sup>

Those (especially portfolio managers) with experience in making adjustments to improve accounting returns, in displaying a firm's track records of financial performance, and in deriving investor expectations implied in stock prices are more motivated to work with the accounting data than Fisher and McGowan.

The pessimism of the above researchers is evident throughout Richard Brief's book (1986), a compilation of the most influential articles on accounting returns vs. economic returns.<sup>7</sup> Thomas Stauffer's highly mathematical article documented, for a wide variety of conditions, the magnitude and sign of deviations from 'true' economic returns for both RONA (return-on-net-assets) and a ratio of cash receipts/gross assets that became known as the Cash Recovery Rate (CRR).<sup>8</sup> Note the intuitive appeal of this later ratio which represents the rate of getting cash back compared to the cash given up. The simplicity of the CRR would seem to offer practical use at the business unit level; however, care is needed since the CRR is not an internal rate of return.<sup>9</sup>

Yuji Ijiri offered an approach to infer economic returns by avoiding, as a starting point, the accounting return with its reliance on earnings. Instead, he began with the CRR:

A corporation invests in a variety of projects, each having a different cash recovery pattern (including a different economic life). However, if it is reasonable to assume that a mix of such projects as well as the cash flow patterns of these projects are reasonably stable over time, then corporate investments may be regarded as repeated investments in a given composite project with a given cash flow pattern over its life.

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<sup>5</sup> G. C. Harcourt. 1965. "The Accountant in a Golden Age." *Oxford Economic Papers* 17(1): 66-80.

<sup>6</sup> Franklin M. Fisher and John J. McGowan. 1983. "On the Misuse of Accounting Rates of Return to Infer Monopoly Profits." *American Economic Review* 73(1): 82-97.

<sup>7</sup> Richard P. Brief. ed. 1986. *Estimating the Economic Rate of Return from Accounting Data*. New York: Garland Publishing.

<sup>8</sup> Thomas R. Stauffer. 1971. "The Measurement of Corporate Rates of Return: A Generalized Formulation." *Bell Journal of Economics and Management Science*. 2(2): 434-469.

<sup>9</sup> Gregory V. Milano. 2010. "Postmodern Corporate Finance." *Journal of Applied Corporate Finance* 22(2): 48-59.

... Earnings are, however, directly affected by depreciation and other noncash charges and credits, which are subject to many discretionary judgments of the corporation. ... The recovery-rate approach is, on the other hand, strictly based on cash flows which are more objective and less subject to arbitrary discretions of the corporation than earnings.<sup>10</sup>

Gerald Salamon built mathematical models to derive the IRR implications from variation in the CRR life and the time patterns of cash receipts over a specified life. Andrew Stark compiled Salamon's work and other similarly impactful articles in his 1990 book.<sup>11</sup>

William Baber and Sok-Hyon Kang extended the CRR approach with their 1996 study of the U.S. pharmaceutical industry.<sup>12</sup> They conducted a sensitivity analysis of accounting returns, CRRs, and estimated IRRs; based on a variety of assumptions of time patterns of cash receipts, investment life, and growth rates for invested capital. Building on their work, a 2023 article in the *Accounting Review* by Shivaram Rajgopal, Anup Srivastava, and Rong Zhao sharpened the estimating process for IRRs including adjustments for intangibles and noted the following:

Nevertheless, critics remain uncomfortable with IRR because it is based on several assumptions about the length and time distribution of benefits generated by investments and the growth rate of investments ... Yet critics ignore that ARR [accounting rates of return] rely on an even greater number of assumptions, including the capitalization or expensing of investment outlays (physical versus intangibles, acquired versus self-developed), revenue recognition, conservative accounting such as impairments and restructuring charges, and depreciation policy. The only difference is that a researcher makes the assumptions in calculating IRRs, while ARRs are based on accounting numbers derived from numerous conventions and managers' assumptions.<sup>13</sup>

Making assumptions, such as the investment life or the R&D capitalization life, is required for the calculation of CFROI. By way of background, the CRR was used at Callard Madden & Associates in the development of CFROI in the early 1970s.<sup>14</sup> However, applications of CFROI for a firm's track record and for use in a valuation model were not published until the late 1990s.<sup>15</sup> The Callard Madden & Associates

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<sup>10</sup> Yuji Ijiri. 1979. "Convergence of Cash Recovery Rate." In Yuji Ijiri and Andrew B. Whinston. eds. 1979. *Quantitative Planning and Control*. Cambridge, MA: Academic Press, p. 260-262, p.20.

<sup>11</sup> Andrew W. Stark. ed. 1990. *The Cash Recovery Approach to the Estimation of Economic Performance*. New York: Garland Publishing.

<sup>12</sup> William R. Baber and Sok-Hyon Kang. 1996. "Estimates of Economic Rates of Return for the U.S. Pharmaceutical Industry, 1976-1987." *Journal of Accounting and Public Policy*. 15(4): 327-346.

<sup>13</sup> Shivaram Rajgopal, Anup Srivastava, and Rong Zhao. 2023. "Do Digital Technology Firms Earn Excess Profits? Alternative Perspectives." *Accounting Review* 98(4): 1-15, p.4.

<sup>14</sup> Think of a bond selling at par with \$100 principal and \$10 interest thereby providing 10% yield-to-maturity or economic return (cash-out and cash-in) because the \$100 principal is repaid at maturity—the end of the investment life. The CRR equals the economic return only when all assets are nondepreciating. Importantly, the smaller the proportion of assets that are nondepreciating the lower the CRR is relative to the economic return.

<sup>15</sup> For an early description of CFROI-driven, life-cycle valuation model and market-implied, company-specific risk differentials see Bartley J. Madden. 1998. "CFROI Valuation Model." *Journal of Investing*.

research was expanded by HOLT Value Associates into a global database well suited for portfolio managers and security analysts. Credit Suisse acquired HOLT in 2002 and today many large money management organizations use the HOLT global database.

As an accounting return, CFROI was designed to be an IRR and therefore directly comparable to the cost of capital. In addition, CFROI is inflation-adjusted (i.e., real). Hence a real CFROI time series as part of a firm's track record of historical performance could be directly compared to a real cost of capital time series. Moreover, this stake in the ground for monetary units of equivalent purchasing power facilitated the development of a global database wherein CFROIs, as noted earlier, were comparable across countries with different inflation environments.

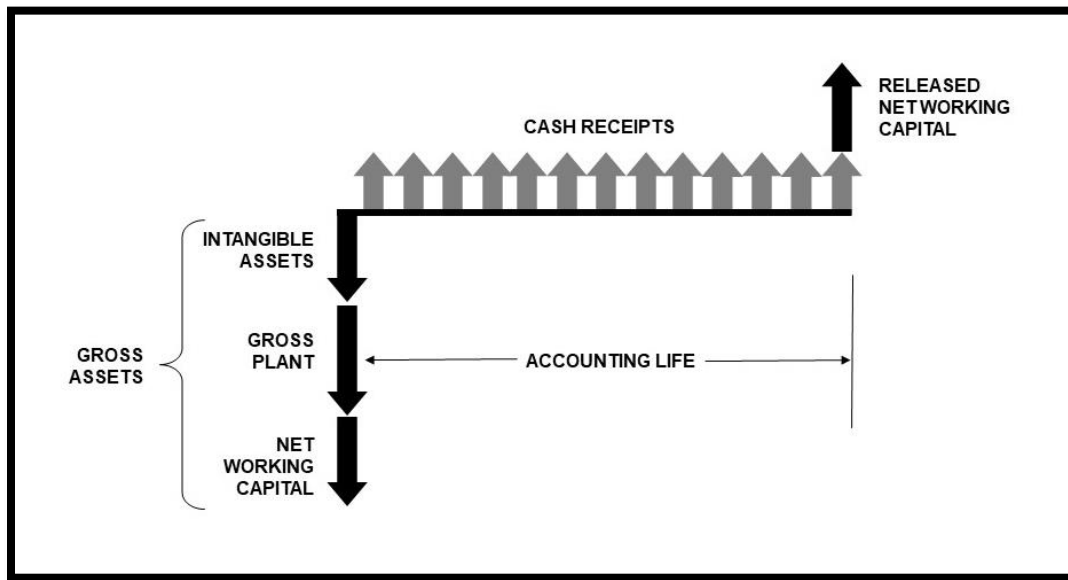
The ironclad rule for calculating ratios in a constant-dollar (real) world is to keep the numerator and denominator in the same units. Cash receipts for a given year are in current dollars but the net plant is a composite of (historical) dollars tied to the years when capital expenditures (CapEx) were made. These CapEx need to be marked up to current dollars to match the year when cash receipts were received. RONA and Earnings/Book violate this ironclad rule by mixing current dollars with historical dollars, which has a big impact on both net assets and common equity (book value).

Figure 1 displays the components of a CFROI which uses a particular year's balance sheet and income statements. The cash receipts and gross assets computations for CFROI parallel in principle the computations used by Rajgopal, Srivastava, and Zhao in their calculations for cash receipts/gross assets. However, additional calculations are used for inflation adjustments including marking up the historical dollar gross plant to current dollars using the GDP Deflator. For many years, CFROI used a straight-line depreciation of gross plant as the accounting life. With the increasing importance of intangibles, the accounting life must be adjusted for an estimated life of intangibles. Net working capital is used to approximate the nondepreciating asset release. The annual cash receipts equal the current year's cash receipts. The internal rate of return for this investment profile is CFROI.

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7(1): 31-44. For a comprehensive description of CFROI calculations, the life-cycle valuation model, and the effects of personal tax rates on market-implied discount rates, see Bartley J. Madden. 1999. *CFROI Valuation: A Total System Approach to Valuing the Firm*. Oxford: Butterworth Heinemann.

Figure 1 CFROI converts cash receipts/gross assets into an internal rate of return



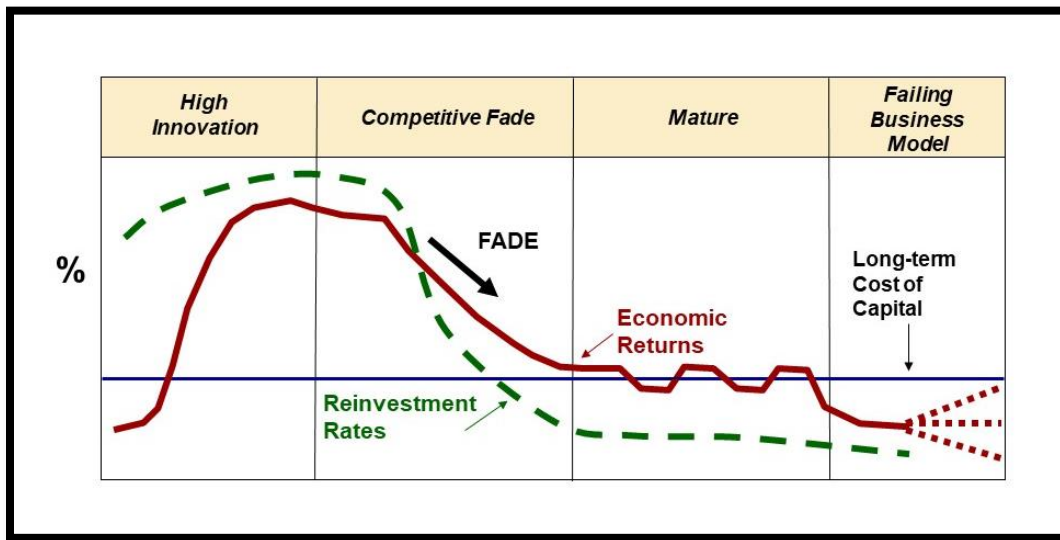
The literature on accounting returns treats the economic return stripped of any relevant context. In contrast, CFROI positions economic returns as critical to value creation and the most important variable in the life-cycle framework (see Figure 2).

Figure 2 illustrates a firm's life-cycle stages; and specifically, how the dynamics of competition impact a firm's profitability and growth. At the *high-innovation* stage, economic returns well in excess of the cost of capital coupled with high reinvestment rates typically describe a business that can scale. At the *competitive fade* stage, economic returns fade toward the cost of capital and reinvestment rates fade toward a much slower growth rate. At the *mature* stage the firm earns the cost of capital and exhibits slow (organic) growth rates. The defining feature of a *failing-business-model* stage is below-average profitability and a business-as-usual culture that results in slow adaptation to a changing environment.

Long-term fade rates of economic returns and reinvestment rates to lower levels critically depend upon a firm's knowledge-building proficiency relative to competitors.<sup>16</sup> Portfolio managers experienced with the life-cycle framework and the related valuation model evaluate potential buy candidates in terms of their likelihood to "beat the fade," i.e., the expected fade implied in current stock prices.

<sup>16</sup> Bartley J. Madden. 2018. "Management's Key Responsibility." *Journal of Applied Corporate Finance* 30(3): 27-35.

Figure 2 Life-Cycle Framework



Source: Bartley J. Madden. 2020. *Value Creation Principles: The Pragmatic Theory of the Firm Begins with Purpose and Ends with Sustainable Capitalism*. Hoboken, NJ: John Wiley & Sons, p. 86.

Knowledgeable investors who use the life-cycle framework as part of their decision-making process understand the accounting adjustments that enable CFROIs to approximate economic reality.<sup>17</sup> Economic returns rooted in ‘cash out and cash in’ directly connect with discounted cash flow, life-cycle valuation models.

The objective of life-cycle investors is to employ an accounting return that: (1) minimizes accounting biases, (2) directly compares to the cost of capital, and (3) provides levels and trends that help gauge economic returns on new investments. For investors, their long-term, life-cycle forecasts generate a net cash receipt stream that drives valuation, which is critical for making buy/hold/sell decisions.

Taking this further, let’s focus on investors who either currently use the life-cycle framework, or (a much larger group) investors who would benefit from using this framework and related data on firms’ life-cycle track records. Simply put, both groups benefit from a learning process that makes them better at forecasting the long-term performance of firms. This learning process would yield similar benefits to top managements and boards of directors.

A learning process ideally should include an analysis of long-term, life-cycle track records covering a diversity of firms in order to gain a deeper understanding of skill, business model viability, and competitive advantage. Such learning enables more informed judgments about the level of skill required to achieve a particular life-cycle forecast and the likelihood of that forecast being achieved. As users gain familiarity with the Translator and the life-cycle way of thinking, they can begin to produce life-cycle

<sup>17</sup> For a comprehensive description of accounting adjustments to better connect with economic reality including up-to-date CFROI calculations, see David A. Holland and Bryant Matthews. 2018. *Beyond Earnings: Applying the HOLT CFROI and Economic Profit Framework*. Hoboken, NJ: John Wiley & Sons.

track records for publicly traded firms of interest—competitors or acquisition candidates for managements and boards and potential buys or sells for investors.

We find it odd that there is so much talk in business and business schools about long-term value creation but so little attention is given to the study of firms' long-term track records of value creation/dissipation. As a first step, we need hands-on experience with accounting return metrics and related track records, which is addressed in the next section.

## **2. The Design and Operation of the Translator**

The Translator is open access software and written in Python. The software simulates a firm as an ongoing portfolio of investments with specified characteristics (see Figure 3). After building up a full portfolio of investments, in each subsequent period the oldest investment ends, the associated depreciating assets are retired, and the specified nondepreciating assets are released. Then a new investment is initiated, and so it goes. The amount invested each period and the economic return on that investment follows an inputted life-cycle (time series) of economic returns and reinvestment rates. Note that inputted economic returns for specific periods determine the subsequent cash receipts over the investment's assigned life.

The pattern of an investment's cash receipts over time (see Figure 3) is also specified by the user. The amount invested is divided into three parts: intangible outlays with an accounting life, capital expenditures with a (depreciating) plant life, and additions to net working capital. Given the inputted Debt/Net Assets and Dividends/Earnings for each period, the sources and uses of cash are balanced by computing either the required share repurchase or sale of equity.<sup>18</sup> The environment is controlled by the user either assigning inflation rates and interest rates for each period or utilizing a portion of a provided U.S. data series covering the period 1885 to 2022 for the GDP Deflator and long-term interest rates.

Figure 3 offers a generalized description of a new investment that can accommodate cash-out and cash-in patterns that are relevant for the user. As to customization, especially useful are varying cash receipt patterns and variation in the assigned life and the amount of released nondepreciating assets. This customization is essential in order to configure say a retailer's assets and investments much differently than an oil/gas exploration firm.

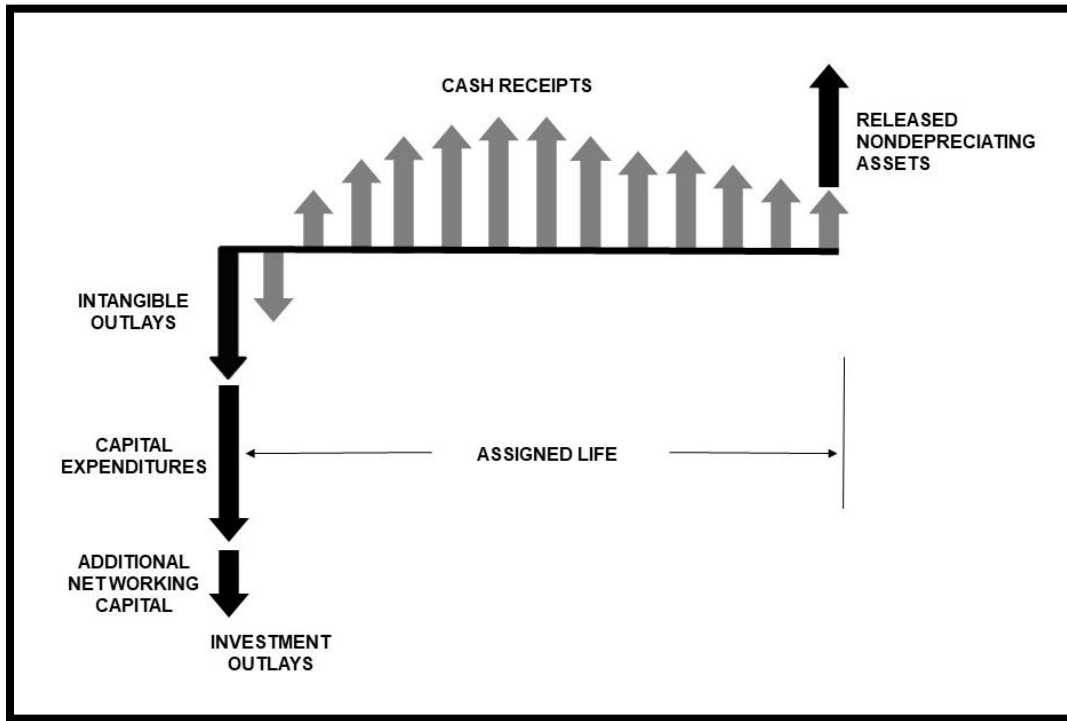
With intangibles in the driver's seat to enable a firm to sustain higher-than-cost-of-capital returns, it is reasonable to assign a secondary role to long-lived tangible assets in determining an investment life as shown in Figure 3. One approach is to use shorter investment lives attuned to the lives for intangible assets and include the (nondepreciated) net asset value for tangible assets in released nondepreciating assets at the end of the (shorter) assigned investment life.

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<sup>18</sup> The current computer code for the Translator can easily be changed to accommodate different rules for debt policy and dividend payout policy.



Figure 3 Generalized Description of a New Investment



We made two critical design decisions for the Translator’s software code. First, the foundation is built for an *economic world* keyed to economic returns being cash-out/cash-in and adjusted for inflation. Hence, real economic returns specify the subsequent cash receipts in constant-dollar purchasing units that follow from the specified amount invested and internal-rate-of-return (economic return). Second, given the inputted inflationary and interest rate environment, the configuration of assets (including intangibles), and the time series of economic returns and reinvestment rates (life cycle), we then calculate as-reported balance sheets and income statements, i.e., transition to an *accounting world*.

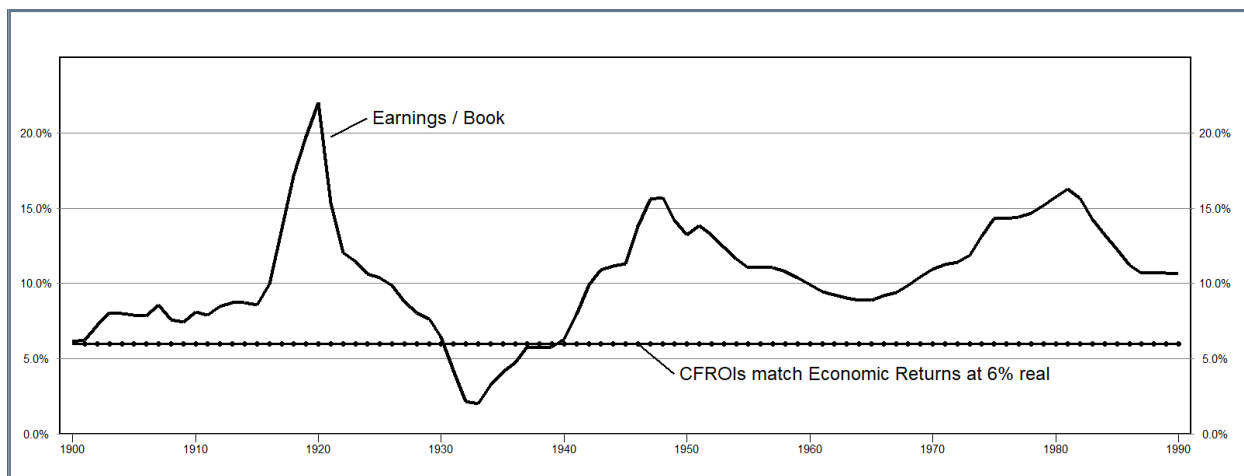
For each period, the Translator output includes balance sheet, income statement, sources and uses of cash, net cash receipt calculations, and accounting returns including RONA, Earnings/Book, CFROI, and CRR. Inflation adjustments translate the mixture of historical dollars in the plant account for a particular year to match cash receipts in current dollars in order to calculate CFROIs.

The website <https://www.MD-Translator.com> provides detailed instructions for those wanting to run the Translator. As previously noted, the code can be downloaded enabling users to make further fine-grained adjustments for their own version of the Translator. The documentation includes formulas for calculated variables and extensive data checking printouts.<sup>19</sup>

<sup>19</sup> Net cash receipts that determine NPV are calculated from the firm’s perspective which is identical to a calculation from the capital owners’ perspective. Beginning with the Translator’s software code, it is a straightforward programming task to develop a life-cycle valuation model highlighted in Madden (2020), Chapter 4.

The Translator facilitates learning by answering useful questions. For example, as to the importance of inflation adjustments, a user can hold constant the real economic returns at say 6% and real reinvestments rates at 3%, and ask what would CFROIs and Earnings/Book be each period for a simulated firm with typical industrial firm characteristics during the period 1900 to 1990?<sup>20</sup> This simulation did not include intangible assets since the primary focus is on the impact of inflation (deflation) on tangible assets during a time period when tangible assets were the critical resource (after 1990 this situation changed). Figure 4 provides the answer.

**Figure 4 Impact of Inflation/Deflation on Earnings/Book for a Typical Industrial Firm, 1900 – 1990**



Source: [www.MD-Translator.com](http://www.MD-Translator.com)

Figure 4 shows the roller coaster time series of Earnings/Book caused by periods of significant inflation and deflation impacting the historical dollar net plant that, in turn, impacts Earnings/Book. Inflation-adjusted CFROIs matched the 6 % real economic returns due to the inputted steady state of both economic returns and reinvestment rates. It is noteworthy that so many academic articles employ Earnings/Book without concern for the inaccuracies during periods of significant nonzero inflation.

The Translator enables users to run simulations in order to experiment with real-world investment descriptions (Figure 3) and to understand the effects of selecting outlays in Selling General & Administrative (SG&A) expenditures that may warrant capitalization and amortization as intangible assets. For specified conditions, including the lives of selected intangibles, users can generate a time series for accounting returns with and without capitalization and the amortization of intangibles. Simulations can investigate modifications to the user’s current accounting return calculation. Although widely used, RONA—frequently labeled ROIC for return-on-invested-capital when additional

<sup>20</sup> Gross assets comprised of 10% net working capital to represent released nondepreciating assets and 90% gross plant with a 14-year life. Also used to represent the typical industrial firm was the cash receipts pattern illustrated in Figure 3, 40% debt/net assets, and 40% dividends/net income.

adjustments are made—has the well-known disadvantage that declining net assets as the plant gets older (more depreciated) automatically boosts RONA since its denominator shrinks. Even worse, firms and business units with fully depreciated but still in use plant secure a further substantial boost to RONA. Care is warranted when legacy industrial businesses that likely operate very old plant are referred to as highly profitable.

Another question: How closely does RONA (return-on-net-assets) track a specified long-term life cycle of firm performance? RONA equals net income plus interest divided by net assets. Let's utilize the Translator to answer this question (see Figure 5). The inputted conditions used zero inflation in order to isolate on the RONA impact due to intangibles. The simulated firm used the inputs from Figure 4 with the exception that intangibles with a 5-year life now account for 60% of gross assets with gross plant 30% and net working capital 10%. In addition, 10% real economic returns and 5% real reinvestment rates hold steady for ten years then fade at a 4% exponential rate to a real 6% ending economic return and a real 2% ending reinvestment rate. The resulting simulation quantified the impact on RONA for the *specified conditions*.

**Figure 5 RONAs with and without adjustments for specified intangibles, zero inflation, and a specified life cycle**

WORK-IN-PROGRESS

Source: [www.MD-Translator.com](http://www.MD-Translator.com)

Intangibles impact RONA in a complex manner, which is revealed by running simulations. The complexity is due to the adjustments affecting both the numerator and denominator and dependent upon key variables: the assigned life for intangibles, reinvestment (organic) growth rates, and the proportion of intangibles to gross assets. RONA gets a boost from net income in the numerator increasing because the full outlay for intangibles is replaced with a smaller amount for amortization of intangibles. However, RONA is reduced due to the denominator increasing due to the inclusion of net intangibles in the firm's total net assets. Changing the key variables would alter the plotted lines for RONA with adjustments for intangibles. Today, with corporate expenditures for intangible assets considerably higher than tangible assets, every corporation has a need for ongoing learning about intangibles and experimentation with the capitalization and amortization of intangibles.

The practical importance of Figure 5 is evident when considering the impact on RONA for a firm's business units having varying proportions of intangibles in their asset base, much different organic growth rates, etc. Resource allocation decisions should be based on accounting returns *adjusted for intangibles* thereby reducing the differences between accounting returns and ("truth") economic returns.

### 3. Step one: securing initial benefits from the explicit handling of intangibles

Intangibles include R&D, brand creation and enhancement, employee training, big data analytics and AI-software to improve process efficiency, customer acquisition costs, lean supply chain development, ecosystem participation and development, ways of nurturing and sustaining a culture rooted in knowledge-building proficiency, and more. Intangibles are the pathway to competitive advantage whereas, due to their lack of exclusivity, substantial outlays for tangible assets rarely are the reason for a firm achieving above-cost-of-capital returns.

Why do accounting rule-makers turn a blind eye to the need for improved performance measurement tied to intangibles? The accounting rule-makers say that they need to protect the integrity of the balance sheet, and that requires not capitalizing and amortizing intangible outlays due to the variation in estimates of useful lives. The necessity of matching revenues with expenses takes a back seat.

The corporate world can not wait for the rule-makers to lead the evolution to the New Economy accounting system. The evolution needs to start at the firm level so that management and the board can seize these three benefits:

- Improved understanding of how value is created (or dissipated) in the firm's business units
- Better performance measurement and compensation systems attuned to long-term value creation
- A sharper lens for the analysis of resource allocation with an eye on the very (intangible) assets that are the means to achieve higher than cost-of-capital returns

Baruch Lev systematically dismantles the arguments for those favoring the status-quo accounting. He makes a foundational point that depreciation schedules for all assets (tangible and intangible) have significant uncertainty and it makes no sense to assert that this uncertainty is acceptable for tangible assets but unacceptable for intangible assets. Moreover, Lev argues that politics is the fundamental roadblock to a large-scale transition to the New Economy accounting system.<sup>21</sup>

The two dominant “influencers” of accounting regulations—corporate executives and independent auditors—are quite happy with the current situation. Intangibles capitalization would put intangibles on the balance sheet, reminding shareholders of what managers did with their money. Any failure of these heavy investments will sooner or later lead to impairment write-offs for which managers will be held publicly responsible for, akin to acquisition goodwill write-offs today. What manager wants this scrutiny and monitoring? They would rather erase all traces of intangible investments by immediate expensing.

Similarly, auditors don't want the additional burden of attesting to the value of balance sheet intangibles. They may even get sued in case of bankruptcy for not warning investors of the failed intangible investments. For these reasons, auditors too love the immediate expensing of intangibles.

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<sup>21</sup> Baruch Lev. 2023. “The Accounting for Intangibles: Response to Adherents of the Status Quo.” Working paper. August 22, 2023.

*We face a fork in the road for making significant progress in developing the New Economy accounting system. Begin an all-or-nothing battle for the implementation of comprehensive accounting rules for the capitalization and amortization of all intangibles similar to the handling of intangibles with purchase-accounting acquisitions involving goodwill. Alternatively, as we prefer, view progress in two steps. Step one is to fully engage firms with improving their accounting return calculations and securing the benefits enumerated above. The Translator is a useful means to jumpstart this engagement. After considerable experience at the firm level with handling intangibles, then tackle the second step of implementing accounting rules for audited (published) accounting statements.*

Let's dig deeper into the benefits from the explicit handling of intangibles. In this regard, one might expect a theory of the firm to offer insights about how firms create value. Indeed, the Pragmatic Theory of the Firm does so, connecting the firm's purpose, its major activities, and its long-term financial performance.<sup>22</sup> The Pragmatic Theory offers two guideposts, especially relevant to intangibles, for optimizing value created. First, the preferred way to connect a firm's long-term financial performance to market valuation is the life-cycle framework and not earnings per share growth rates and price/earnings multiples.<sup>23</sup> Second, knowledge building proficiency manifested in a firm's culture is the critical determinant of a firm's long-term financial performance. With these guideposts in mind, let's analyze some important intangibles-related responsibilities of management and the board that can benefit a firm's capabilities to create value.

### **Performance measurement**

The life-cycle framework provides a useful context for measuring what really matters for long-term performance. For firms and business units that are well beyond the startup stage, the critical task is to sustain profitability at least equal to the firm's opportunity cost of capital. Hence, by adjusting for intangibles, accounting biases are minimized, and the resulting accounting returns yield a more accurate comparison to the cost of capital.

In addition, for firms with substantial intangibles, such as large R&D expenditures, a grossly misleading life-cycle track record results when intangibles are not capitalized and amortized. The track record is not only misleading as a time series of accounting returns but is especially misleading for the time series of reinvestment rates which only reflect growth in tangible assets.

Knowledgeable portfolio managers are a step ahead of most corporate managers given their considerable experience in quantifying the valuation effects of varying levels of accounting returns and reinvestment rates and related fade rates (see Figure 2). Substantial value is created when management ratchets up and sustains (favorable fade) its reinvestment rates when coupled to accounting returns well above the cost of capital. The false assumption to overcome is that achieving high accounting returns, by itself, is the ticket to optimum value creation.

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<sup>22</sup> Bartley J. Madden. 2021. "The Pragmatic Theory of the Firm." *Journal of Applied Corporate Finance*. 33(1): 96-110.

<sup>23</sup> Measures of economic value added reflect the critical comparison of accounting returns versus cost of capital. The accuracy versus complexity tradeoffs of economic value-added displays versus life-cycle track records is discussed in Madden (2020), pp. 176-177.

The following quote is from an article authored by a portfolio manager who took a long-term position in IDEXX Laboratories after discussing with the CEO details about the firm's R&D expenditures:

IDEXX is a leading provider of testing and diagnostic services to veterinarians. Analysis of IDEXX reveals the wide breadth of the firm's R&D and its unusually long economic life. For instance, instruments placed 20 years ago remain in use because they are compatible with the latest diagnostic tests. This creates high switching costs for veterinarians evidenced in the firm's 97% customer retention rate. So long as the company stays on the cutting edge of diagnostics, instrument placements and utilization will stay high, and a virtuous R&D cycle is created.

A longer R&D economic life benefits a firm's future net cash receipts, boosting a firm's market valuation. The reinvestment rates for IDEXX are substantially higher after the inclusion of R&D as an [intangible] asset. The resulting life-cycle track record ... shows sustained (not fading) very high economic returns, coupled with high reinvestment rates—the ideal combination to create shareholder value.<sup>24</sup>

Another advantage of working with life-cycle track records is the enhanced ability to judge the plausibility of a forecast given a firm's past track record of success; and ideally, including comparisons with track records for competitors. After extensive experience working with these track records, users (typically portfolio managers) develop a pragmatic nose for the skill needed to achieve different levels of life-cycle performance. Intangible assets are the means to achieve favorable life-cycle fade (see Figure 2).

### **The hiring and compensation of managers**

Absent the life-cycle way of thinking, compensation consultants tout quartile rankings of compensation that promote a rising trend for CEO compensation since boards tend to believe that the CEOs they hire are above-average. Usually, considerably more emphasis is placed on near-term (next three years) financial targets. Today's compensation plans are crafted using easily quantified targets such as earnings per share growth rates and ROIC.

Imagine a far different compensation world where the emphasis is on incentivizing what really matters even if it is not easily quantified. Let's begin by incentivizing managers to deal with the top priority given their firm's, or business unit's, current life-cycle position (see Figure 2). In the very early part of the high innovation stage when the business is showing losses, the priority is to either confirm or disconfirm its core business model assumptions, and adapt accordingly. Substantial value creation comes from developing businesses that can scale and later combine high accounting returns with high reinvestment rates. In the competitive fade stage, the priority is to continually build or acquire new capabilities in order to expand into new markets and extend the firm's competitive advantage (Amazon has excelled in this regard). In the mature stage, the top challenge is to continuously improve the efficiency of existing businesses while pursuing innovations that might even compete with businesses that currently pay the bills. Finally, a business in the failing business model stage needs to purge complacency and business-as-usual attitudes. A restructuring to a much smaller size is most likely needed in order to earn the cost of

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<sup>24</sup> Jeffrey B. Madden. 2019. "The World has Changed: Investing in the New Economy." *Journal of Wealth Management*. 22(2): 87-98, p.93.

capital. If this cannot be achieved, the business should be shut down, resources reallocated, and employees assisted in transitioning to other opportunities.

It is highly desirable for CEOs to be skilled in applying systems thinking to the future using different ways to analyze complexity in a fast-changing world.<sup>25</sup> The desired result is strategic positioning that enables the firm to both anticipate and to quickly adapt to change that ultimately sustains favorable fade (see Figure 2) for accounting returns and reinvestment rates. In addition, CEOs should actively communicate to employees the purpose of the firm and ensure the effectiveness of employee training and on-the-job mentoring that reinforces a knowledge-building culture that helps all employees to become value creators.

Ideally, CEOs would be experienced with life-cycle track records and the connection to valuation. CEOs would then orchestrate compensation arrangements for their business unit leaders based on long-term value creation. In this regard, economic profit metrics are clearly superior to earnings targets. By capitalizing R&D expenditures and other SG&A expenses, business unit leaders are not wrongly penalized in the short term. Moreover, a knowledge-building culture encourages experimentation and accepts failures that provide useful feedback leading to smart adaptations in a fast-changing world.

As to investing for long-term value creation, Danaher provides an example of creating an intangible asset by investing in training future leaders to carry the torch for the firm's culture which, in turn, is rooted in knowledge building proficiency. For decades, Danaher has been recognized as the preeminent U.S. firm for lean manufacturing. Top management gave Mark DeLuzio the assignment to nurture and sustain the firm's lean culture—the Danaher Business System (DBS)—across the entire firm. DeLuzio summarized his process:

Presidents and vice presidents, as well as other leaders, came out of their respective roles and worked full-time in the DBS office, anywhere from 6 to 12 months. When they returned ... they led DBS in their line role of their organization *with almost a religious fervor*. Ultimate career success at Danaher was contingent upon one's ability to lead and achieve results utilizing the Danaher Business System. The DBS Lean office played a major role in the evolution of Danaher's culture.<sup>26</sup>

(italics added)

The employee training 'expenses' incurred by the DBS office were buried in SG&A but certainly were outlays that produced long-lived benefits and, as such, were an especially valuable intangible asset

### **Net Zero Transition**

A necessary component of a firm's purpose is to take care of future generations.<sup>27</sup> The impact of greenhouse gas (GHG) emissions on the environment has led many firms to commit to achieve net zero emissions. With carbon dioxide the main culprit in GHG emissions, over 20 countries (including Canada

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<sup>25</sup> Michael C. Jackson. 2019, *Critical Systems Thinking and the Management of Complexity*. Hoboken, NJ: John Wiley & Sons.

<sup>26</sup> Mark C. Deluzio. 2020. *Flatlined: Why Lean Transformations Fail and What to Do About It*. New York: Routledge. p. 79.

<sup>27</sup> Bartley J. Madden. 2017. "The Purpose of the Firm, Valuation, and the Management of Intangibles." *Journal of Applied Corporate Finance* 29(2): 76-86.

but not the U.S.) have imposed a tax on carbon emissions. A particularly important challenge for boards of directors is how best their firm can transition to net zero. A common assumption is that the best way to meet this challenge is to rely on ESG metrics. A counter argument is that getting to Net Zero critically depends upon innovation at the firm level by which skilled firms deliver innovative solutions to their customers' needs to reduce emissions. That point tends to be unappreciated by many ESG proponents who are not well versed in understanding how firms create value.<sup>28</sup>

The 2023 book, *Net Zero Business Models: Winning in the Global Net Zero Economy* by John Montgomery and Mark Van Clieaf is a comprehensive analysis of the challenges firms face in transitioning to net zero. The authors provide an insightful way of looking at these challenges by way of four strategic Pathways to navigate the transition to net zero. Pathway One firms, such as Microsoft, believe that they will achieve net zero by maintaining their existing business model coupled to eco-efficiency process improvements and possibly the use of carbon offsets and carbon capture. Pathway Two firms feel that significant change in their strategies and business models is needed to achieve net zero. Pathway Three firms do not have legacy businesses and are creating new net zero business models. Tesla in its early years was Pathway Three. Pathway Four firms are participating in, and possibly leading, an industry-wide transformation. The Pathway classification is dynamic in that, for example, a Pathway Two firm may conclude that their industry needs to be transformed and shift their strategy accordingly and become a Pathway Three firm.

After reading our discussion of the life-cycle framework, you might think that there is a fit with the Pathway classification. You would be right. Montgomery and Van Clieaf note:<sup>29</sup>

Analyzing a company's performance using ... the life cycle framework will guide companies strategically to choose the appropriate Pathway to net zero. ... Applying this strategic framework for innovation and capital allocation will also inform a company about its transition plan, clarify its transition burden, and suggest how to finance it. (p. 207)

They provide a wake-up call to managements and boards as to the impact of a carbon tax similar to taxes imposed by other countries:

Applying a carbon tax of \$100 per metric ton of ... emissions may accelerate a company's progression through the four stages [see Figure 2] of the innovation and return on capital life cycle depending on its carbon intensity.

[We] reviewed 1,902 public companies in the global materials sector (mining, metals, steel, cement, glass, and chemicals). ... When stress tested for a carbon tax of \$100 per ton of carbon dioxide emissions ... 1,300 of these companies will have a carbon-adjusted return on capital of less than [real] 5%, which is close to or below their cost of capital. (p. 216)

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<sup>28</sup> Bartley J. Madden. 2023. "Bet on Innovation, not ESG metrics, to lead the net zero transition." *Journal of Applied Corporate Finance*. 35(2): 35-44.

<sup>29</sup> John Montgomery and Mark Van Clieaf. 2023. *Net Zero Business Models: Winning in the Global Net Zero Economy*. Hoboken, NJ: John Wiley & Sons. pp. 207-216.



Importantly, they stress the usefulness of the life-cycle framework in enabling boards of directors to fulfill their responsibilities:

A board of directors should have a measurement and reporting process for return on capital, cost of capital, economic profit, and future value [% of today's market value attributed to future investments] to guide effective capital allocation policies and strategies. ... [The] life cycle framework will not only help companies to choose the appropriate Pathway to net zero but also provides a tool that boards can use to monitor, preserve, and enhance shareholder value. (p. 216)

The more one appreciates the usefulness of life-cycle track records, the more apparent is the need for ongoing learning experiences about intangibles in general, and in particular, assigning accounting lives for intangibles thereby enabling capitalization and amortization. As noted earlier, the resulting better matching of revenues and expenses leads to more accurate accounting returns and improved life-cycle track records that, in turn, lead to improved resource allocation decisions.

#### **4. Concluding Thoughts**

The ideas presented in this paper have a common thread—value creation. The discussion below admittedly reflects an optimistic, but pragmatic, view of how these ideas could be put to productive use by four distinct groups: CFOs and their staffs with guidance from consulting firms, boards of directors, investors, and business school faculty.

First, CFOs and their staffs would immediately benefit from using the Translator as an integral part of an ongoing learning process to improve their accounting return metric used to proxy for economic returns. A question for every CFO is: Why wait? The Translator programming code can be easily changed to handle intangibles in more granular detail, to incorporate a multi-year investment outlay in place of the single year investment outlay (see Figure 3), etc. The website <https://www.MD-Translator.com> explains calculations, such as current dollar gross plant, so that users can quickly gain confidence about how things work.

Widespread commitment by CFOs to improve the measurement of accounting returns could jumpstart best practices across industries for assigning accounting lives to intangible outlays. Moreover, the consulting arms of accounting firms could expedite progress. For example, the accounting life for employee training could be correlated with employee turnover. Longer lives for lower employee turnover. Advertising outlays designed to build brands could be evaluated in terms of consumer perception of the brand before and after an advertising campaign. This would help in approximating the amortization life and also indicate if the advertising expenditure was worthwhile. This perspective suggests that the New Economy accounting system may well evolve from the bottom-up experiences of finance practitioners.

Second, boards of directors would benefit from incorporating the life-cycle framework into their decision-making for resource allocation. Many directors have been highly successful in a variety of leadership positions but still rely on an overly simplistic mindset for financial issues: Grow the business without regard to its position on the life cycle; the stock market only cares about earnings growth rates; do whatever it takes to beat Wall Street's quarterly earnings expectations, and so forth. Improving this mindset is likely a long slough but worth the effort.

Third, investors with quantitative skills would seem a natural audience for improvements in the measurement of accounting returns. Such an audience includes large pension funds and sovereign wealth funds that certainly have a long-term perspective. An improved lens for measuring past value creation/dissipation facilitates better forecasts of future value creation and more insightful conversations with management.

Fourth, the Translator coupled with the life-cycle framework offers new capabilities for business school professors and students studying value creation. Long-term track records are relevant for studying business history, strategy, and any course dealing with a firm's past and future performance. A useful first step is to start working with the Translator.