WHITE PAPER

THE RELEVANCE OF NON-FINANCIAL KEY PERFORMANCE INDICATORS (KPIS)

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CONTENTS

EXECUTIVE SUMMARY

Overview: The limitations of financials statements in assessing firm performance have long been known to the academic and practitioner accounting communities. Recent years have witnessed a sharp increase in the frequency and scope of non-financial Key Performance Indicators (KPIs) disclosed by companies and used by market participants. In this study, we investigate the relevance of various voluntarily reported non-financial KPIs. We find that KPIs are positively associated with future profitability, sales growth, and current stock returns; however, the stock market underreacts to the information embedded in KPIs for firms operating in opaque information environments. We conclude with a regulatory recommendation on standardization of KPIs. Salient aspects of our study are summarized below.

- **KPIs are leading indicators of future financial performance:** Market participants increasingly rely on KPIs outside the scope of traditional financial statements. Traditional financial statement metrics (GAAP and non-GAAP) may not reflect underlying business developments on a timely basis.

- **KPIs are contextual:** Value drivers vary not only across, but within industries. For example, same-store sales growth for retailers; passenger load factor and cost per seat mile for airlines; value of new orders and value of order backlog for homebuilders; number of restaurants opened/closed for restaurants.

- **Our Objectives:**
  - To examine the *value relevance* of a large set of industry specific non-financial KPIs.
  - To study the efficacy of a *fundamental analysis strategy* using KPIs to screen firms in multiple industries such as airlines, retail, homebuilding, hotel, internet, oil and gas, restaurant, semiconductor, telecom, and pharmaceutical industries.

- o To study ***cross-sectional and inter-temporal variation*** based on firm- and KPI characteristics.

- **Research Approach:** We assemble a dataset on industry specific KPIs from S&P Capital IQ, covering U.S. firms from 2011 to 2016 and spanning over ten industries. We allocate all KPIs into two broad categories: ***Efficiency***, considering association with cost or asset deployment efficiency; and ***Growth***, indicating growth in sales and/or assets. We construct KPI scores for each firm and each category, denoted as ***K-Efficiency*** and ***K-Growth***.

- **Primary Measurement Challenge and Tradeoffs:** A key challenge is the lack of standardization in measurement and disclosure of KPIs even within the same industry. We confront this challenge by collapsing each KPI into a 0/1 binary variable to force standardization. However, we realize that this could lead to a loss of relevant continuous information.

- **What do we find?** We find evidence that KPIs related to efficiency (cost and asset deployment efficiency) are positively associated with future profitability, sales growth, and current stock returns. *Importantly, we find that the stock market underreacts to the information embedded in KPIs for firms operating in opaque information environments.* A long-short trading strategy based on KPIs (subject to portfolio size limitations) yields significantly positive returns over the 2011 to 2016 period.

- **Policy Recommendation:** The evidence presented in this study suggests that standardization of KPI reporting may be beneficial for firms operating in opaque information environments.

1: INTRODUCTION

Information reported in financial statements only tells part of the business story for many industries. For example, in its most recent earnings announcement on August 24, 2018, Foot Locker Retail Inc (NYSE:FL) reported strong premarket earnings and sales performance that beat analysts' forecasts. However, its stock price fell as much as 12% on the trading day.[1] The sharp drop in stock price was likely due to the fact that same-store sales growth, a key non-financial performance indicator (KPI) for retail companies, rose by only 0.5%, falling short of the consensus street estimate of a 0.7% increase. The popular press is replete with such instances of KPI relevance almost on a daily basis. As another example, the stock market seems to be fixated on, among other things, the production numbers forecasted and reported by Tesla. This anecdotal evidence suggests the information contained in non-financial KPIs, which are usually voluntarily disclosed and outside the scope of traditional financial statement metrics, are value relevant and hence used by investors to assess the performance of firms. Given the significant value relevance of KPIs for investors and the fact that they are voluntarily disclosed, KPIs have drawn much attention from securities regulators worldwide (SEC 2003, 2008, 2016; EU 2003; IASB 2010; AcSB 2018).

Firms disclose various KPIs to inform analysts and investors about business developments that are not captured by traditional GAAP measures of financial performance. As expected, the use of KPIs is highly contextual. For example, while same-store sales growth is an important KPI for retailers, other commonly observed KPIs include passenger load factor and cost per seat mile for airline companies, the value of new orders and value of order backlog for homebuilding firms, and the number of restaurants opened/closed for restaurant chains.

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[1] https://www.nasdaq.com/article/foot-locker-stock-falls-hard-despite-q2-earnings-beat-cm1013001

In this study, we examine the value relevance of a large set of industry specific non-financial KPIs and the efficacy of a fundamental analysis strategy using KPIs to screen firms in multiple industries. We build on prior studies in accounting and finance that demonstrate the usefulness of combining multiple financial statement information signals in predicting future accounting performance and stock returns (e.g., Piostroski 2000; Mohanram 2005; Mohanram, Saiy, and Vyas 2018). We assemble a dataset of industry-specific KPIs from Capital IQ, which has a broad coverage over the following ten industries: airlines, retail, homebuilding, hotel, internet, oil and gas, restaurant, semiconductor, telecom, and pharmaceuticals. The resultant sample covers the period from 2011 to 2016.

We first examine the association between KPI scores and future accounting performance. Our results suggest that the KPI indices are positively associated with future ROA and sales growth. We then examine whether the stock market impounds the information contained KPI scores for future performance into current stock returns. We find that the information content of KPIs is reflected, at least to some extent, in current stock prices after controlling for concurrent information embedded in earnings. We further explore whether the markets underreact or overreact to KPI disclosures by examining their association with future stock returns. Although we find that the association is not significant using the full sample, KPI scores are positively associated with future stock returns for firms in opaque information environments, such as small firms, firms with low analyst coverage, and those with low institutional ownership. The return predictability of KPI scores persists after we control for common risk factors.

We also explore the feasibility of a potential trading strategy based on the KPI scores. We find that for firms with opaque information environment, a long-short hedge strategy based on *K-Total* earns annual abnormal one-year-ahead returns ranging from 12.21% to 14.84%, which is

statistically significantly different from zero. A similar strategy using *K-Efficiency* (*K-Growth*) generates similar abnormal returns, ranging from 5.28% (6.13%) to 30.50% (13.19%). We note as a caveat, however, that these hedge returns are subject to significant portfolio size limitations.

Our paper provides timely implications for policymakers by highlighting the relevance of a large set of KPIs in the stock market. Moreover, our tests on the return predictability of KPIs suggest that the markets do not seem to fully incorporate their information into stock prices and indicate the need for better communication and standardization of KPIs.

2: WHAT DO WE KNOW SO FAR?

Key Performance Indicators (KPIs) have drawn much attention from securities regulators worldwide. For example, in the U.S., the SEC has encouraged firms to discuss both financial and non-financial KPIs in the MD&A section of the annual report (SEC 2003). In 2008, the SEC Advisory Committee on Improvements to Financial Reporting recommended encouragement of private initiatives to develop high quality KPIs for specific business activities or industries. The SEC also sought comments regarding potential principles-based requirements for KPI reporting and standardization (SEC 2016). Internationally, the EU and IASB have put forth guidelines to facilitate the reporting of both financial and non-financial performance measures (EU 2003; IASB 2010). In Canada, the AcSB has issued a Framework for Reporting Performance Measures in December 2018. The framework aims to enhance the reporting of performance measures, including KPIs, across different sectors and provide guidance to ensure disclosure of high quality information (AcSB 2019).

Despite their anecdotal relevance and interest from investors and regulators, there is limited academic research on the impact of KPIs on business assessments made by investors and other stakeholders. Most of the extant studies focus on the role of KPIs within certain industries. For instance, Amir and Lev (1996) show that market share and penetration rate are value relevant for wireless companies. Trueman, Wong, and Zhang (2000, 2001), Demers and Lev (2001), and Rajgopal, Shevlin, and Venkatachalam (2003) demonstrate the informational role of web usage for internet companies. Other studies examine KPIs such as customer satisfaction (Behn and Riley 1999; Ittner and Larcker 1998; Banker, Potter, and Srinivasan 2000; Riley, Pearson, and Trompeter 2003; Smith and Wright 2004; Dresner and Xu 1995; Banker and Mashruwala 2007), order backlog (Lev and Thiagarajan 1993; Behn 1996; Liu, Livnat, and Ryan 1996; Chandra, Procassini,

and Waymire 1999; Rajgopal, Shevlin, and Venkatachalam 2003; Steele and Trombley 2012; Chang, Chen, Hsu, and Mashruwala 2018), customer acquisition cost, average revenue per user, number of subscribers (Simpson 2010; Livne, Simpson, and Talmor 2011), growth in same-store sales, the number of existing numbers, and stores opened/closed (Curtis, Lundholm, and McVay 2014). More recently, Givoly, Li, Lourie, and Nekrasov (2019) focus on a much larger number of KPIs across multiple industries that have analyst KPI forecasts available in the IBES dataset. The authors provide evidence suggesting that KPIs are significantly associated with stock market reaction at earnings announcements.

Our study complements extant literature by examining the value relevance of a large list of KPIs disclosed by companies across multiple industries. We assemble a dataset of industry-specific KPIs from the S&P Capital IQ database covering ten industries, allowing us to obtain a broader view of the relevance of KPIs. More importantly, we group the KPIs into two categories and then construct indices using variables from each category. Our approach is consistent across different industries, which allows researchers to examine heterogeneous KPIs in a systematic manner as opposed to examining each separate KPI at a time. More importantly, we test a KPI-based trading strategy and examine its predictive power for future accounting and stock returns. Grouping various KPIs into indices provides us with distinct insights that are new to the literature.

Our study also contributes to the academic literature on fundamental analysis that mainly focuses on investment strategies based on financial statement information. For example, Ou and Penman (1989) show that certain accounting metrics help predict future changes in earnings. Abarbanell and Bushee (1997) show that analysts underreact to accounting information and an investment strategy based on the measures examined in Lev and Thiagarajan (1993) earns abnormal returns. Piotroski (2000) demonstrates that an investment strategy based on financial

statement analysis earns excess returns for value stocks and Mohanram (2005) documents a similar effect of financial statement analysis for growth firms. Mohanram, Saiy, and Vyas (2018) apply the tools of financial statement analysis to banks and show that a composite score based on certain accounting measures predicts future stock returns. However, whether a similar technique can be applied to non-financial performance measures is ex ante unclear. We contribute by standardizing disclosed non-financial KPI information and demonstrating the return predictability of the standardized KPI metrics.

3: RESEARCH APPROACH AND FINDINGS[2]

We obtain annual industry-specific KPIs FROM Capital IQ, necessary accounting information from COMPUSTAT, and stock returns from CRSP. We find that the number of observations increases gradually over the sample period, reflecting the growing popularity in disclosure of KPIs. Overall, there are 10 industries in our sample: airlines, homebuilders, hotel & gaming, internet, oil & gas, restaurants, retail, semiconductors, telecom, and pharmaceutical firms. Pharmaceutical, oil & gas, and hotel & gaming firms have the largest representation in our sample, while other industries each represent less than 10 per cent of the full sample. We exclude the mining industry from our study due to the large and empirically challenging heterogeneity in disclosure of commodity-specific KPIs.

DEVELOPMENT OF KPI INDICES

A key measurement challenge encountered by external analysts is the lack of standardization in measurement and disclosure of KPIs even within firms in the same industry. To construct the indices used in our tests, we start by allocating industry-specific KPIs into two broad categories: *Efficiency* and *Growth*. *Efficiency* includes measures that measure asset deployment and cost efficiency. Specifically, KPIs included under *Efficiency* can be related to cost management (e.g., the average production cost for oil & gas firms), sales per unit of assets (e.g., same store sales for retailers), or the level of activity generated by per unit of assets (e.g., load factor for airlines). *Growth* includes KPIs that capture the increase in total assets, production and sales (e.g., the total number of stores, the total number of aircraft, and the number of products). Within each category, we select up to five measures with the most observations available.

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[2] Please note that we have added emphasis in this section by underlining key inferences. Complete statistical results tables are not presented in this document but are available upon request from the Professional Accounting Centre.

For each firm-year observation, we calculate the *changes* in each KPI and create an indicator that equals one if the corresponding KPI increases relative to the prior year and zero if the KPI decreases or remains constant. We multiply KPIs that are ex ante deemed to be negatively associated with performance by -1, to ensure that the indicators increase with the intended construct (firm performance). We calculate the average value of the indicators to construct indices for each industry, which are denoted as *K-Efficiency* and *K-Growth*, respectively. If the number of observations varies across different variables, we calculate the mean value of the indicators using the union of their sample to increase the power of the empirical tests. We also create an overall index for each industry, denoted as *K-Total*, by taking the average value of indicators based on variables from both categories. By construction, the three KPI scores range from 0 to 1.

SUMMARY STATISTICS

All KPI indices are standardized to range from 0 to 1, with a mean value of 0.55 for *K-Growth*, 0.60 for *K-Efficiency*, and 0.53 for *K-Total*. The mean value of *K-Efficiency* (*K-Growth*) ranges from 0.49 for homebuilders (0.27 for Pharmaceutical) to 0.88 for restaurants (0.85 for homebuilders). The number of KPIs used for calculating *K-Efficiency* (*K-Growth*) ranges from 1 to 5 (1 to 4), and in certain industries (e.g., internet, telecom, and pharmaceuticals), only one index is calculated due to the availability of measures in the two categories.

CORRELATIONS

We begin with a basic statistical correlation analysis. As expected, we observe that future ROA and sales growth are both significantly associated with each of the three KPI indices, which ***provides summary evidence that KPI indices help predict future accounting performance***. Current stock returns are positively associated with *K-Efficiency*, but are not significantly

correlated with *K-Growth* or *K-Total*. Future stock returns are not significantly correlated with any KPI index for the full sample.

Overall, these exploratory correlation analyses based on the full sample provide ***initial evidence that investors incorporate the information content of KPIs into current stock prices and that there is no significant return predictability in the full sample***. However, it is likely that the level of market efficiency related to KPIs varies across different types of firms. In later sections, we will examine the differential level of market efficiency for KPIs of firms with different information environments.

REGRESSION ANALYSES: KPIS AND FUTURE ACCOUNTING PERFORMANCE

We next conduct formal statistical analyses using regressions to examine the association between KPIs indices and future financial performance. We first examine the relation between KPI indices and future earnings using a multivariate regression framework. The regression results indicate that ***K-Efficiency is positive and significant after controlling for current accounting information***. The finding is consistent with the correlations discussed earlier, and suggests that KPI indices convey useful information for future earnings performance.

We next examine the association between KPI indices and future sales growth. We estimate a similar regression model as earlier. Our results suggest the ***K-Efficiency is positively associated with future sales growth***. However, the coefficients for *K-Growth* and *K-Total* are not statistically significant.

Taken together, our findings suggest that ***KPI indices are associated with future financial performance measured by accounting metrics***. In the next section, we will further explore the extent to which the markets incorporate the information content of KPIs into current stock prices.

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REGRESSION ANALYSES: KPIS AND STOCK RETUIRNS

Concurrent Returns

We begin by examining whether investors are aware of the predictability of KPI indices for future financial performance. We analyze buy-and-hold stock returns using a one-year horizon from 9 months prior, to 3 months after, the fiscal year-end. We control for the information content of GAAP earnings using two measures: Earnings scaled by stock prices and change in earnings scaled by stock prices. We find that the ***coefficients for K-Efficiency are positive and statistically significant, suggesting that the markets are able to incorporate the information content of KPIs, at least to some extent, in concurrent stock returns***.

Future Returns

Our findings regarding current stock returns do not address the question of whether the market reaction to KPIs is complete and whether the KPI indices have predictability for future returns. Thus, we further examine the association between KPI indices and size-adjusted buy-and-hold stock returns over a one-year horizon starting at the four months after the fiscal year-end. ***The coefficients for the KPI indices are positive but not significantly different from zero. This suggests that the market reaction to the information content of KPIs is on-average complete, and therefore, the KPI indices do not predict for future returns in the full sample analyses***.

Return Predictability in Sub-samples

Despite the on-average lack of return predictability for the full sample, we conjecture that the extent to which the markets react to KPIs may vary across firms. ***It is likely that the markets***

do not fully incorporate the information content of KPIs for firms with relatively opaque

information environments. We test this conjecture by examining subsamples based on firm size,

analyst coverage (firms without coverage, firms with one or two analysts covering, and firms

with more than two analysts covering) and based on the level of institutional ownership.

The results are consistent with our conjecture in all three analyses. For small firms, an increase in *K-Growth* from 0 to 1 is associated with an **18.3%** increase in annual abnormal stock returns. Similarly, the magnitude of abnormal returns is **40.4%** for *K-Efficiency* and 22.0% for *K-Total*. For firms without analyst coverage, increase in *K-Efficiency* (*K-Total*) from 0 to 1 is associated with a **30.9% (15.5%)** increase in annual abnormal returns. For firms with low institutional ownership, increasing *K-Growth* (*K-Total*) from 0 to 1 is associated with an **11.9% (13.3%)** increase in annual abnormal returns.

Overall, the results demonstrate that the **market does not completely incorporate the information of KPIs into current stock returns for firms with more opaque information environments, and consequently, the KPI indices have significant predictive power for future abnormal returns**.

Trading Strategy Based on KPI Indices

We further analyze the returns to a trading strategy based on KPI indices. We focus on firms with more opaque environments, inferred by size, analyst coverage, and institutional ownership. The results suggest that the portfolio returns monotonically increase with *K-Total* for No Coverage Firms and Low IO firms. The hedge returns for the three sets of firms range from **12.21% to 14.84%**. The hedge returns to a strategy based on *K-Efficiency* (*K-Growth*) range from

5.28% to 30.50% (6.13% to 13.19%). Taken together, our findings suggest that a trading strategy based on KPI indices could earn significant excess returns over the one-year ahead time horizon.

These trading strategy results are subject to an ***important caveat regarding the small number of observations in long/short portfolios*** — accordingly, these strong results may not hold in an out-of-sample analysis.

Hedge Returns over Time

We next examine hedge returns for a trading strategy based on KPI indices by each year in our sample period from 2011 to 2016. Such analyses are crucial to ensure that the trading strategy is not driven by extreme return patterns in a single year. ***We find that the hedge returns for the K-Total strategy are positive in all but one years for small firms and firms with no analyst coverage firms and the returns are positive in all years for low institutional ownership firms. The mean hedge return ranges from 12.72% to 15.43% for different samples.*** The consistent performance of the trading strategy's performance across time suggests that the abnormal return is likely to be driven by mispricing instead of by risk. Moreover, the Sharpe ratio ranges from 0.84 to 2.24 for different samples, which is comparable to those in prior studies (e.g., Sloan 1996, Mohanram et al. 2018).

Similar return patterns are observed for strategies based on K-Efficiency and K-Growth. The mean hedge returns for K-Efficiency (K-Growth) based strategy ranges from 4.74% to 18.17% (from 9.26% to 12.41%) and the Sharpe ratio for *K-Efficiency* (*K-Growth*) ranges from 0.29 to 1.06 (from 0.77 to 3.23). ***For both strategies, hedge returns are positive in most years for different samples.***

Overall, the patterns of abnormal returns over time supports the notion that the abnormal returns to KPI based trading strategies seem to be driven by the markets' under-reaction to the information content embedded in KPIs rather than an omitted risk factor.

5: CONCLUSIONS AND POLICY RECOMMENDATION

Anecdotal accounts suggest that industry-specific KPIs are considered to be highly value relevant by capital market participants. Not surprisingly, KPIs have drawn significant attention from securities regulators across the world. Despite the importance of KPIs to market participants, few studies examine the relevance of KPIs across multiple industries in a systematic way.

In this study, we examine the value relevance of a large set of industry-specific non-financial KPIs, and the efficacy of a trading strategy using KPIs to screen firms in multiple industries. We assemble a database of KPIs from Capital IQ and show that KPIs are significantly associated with future financial performance. We find that concurrent stock returns reflect the information content of KPIs, suggesting that investors are aware of the relevance of KPIs for future accounting performance. We also show that the extent to which the stock market reacts to KPIs varies across firms with different information environments. Our findings suggest that the markets underreact to KPIs for firms operating in opaque information environments. A hedge strategy based on composite KPI scores (subject to portfolio size limitations) earns excess returns over the one-year ahead horizon.

Our research has implications for policymakers who are concerned about the lack of standardization of KPI disclosures. The results on the return predictability of KPIs suggest that the markets do not fully incorporate their information into stock prices for firms with opaque information environments, and indicate the need for better communication or standardization of KPIs for such firms. Our findings on the efficacy of a trading strategy based on KPIs should also be of interest to investors. Our study also extends the literature on fundamental analysis and shows that similar techniques can be applied to non-financial industry-specific KPI measures.

References

Abarbanell, J., and Bushee, B. 1997. Fundamental Analysis, Future Earnings, and Stock Prices. *Journal of Accounting Research*, 35(1), 1-24.

AcSB. 2019. Reporting Performance Measures. Available at: https://www.frascanada.ca/en/acsb/news-listings/framework-for-performance-measures

Amir, E., and B. Lev. 1996. Value-Relevance of Nonfinancial Information: The Wireless Communications Industry. *Journal of Accounting and Economics* 22 (1): 3–30.

Banker, R., G. Potter, and D. Srinivasan. 2000. An Empirical Investigation of an Incentive Plan That Includes Nonfinancial Performance Measures. *The Accounting Review* 75 (1): 65–92.

Barth, M. E., Landsman, W. R., Lang, M., and Williams, C. 2012. Are IFRS-based and US GAAP-based accounting amounts comparable? *Journal of Accounting and Economics*, *54*(1), 68–93.

Behn, B. 1996. Value Implications of Unfilled Order Backlogs. *Advances in Accounting* 14: 61-84.

Behn, B, and R. A. Riley. 1999. Using Nonfinancial Information to Predict Financial Performance: The Case of the U.S. Airline Industry. *Journal of Accounting, Auditing & Finance* 14 (1): 29–56.

Bonacchi, M. , Kolev, K. and Lev, B. (2015), Customer Franchise—A Hidden, Yet Crucial, Asset. *Contemporary Accounting Research* 32: 1024-1049.

Riley, R. A., T. A. Pearson, and G. Trompeter. 2003. The Value Relevance of Non-Financial Performance Variables and Accounting Information: The Case of the Airline Industry. *Journal of Accounting and Public Policy* 22 (3): 231–54.

Chandra, U., A. Procassini, and G. Waymire. 1999. The Use of Trade Association Disclosures by Investors and Analysts: Evidence from the Semiconductor Industry. *Contemporary Accounting Research* 16: 643-670.

Chang, H., Chen, J., Hsu, S., and Mashruwala, R. 2018. The Impact of the Bullwhip Effect on Sales and Earnings Prediction Using Order Backlog. *Contemporary Accounting Research*, 35: 1140-1165.

Curtis, A., R. Lundholm, and S. Mcvay. 2013. Forecasting Sales: A Model and Some Evidence from the Retail Industry. *Contemporary Accounting Research* 31 (2): 581–608.

Davila, A., and M. Venkatachalam. 2004. The Relevance of Non-Financial Performance Measures for CEO Compensation: Evidence from the Airline Industry. *Review of Accounting Studies* 9 (4): 443–64.

De Franco, G., Kothari, S., and Verdi, R.S. 2011. The Benefits of Financial Statement Comparability. *Journal of Accounting Research*, 49: 895-931.

Demers, E., and B. Lev. 2001. A Rude Awakening: Internet Shakeout in 2000. *Review of Accounting Studies* 6 (2): 331–59.

Dresner, M., and K. Xu. 1995. Customer Service, Customer Satisfaction, and Corporate Performance in the Service Sector. *Journal of Business Logistics*, 16(1), 23.

Easton, P., and Harris, T. 1991. Earnings As An Explanatory Variable For Returns. *Journal of Accounting Research*, *29*(1), 19–36.

Ely, K., P. J. Simko, and L. G. Thomas. 2003. The Usefulness of Biotechnology Firms' Drug Development Status in the Evaluation of Research and Development Costs. *Journal of Accounting, Auditing & Finance* 18 (1): 163–96.

European Union (EU) Accounting and Modernisation Directive. 2003. Directive 2003/51/EC of the European Parliament and of the Council.

Francis, J., K. Schipper, and L. Vincent. 2010. The Relative and Incremental Explanatory Power of Earnings and Alternative (to Earnings) Performance Measures for Returns. *Contemporary Accounting Research* 20 (1): 121–64.

Givoly, D and Y. Li, B. Lourie, and A. Nekrasov. 2018. Key Performance Indicators: The Incremental News in Their Disclosures and the Properties of Their Analyst Forecasts. Working Paper.

Guo, R.J., B. Lev, and N. Zhou. 2005. The Valuation of Biotech IPOs. *Journal of Accounting, Auditing & Finance* 20 (4): 423–59.

Hand, J. 2000. Profits, Losses and the Non-Linear Pricing of Internet Stocks. Working Paper.

Hand, J. 2001. The Role of Economic Fundamentals, Web Traffic, and Supply and Demand in the Pricing of U.S. Internet Stocks. *European Finance Review* 5: 295–317

Hand, J. 2005. The Value Relevance of Financial Statements in the Venture Capital Market. *The Accounting Review* 80(2), 613-648.

Hand, J. and H. Laurion, and A. Lawrence, and N. Martin. 2018. Analyst Forecast Data Feeds Are Not What They Used to Be. *Working Paper*.

Harris, T., and Ohlson, J. 1987. Accounting Disclosures and the Market's Valuation of Oil and Gas Properties. *The Accounting Review*, 62(4), 651-670.

Hughes, K. 2000. The Value Relevance of Nonfinancial Measures of Air Pollution in the Electric Utility Industry. *The Accounting Review*, 75(2), 209-228.

International Accounting Standards Board (IASB). 2010. IFRS Practice Statement 1 Management Commentary: A framework for presentation.

Ittner, C., and D. Larcker. 1998. Are Nonfinancial Measures Leading Indicators of Financial Performance? An Analysis of Customer Satisfaction. *Journal of Accounting Research* 36: 1–35.

Ittner, C., D. Larcker, and M. Rajan. 1997. The Choice of Performance Measures in Annual Bonus Contracts. *The Accounting Review* 72 (2): 231–55.

Kaplan, R., and D. Norton. 1992. The Balanced Scorecard: Measures that Drive Performance. *Harvard Business Review* 70: 71–79.

Kaplan, R., and D. Norton. 2001. Transforming the Balanced Scorecard from Performance Measurement to Strategic Management: Part I. *Accounting Horizons* 15 (1): 87–104.

Keating, E. K., T. Z. Lys, and R.P. Magee. 2003. Internet Downturn: Finding Valuation Factors in Spring 2000. *Journal of Accounting and Economics* 34 (1): 189–236.

Lev, B., and S. R. Thiagarajan. 1993. Fundamental Information Analysis. *Journal of Accounting Research*, *31*(2), 190–215.

Li, K. and P. Mohanram. 2018. Fundamental Analysis: Combining the Search for Quality with the Search for Value. *Contemporary Accounting Research forthcoming*

Liu, C., J. Livnat, and S. G. Ryan. 1996. Forward-looking Financial Information: The Order Backlog as a Predictor of Future Sales. *The Journal of Financial Statement Analysis (Fall),* 89-99.

Livne, G., Simpson, A., and Talmor, E. 2011. Do Customer Acquisition Cost, Retention and Usage Matter to Firm Performance and Valuation? *Journal of Business Finance & Accounting*, 38: 334-363.

Magliolo, J. 1986. Capital Market Analysis of Reserve Recognition Accounting. Journal of Accounting Research, 24, 69-108.

Mohanram, P. S. 2005. Separating Winners from Losers among Low Book-to-Market Stocks Using Financial Statement Analysis. *Review of Accounting Studies* 10 (2): 133–70.

Mohanram, P, S. Saiy, and D. Vyas. 2018. Fundamental Analysis of Banks: The Use of Financial Statement Information to Screen Winners from Losers. *Review of Accounting Studies* 23 (1): 200–233.

Myers, J.N. 1999. "Implementing Residual Income Valuation with Linear Information Dynamics." *The Accounting Review* 74 (1): 1–28.

Ou, J.A., and S. H. Penman. 1989. Financial Statement Analysis and the Prediction of Stock Returns. *Journal of Accounting and Economics* 11 (4): 295–329.

Piotroski, J. 2000. Value Investing: The Use of Historical Financial Statement Information to Separate Winners from Losers. *Journal of Accounting Research*, 38, 1-41.

Rajgopal, S., T. Shevlin, and M. Venkatachalam. 2003. Does the Stock Market Fully Appreciate the Implications of Leading Indicators for Future Earnings? Evidence from Order Backlog. *Review of Accounting Studies* 8 (4): 461–92.

Rajgopal, S., M. Venkatachalam, and S. Kotha. 2003. The Value Relevance of Network Advantages: The Case of E–Commerce Firms. *Journal of Accounting Research* 41 (1): 135–62.

Schefczyk, M. 1993. Operational performance of airlines: An extension of traditional measurement paradigms. *Strategic Management Journal* 14: 301-317.

Securities and Exchange Commission (SEC). 2003. Interpretation: Commission Guidance Regarding Management's Discussion and Analysis of Financial Condition and Results of Operations.

Securities and Exchange Commission (SEC). 2008. Final report of the advisory committee on improvements to financial reporting to the United States Securities and Exchange Commission.

Securities and Exchange Commission (SEC). 2016. Concept Release: Business and Financial Disclosure Required By Regulation S-K.

Simpson, A. 2010. Analysts' Use of Nonfinancial Information Disclosures. *Contemporary Accounting Research* 27 (1): 249–88.

Smith, R.E. and W. F. Wright (2004) Determinants of Customer Loyalty and Financial Performance. *Journal of Management Accounting Research*: December 2004, Vol. 16, No. 1, pp. 183-205.

Smith, R.E. and W. F. Wright. 2004. "Determinants of Customer Loyalty and Financial Performance." *Journal of Management Accounting Research* 16 (1): 183–205.

Spear, N. A. 1994, The Stock Market Reaction to the Reserve Quantity Disclosures of U.S. Oil and Gas Producers. *Contemporary Accounting Research*, 11: 381-404.

Steele, L.B. and M.A. Trombley. 2012. The Information Content of Accounting Disclosures for Forecasting Sales of Manufacturing Firms. Working Paper, University of Wisconsin and University of Arizona.

Trueman, B., M. H. Franco Wong, & Zhang, X. 2000. The Eyeballs Have It: Searching for the Value in Internet Stocks. Journal of Accounting Research, 38, 137-162.

Trueman, B, F. Wong, and X.J. Zhang. 2001. Back to Basics: Forecasting the Revenues of Internet Firms. *Review of Accounting Studies* 6 (2): 305–29.

Xu, B., Magnan, M. L. and André, P. E. 2007. The Stock Market Valuation of R&D Information in Biotech Firms. *Contemporary Accounting Research*, 24: 1291-1318.