FABA
Finance, Accounting and Business Analysis
ISSN: 2603-5324

Finance, Accounting and Business Analysis
Volume 7 Issue 1, 2025
http://faba.bg/
ISSN 2603-5324
DOI: https://doi.org/10.37075/FABA.2025.1.03

Do key performance indicators derived from value-based management better predict total stockholder return than traditional performance indicators?

Matthias Olivier [1*], **Roland Wolf** [2]

UCAM Universidad Católica de Murcia, Murcia, Spain [1]
FOM University of Applied Sciences for Economics and Management, Essen, Germany [2]
* Corresponding author

Info Articles

History Article:
Submitted 26 October 2024
Revised 4 January 2025
Accepted 20 February 2025

Keywords:
Value Based Management, key performance Indicators, Value oriented performance measurement, Value Accounting.

JEL: G32; M41

Abstract

Purpose: This study investigates whether key performance indicators derived from value-based management are able to better predict total stockholder return than traditional performance indicators.
Design/Methodology/Approach: A sample (n = 1388) is drawn from corporate indices in four European countries (France, Germany, Italy, and Spain). The explanatory power of traditional performance indicators and value-based performance indicators is compared with regard to total stockholder return.
Findings: It is found that in the sample, value-based performance indicators are not able to better explain total stockholder return than traditional performance indicators.
Practical Implications: The results suggest that companies should consider placing greater emphasis on performance indicators, as leveraging both traditional and value-based performance metrics could help improve understanding of stockholder returns and potentially drive more informed strategic decision-making.
Originality/Value: The study provides insights into the relative effectiveness of value-based performance indicators versus traditional ones in explaining stockholder return across multiple European countries.
Keywords: Value Based Management, Key Performance Indicators, Value Oriented Performance Measurement, Value Accounting,
Paper Type: Research Paper.

* Address Correspondence:
E-mail: molivier@alu.ucam.edu[1]
roland.wolf@fom.de[2]

INTRODUCTION

Shareholder value is oftentimes considered the primary goal of any company in a free enterprise system (Friedman 1970), the concept was formalized by Alfred Rappaport in his book "Creating Shareholder Value: The New Standard for Business Performance" in 1986. Rappaport argues that ultimately the only reliable way to evaluate management's performance with regards to corporate strategy is the rate at which shareholder value is created (Rappaport 1986). The key concept of Rappaport's theoretical approach resulted in the establishment of the value-based management as a management principle. The concept of value-based management asserts that the primary guiding principle for management decisions is determined by maximizing shareholder value. Therefore, all actives of the company should be aligned in a way to maximize the value of the company (Weber et al. 2017). It is to note that the maximization of shareholder value does not necessarily (or oftentimes not at all) mean the short-term maximization of company profits. The value-based management principle much rather postulates that shareholder maximization is achieved when long-term implications of company policy and management decisions are taken into consideration (Weber et al. 2017). While these observations brought about a fundamental change in the understanding of corporate business strategies and today are considered a fundamental part of the body of knowledge in management science, the operationalization of these concepts is an area that is continuously evolving (Wobst et al. 2025). The operationalization of value-based management principles with the implementation of value-based measures of performance measurement puts these value-based measures of performance measurement into contrast to traditional performance indicators. This paper examines whether value-based performance measures are used by the participants in the European capital market to make market decisions using a sample of listed companies from France, Germany, Italy, and Spain.

KEY PERFORMANCE INDICATORS DERIVED FROM VALUE-BASED MANAGEMENT

Theoretical foundation of value relevance and empirical insights

The value relevance of performance indicators (both financial and non-financial) enables stake- and shareholders to evaluate the performance of a company and is ultimately reflected in the performance at the marketplace. This chapter summarizes the most discussed scientific research with regard to performance indicators and details the developments of the theoretical background and empirical insights.

The theoretical background of the value relevance can be traced back to the efficient market hypotheses based on the work of Fama (1970). The efficient market hypotheses states that the market price of a stock represents fully the available information, including both financial and non-financial data. In an efficient market all available information is already represented in the stock price and changes in the stock price are caused by new facts that are able to change the current price. This theoretical concept can be seen as empirically supported by the data analysis of Ball and Brown (1968) that showed the association of market information and stock price reaction. This study is noteworthy because it highlighted the value relevance of ad hoc capital market information. Based on these foundations numerous models were implemented. One noteworthy model that was developed by Ohlson (1995) that shows the relationship between market value and accounting information. Ohlson's concept is based on the idea that the value of a company can be based on a linear function of book values and earnings. These theoretical approaches have formed the basis that most research is founded on to develop the approaches for value relevance further. Feltham and Ohlson (1995) expanded these ideas by also including less secure factors into their equations. Most notably including growth potential in their model and therefore focusing more on the future performance of a stock that is represented by the current stock price. This extension has proven to be a cornerstone of the approach to value performance as the stock price is considered to only represent future performance of a stock.

Empirical results regarding value relevance

The empirical research has shown consecutively that finical information like Net Income, EBIT, EBITDA and Cashflow have a significant influence on market pricing, however the results regarding the significance of individual factors has been the subject of a multifaceted debate and has led to a wide array of insights.

Income is generally considered as being the most impactful performance indicator with regard to value relevance, as Kothari and Zimmerman (1995) have shown in a conclusive literature review and concluded that income is highly correlated with stock returns. This underscores the relevance that individual investors give to actual and estimated income publications that can lead to abrupt changes in market prices, especially if there is a difference between prior and current expectations. Collins et al. (1997) extended this perspective by further increasing the time horizon of the investigation and observed that the value relevance of income has been increasing at a slim rate over time, however that a corresponding slight increase in the relevance of book value has off set this development when considering income and book value and income

in combination. This observation is reinforced by the work of Penman and Sougiannis (1998) that showed that the book value has a significant impact on stock prices. This might indicate that the book value is a factor that is used to stabilize rapid changes in the estimated earnings and therefore makes models based on earnings performance more robust when considered as an additional variable. This was further dissected by Burgstahler and Dichev (1997) that noted that the situation of the company under consideration can influence the performance measurement that proves too impactful, as for companies that show a history of losses, book value becomes more relevant.

The significance of cashflows has increased over time, based on academic work of Dechow (1994) and Barth et al. (1998) who argued that cashflows paint a clearer picture of operative performance than the accrual accounting based performance indicators. This is considered to be especially true for industries and sectors that have discretion in accrual-based accounting by using leeway granted by accounting standards and auditors.

A different approach to the implication of historical performance was shown by focusing on the dividends a company pays as a signaling instrument to show successful performance. As Lintner (1956) coined the belief that stable dividends promise a stable performance. Based on these insights DeAngelo et al. (2000) proved that dividend policy is an important tool for signaling. And also, may represent trust in future performance.

The value relevance of non-financial performance indicators has increased in more recent years. Gompers et al. (2003) developed a model to include corporate governance into the performance relevance model and showed that a successful corporate governance structure is associated with a better performance. Klein (2002) showed that independence in boards and audit commits can increase the financial performance.

Value based management as a management concept

The creation of shareholder value oftentimes lies at the heart of corporate strategy. The idea is fleshed out by the concept of value-based management. Value based management is a way for the corporate strategy department to put the maximization of shareholder value into the individual business units of the company. The main idea is to align corporate strategy with the creation of shareholder value by viewing each decision and action that is made within the company from the perspective of shareholder value. In other words, value-based management means that the management of each individual business unit evaluates individual decision from a perspective that puts creating shareholder value for the company as a whole as the top priority (Weber et al. 2017).

At the beginning of any value-based management concept stands the idea of strategic planning. For an implementation of a value-based management concept each department responsible for strategic planning has to identify the value drivers from a strategic standpoint. The value drivers are individual factors that influence the value of the company. Metaphorically speaking looking at the value drivers is like putting shareholder value under the microscope to get a clearer picture of the individual elements of the value creation process. Commonly considered value drivers are profitability, market share and revenue growth. However, the identification of the value drivers in specific should go beyond these platitudes. Identification of value drivers therefore has to be based on a rigorous data analysis of financial and operational data.

Based on these value drivers the company can derive long term goals for value creation by individually setting goals for the value drivers. Subsequently, a corporate controlling that is focused on value creation within the strategic units of the company is central to value based management. A corporate controlling that adheres to the principles of value-based management promotes an approach that evaluates long term cashflows from each strategic unit and discounts them using the appropriate cost of capital. Additional shareholder value is created whenever the return of the investments exceeds the cost of capital. The common denominator of all actions based on value-based management is that the company's value is driven by discounted future cash flows. The key differentiator of a value-based management approach is to align decision making regarding strategic and operational decisions with the corresponding impacts on future discounted cash flows. From a more practical perspective this means that capital is allocated to those units of the company that promise the highest return on capital employed. Conversely, underperforming strategic units are changed or discontinued. The bridge between these theoretical considerations of the value-based management framework is built by the implementation of key performance indicators to evaluate the strategic units and projects of the company.

Value based management and key performance indicators

The implementation of a value-based management system requires the selection of key performance indicators that operationalize the value-based management approach (Martin et al. 2009). However, the implementation of key performance indicators is oftentimes considered as the gateway to principal agent conflicts. Agency theory is relevant in situations whenever a "principal" hires an "agent" to act on the principal's behalf (Gailmard 2014). The situation results in the principal-agent conflict. The conflict arises,

because the agent takes actions in his own interest and not in the interest of the principal that he represents (Jensen and Meckling 1976). The most important factor contributing to this conflict is the information asymmetry between the principal and the agent. Most commonly considered are hidden actions and hidden information. The hidden actions are due to the principal's inability to monitor all of the agents' actions in detail and the agent is able to take actions that benefit the agent and may hurt the principal. The possibility of hidden actions can lead to a moral hazard for the agent because the agent can be in a situation where an action is beneficial to him but at the principal's expense (Pauly 1968). Hidden Information is relevant due to the fact that the agent has more and better access to information, as the agent is closer to the business itself and might even be privy to some of the information, resulting in the principal being at an information disadvantage. The possibility of hidden information can lead to an adverse selection for the principal, because the information asymmetry might lead to an imbalance between the agent and the principal (Akerlof 1970). One of the most important tools to mitigate these problems in terms of the principal agent conflict is the design and the contents of the contractual relationship between the principal and the agent (Jensen and Meckling 1976). In an ideal situation the contract can be designed in a way that aligns the interests of the principal and the agent. While there are ample scientific models to evaluate these considerations from a theoretical perspective, the practical perspective is often concerned with the problem, how the success of the agent is measured (Ali and Hwang 2000). As the measures of success are therefore a key element to the mitigation of the principal agent conflicts, the analysis will look to the measures of success used for performance measurement in order to highlight the challenges resulting from the principal agent conflict. Traditional performance measures like Earnings and Revenue are criticized for lacking the alignment between shareholder value and management performance. Value based management emphasizes the use of key performance indicators that underscore the created value.

CONCEPT FOM

To enable a comparison between the predictive power of traditional performance indicators and value-based performance indicators a standardized value concept is helpful. The standardization of a value-based concept enables our research to incrementally develop the understanding of value-based performance indicators. In this paper we therefore want to draw on the standardized approach that was developed by cfrv (Center for Financial Reporting and Valuation) and FOM (Hochschule für Oekonomie & Management) to determine value-oriented key performance indicators (Wolf 2017). In detail we identified four different value-oriented performance indicators for use in our model.

Value Added (cfrv/FOM): determines the value added by subtracting total cost of capital from EBIT, while total cost of capital is calculated using a WACC-approach. For comparability purposes, the value added per share (cfrv/FOM) ratio is used.

Value rate (cfrv/FOM) per share determines the value-added rate by dividing the Value Added by the capital used.

Price value ratio (cfrv/FOM): determines the ratio of the stock price to the added value.

Value performance ratio cfrv/FOM: determines the ratio of the Value rate (cfrv/FOM) to the Price value ratio (cfrv/FOM)

For additional corroboration we used the value-based performance indicators ROCE, EVA and Price/Value Ratio based on EVA that have been calculated in accordance with the industry standards.

The following research analyses whether novel ideas for value-based performance indicators are better able to capture the actual value creation of the companies.

RESEARCH DESIGN

Performance indicators for analysis

For the analysis we have considered different performance indicators that might be suitable to explain the change in the shareholder value. From an analytical perspective we grouped the performance indicators into two subgroups that form the basis of our analysis. On the one hand we considered traditional performance indicators, on the other hand we considered value-oriented performance indicators.

Among the group of traditional performance indicators, we made the following consideration with regard to selection of performance indicators. We considered Revenue per share and return on sales to include a top line perspective in the analysis. We included EBIT per share, EBIT margin, Earnings Before Tax per share and Earnings per share to include the most commonly used indicators for economic success in the accrual sense and expanded the selection with the CF margin for a more Cash oriented perspective. To incorporate the perspective of traditional stock analysis we incorporated the P/E Ratio, return on equity before tax, return on equity after tax, return on assets before tax and Tobin's Q. For the calculation of these performance indicators, we were able to rely on traditional patterns for calculation.

With regard to the value-based performance indicators we use the cfvr/FOM approach outlined in

the previous chapter and also included the EVA methodology to broaden the value-based approach of the research.

Sample selection and data

As a basis for our sample of companies, we chose Stock Indices from four Continental European countries (France, Germany, Italy, and Spain). We chose these four European countries, because they represent a significant portion of the EU's GDP (in total these four countries are responsible of about 60 % of the EU's GDP). The benchmark stock indices were chosen, because the biggest public companies are oftentimes considered to be a benchmark to smaller companies as big public companies are at the pulse of current developments in corporate strategy. As a result, we chose the French CAC 40, the German DAX 40, the Italian MIB and the Spanish IBEX 35 to give us the basic population for our analysis. In total we had a number of 155 companies in our initial sample. We collected the financial information data for an analysis period of ten years (2014 through 2023) to have a longer-term perspective on the development of shareholder value to include a medium to long term perspective on the creation of shareholder value.

We employed Bloomberg Financial to retract the financial data of our sample. We corroborated the data by verifying accuracy through comparisons with Refinitiv and if necessary, replacing missing data in our sample. For the ten-year observation period we extracted a population of n = 1388 individual observations. For the calculation of the performance indicators, we used standard calculation principles.

Table 1. Sample Composition

Index	No.	Possible Observations	Exclusion due to missing data	Individual Observations
CAC 40	40	400	42	358
DAX 40	40	400	45	355
IBEX 35	35	350	34	316
MIB	40	400	41	359
Total	**155**	**1550**	**136**	**1388**

Source: Authors' compilation

Table 2. Sample Structure

Index	Industry	Banking	Insurance	Other Sectors	Total
CAC 40	21	2	3	14	40
DAX 40	20	3	4	13	40
IBEX 35	16	6	3	10	35
MIB	22	4	3	11	40
Total	**79**	**15**	**13**	**48**	**155**

Source: Authors' compilation

Models' specification

To determine the predictive power of the different performance indicators, we use a fixed effects model. The dependent variable is the total stockholder return (TSR). We have identified n = 1388 individually calculated performance indicators. We have grouped the performance indicators into two groups. The first group of the performance indicators are traditional performance indicators that are based on a traditional accrual-based approach towards performance measurement. The other group of performance indicators are based on value-oriented management performance indicators.

Table 3. Dependent Variable

Dependent Variable	Variable Abbreviation
Total Stockholder Return	TSR

Source: Authors' compilation

Table 4. Independent Variables: traditional Performance Indicators

Performance Indicators	Variable Abbreviation
Revenue per share	RpS
Return on sales	RoS
Ebit per share	EBITpS
Ebit margin	EBITM
CF margin	CFMAR
Earnings per share	EpS
P/E Ratio	PER
Ebt per share	EBTpS
Return on equity before tax	RoEbT
Return on equity after tax	RoEaT
Return on assets before tax	RoAbT
Tobin's Q	TQ

Source: Authors' compilation

Table 5. Independent Variables: Value Oriented Performance Indicators

Performance Indicators	Variable Abbreviation
Return on capital employed	ROCE
Value added cfrv/FOM per share	VApS
Value rate cfrv/FOM per share	VRpS
Price value ratio cfrv/FOM	PVR
Value performance ratio cfrv/FOM	VPR
Economic value added per share	EVApS
Price Value ratio EVA	PEVAR

Source: Authors' compilation

Table 6. Full definitions of the variables

Variable Abbreviation	Variable Definition
TSR	((Ending Stock Price - Beginning Stock Price + Dividends Paid) / Beginning Stock Price) × 100
RpS	Total revenue / Number of outstanding shares
RoS	(Operating income (Ebit) / Total revenue) × 100
EBITpS	EBIT / Number of Outstanding Shares
EBITM	(EBIT / Total Revenue) × 100
CFMAR	(Operating Cash Flow / Total Revenue) × 100
EpS	Net Income / Number of Outstanding Shares
PER	Share Price / Earnings per Share (EPS)
EBTpS	EBT / Number of Outstanding Shares
RoEbT	(EBT / Shareholders' Equity) × 100
RoEaT	(Net Income / Shareholders' Equity) × 100
RoAbT	(EBT / Total Assets) × 100
TQ	Market Value of Firm's Assets / Replacement Cost of Firm's Assets
ROCE	(EBIT / Capital Employed) × 100
VApS	(Cash Flow Return on Value / Fixed Operating Margin) / Number of Outstanding Shares
VRpS	Cash Flow Return on Value / Fixed Operating Margin per Share

Variable Abbreviation	Variable Definition
PVR	hare Price / (Cash Flow Return on Value / Fixed Operating Margin)
VPR	(Cash Flow Return on Value / Fixed Operating Margin) × 100
EVApS	Economic Value Added / Number of Outstanding Shares
PEVAR	Share Price / Economic Value Added per Share

Source: Authors' compilation

To determine the predictive power of the regression model we run the regressions individually for each independent variable. The independent variables show the rate of change of an individual performance indicator.

Table 7. Regression Model: traditional performance indicators

Variable Abbreviation	Regression Model
RpS	$TSR = \alpha + \beta*RpS+ \epsilon$
RoS	$TSR = \alpha + \beta*RoS+ \epsilon$
EBITpS	$TSR = \alpha + \beta*EBITpS+ \epsilon$
EBITM	$TSR = \alpha + \beta*EBITM+ \epsilon$
CFMAR	$TSR = \alpha + \beta*CFMAR+ \epsilon$
EpS	$TSR = \alpha + \beta*EpS+ \epsilon$
PER	$TSR = \alpha + \beta*PER+ \epsilon$
EBTpS	$TSR = \alpha + \beta*EBTpS+ \epsilon$
RoEbT	$TSR = \alpha + \beta*RoEbT+ \epsilon$
RoEaT	$TSR = \alpha + \beta*RoEaT+ \epsilon$
RoAbT	$TSR = \alpha + \beta*RoAbT+ \epsilon$
TQ	$TSR = \alpha + \beta*TQ+ \epsilon$

Source: Authors' compilation

Table 8. Regression Model: value-oriented performance indicators

Variable Abbreviation	Regression Model
ROCE	$TSR = \alpha + \beta*ROCE+ \epsilon$
VApS	$TSR = \alpha + \beta*VApS + \epsilon$
VRpS	$TSR = \alpha + \beta*VRpS + \epsilon$
PVR	$TSR = \alpha + \beta*PVR + \epsilon$
VPR	$TSR = \alpha + \beta*VPR + \epsilon$
EVApS	$TSR = \alpha + \beta*EVApS+ \epsilon$
PEVAR	$TSR = \alpha + \beta*PEVAR+ \epsilon$

Source: Authors' compilation

Building on the results of the simple regression models, a multiple regression model is developed that incorporates the highest-ranked performance indicators to provide deeper insights. However, this approach introduces the potential challenge of multicollinearity, which may affect the stability and interpretability of the model's estimates. As a result, the variables chosen for the multiple regression will need to be reviewed for the level of correlation before the regression is performed to mitigate this issue.

EMPIRICAL RESULTS

Results simple panel regression analysis

Descriptive statistics related to the variables of the research are presented in Table 8 and 9.

Table 9. Descriptive statistics independent variables

Abbreviation	N	Median	Mean	SD
RpS	1355	0.0701	0.0997	0.2717
RoS	1355	2.1130	4.4340	7.0671
EBITpS	1355	0.0983	0.1372	0.2520
EBITM	1355	0.1291	0.4722	12.7261
CFMAR	1355	1.1769	2.6272	5.7987
EpS	1355	13.6821	18.4380	116.8462
PER	1355	1.5835	3.5706	7.0446
EBTpS	1355	0.1374	0.1404	0.2134
RoEbT	1355	0.1048	0.1028	0.1754
RoEaT	1355	0.0535	0.0597	0.0629
RoAbT	1355	1.1360	1.4560	1.1384
TQ	1355	0.0780	0.0909	0.1171
ROCE	1355	0.1955	0.8783	4.3732
VApS	1355	0.0105	0.0227	0.1200
VRpS	1355	14.7566	32.3438	358.4022
PVR	1355	0.0127	-0.0626	5.4477
VPR	1355	-0.0503	-2.4621	22.7578
EVApS	1355	-1.6805	-117.1010	4,215.7867
PEVAR	1355	16.5466	40.7874	65.1478

Source: Authors' compilation

Table 10. Correlation Matrix

	TSR	RpS	RoS	EBITpS	EBITM	CFMAR	EpS	PER	EBTpS	RoEbT	RoEaT	RoAbT	TQ	ROCE	VApS	VRpS	PVR	VPR	EVApS	PEVAR
TSR	1.0000	0.3935	0.1165	0.7088	0.1208	0.0807	0.6707	0.0316	0.7055	0.2039	0.2208	0.3579	0.2473	0.1803	0.5643	0.0264	0.0245	-0.0722	-0.0005	0.5584
RpS	0.3935	1.0000	-0.0836	0.7131	-0.1110	-0.0947	0.6897	0.0161	0.7025	0.0816	0.0884	-0.0195	0.0634	0.0268	0.2466	-0.0237	0.0115	-0.3158	0.0065	-0.0181
RoS	0.1165	-0.0836	1.0000	0.2340	0.9596	0.2659	0.2801	0.0115	0.2422	0.4185	0.3659	0.5058	0.3479	0.2953	0.2666	0.0298	0.4687	0.0169	-0.0438	0.1819
EBITpS	0.7088	0.7131	0.2340	1.0000	0.2207	0.0312	0.9862	0.0116	0.9974	0.3151	0.3150	0.3564	0.2936	0.2347	0.7359	-0.0008	0.1567	-0.1970	-0.0212	0.2282
EBITM	0.1208	-0.1110	0.9596	0.2207	1.0000	0.3170	0.2483	0.0105	0.2245	0.3803	0.3522	0.5025	0.3556	0.3012	0.2724	0.0319	0.4083	0.0310	-0.0551	0.2048
CFMAR	0.0807	-0.0947	0.2659	0.0312	0.3170	1.0000	0.0298	0.0012	0.0333	0.1030	0.0999	0.1919	0.1337	0.0824	0.0482	0.0345	-0.0047	0.0077	-0.0344	0.2131
EpS	0.6707	0.6897	0.2801	0.9862	0.2483	0.0298	1.0000	0.0038	0.9899	0.3453	0.3293	0.3661	0.3056	0.2448	0.7401	0.0008	0.1907	-0.2078	-0.0200	0.2156
PER	0.0316	0.0161	0.0115	0.0116	0.0105	0.0012	0.0038	1.0000	0.0102	0.0250	0.0260	0.0393	0.0283	0.0127	-0.0020	0.0137	0.0032	-0.0008	0.0017	0.0608
EBTpS	0.7055	0.7025	0.2422	0.9974	0.2245	0.0333	0.9899	0.0102	1.0000	0.3227	0.3218	0.3626	0.3010	0.2409	0.7438	0.0008	0.1591	-0.2024	-0.0227	0.2344
RoEbT	0.2039	0.0816	0.4185	0.3151	0.3803	0.1030	0.3453	0.0250	0.3227	1.0000	0.9781	0.6555	0.4393	0.3439	0.3968	0.0396	0.4377	0.0308	-0.0207	0.3687
RoEaT	0.2208	0.0884	0.3659	0.3150	0.3522	0.0999	0.3293	0.0260	0.3218	0.9781	1.0000	0.6464	0.4187	0.3142	0.3944	0.0410	0.3591	0.0353	-0.0238	0.3922
RoAbT	0.3579	-0.0195	0.5058	0.3564	0.5025	0.1919	0.3661	0.0393	0.3626	0.6555	0.6464	1.0000	0.6706	0.5222	0.5304	0.0492	0.4074	0.1088	-0.0266	0.6914
TQ	0.2473	0.0634	0.3479	0.2936	0.3556	0.1337	0.3056	0.0283	0.3010	0.4393	0.4187	0.6706	1.0000	0.8708	0.4340	0.0293	0.4005	-0.0018	-0.0134	0.4769
ROCE	0.1803	0.0268	0.2953	0.2347	0.3012	0.0824	0.2448	0.0127	0.2409	0.3439	0.3142	0.5222	0.8708	1.0000	0.4244	0.0172	0.4824	0.0231	-0.0119	0.2962
VApS	0.5643	0.2466	0.2666	0.7359	0.2724	0.0482	0.7401	-0.0020	0.7438	0.3968	0.3944	0.5304	0.4340	0.4244	1.0000	0.0229	0.2559	-0.0367	-0.0293	0.3333
VRpS	0.0264	-0.0237	0.0298	-0.0008	0.0319	0.0345	0.0008	0.0137	0.0008	0.0396	0.0410	0.0492	0.0293	0.0172	0.0229	1.0000	0.0039	0.0136	0.0014	0.0934
PVR	0.0245	0.0115	0.4687	0.1567	0.4083	-0.0047	0.1907	0.0032	0.1591	0.4377	0.3591	0.4074	0.4005	0.4824	0.2559	0.0039	1.0000	0.0066	-0.0031	0.0128
VPR	-0.0722	-0.3158	0.0169	-0.1970	0.0310	0.0077	-0.2078	-0.0008	-0.2024	0.0308	0.0353	0.1088	-0.0018	0.0231	-0.0367	0.0136	0.0066	1.0000	-0.0027	0.0715
EVApS	-0.0005	0.0065	-0.0438	-0.0212	-0.0551	-0.0344	-0.0200	0.0017	-0.0227	-0.0207	-0.0238	-0.0266	-0.0134	-0.0119	-0.0293	0.0014	-0.0031	-0.0027	1.0000	0.0017
PEVAR	0.5584	-0.0181	0.1819	0.2282	0.2048	0.2131	0.2156	0.0608	0.2344	0.3687	0.3922	0.6914	0.4769	0.2962	0.3333	0.0934	0.0128	0.0715	0.0017	1.0000

We ran 19 simple panel regression analysis for all the companies in the CAC, DAX, IBEX and MIB over a ten-year time span. The simple regression analysis for the whole data set showed statistically significant results in 2 out of 19 regression models at the 5% significance level between the performance indicator and Total Shareholder Return (TSR) (as shown in Table 11 and 12). Divided by subgroups we found that out of the 12 traditional performance indicators 2 show a significant result at the 5% significance level between the performance indicator and Total Shareholder Return (TSR). Out of the 7 value-oriented performance indicators none show a significant result at the 5% significance level between the performance indicator and Total Shareholder Return (TSR). We have ranked the 19-panel regression model by the predictive power (indicated by r-squared). It is to note that Tobin's Q shows the highest predictive power among the traditional performance indicators. The highest ranked performance indicator from the group of the value-oriented performance indicators is Value rate per share with rank 3. However, this result is not significant. To further deepen the understanding of the predictive power we incrementally performed a two-factor regression analysis to better understand if the combination of traditional performance indicators offers a higher predictive power.

Table 11. Independent Variables: traditional Performance Indicators

Performance Indicators	Variable Abbreviation	Coefficient	Std. Error	t-Statistic	p-Value	R2	Rank
Revenue per share	RpS	0.5478	0.0306	17.9273	0.0000	0.2552	2
Return on sales	RoS	0.0002	0.0005	0.3500	0.7264	0.0001	9
EBIT per share	EBITpS	-0.0002	0.0013	-0.1707	0.8645	0.0000	16
EBIT margin	EBITM	-0.0004	0.0014	-0.3119	0.7552	0.0001	13
CF margin	CFMAR	-0.0001	0.0017	-0.0670	0.9466	0.0000	17
Earnings per share	EpS	0.0002	0.0007	0.3244	0.7457	0.0001	12
P/E RATIO	PER	-0.0009	0.0010	-0.8589	0.3906	0.0008	5
EBT per share	EBTpS	-0.0005	0.0019	-0.2455	0.8062	0.0001	15
Return on equity before tax	RoEbT	0.0002	0.0006	0.2960	0.7673	0.0001	14
Return on equity after tax	RoEaT	-0.0011	0.0016	-0.6864	0.4927	0.0005	6
Retrun on assets before tax	RoAbT	-0.0004	0.0013	-0.3304	0.7411	0.0001	11
Tobin's Q	TQ	1.1819	0.0530	22.2986	0.0000	0.3464	1

Source: Authors' compilation

Table 12. Independent Variables: Value Oriented Performance Indicators

Performance Indicators	Variable Abbreviation	Coefficient	Std. Error	t-Statistic	p-Value	R2	Rank
Return on capital employed	ROCE	-0.0004	0.0013	-0.3333	0.7390	0.0001	10
Value added per share	VApS	0.0008	0.0008	1.0202	0.3079	0.0011	4
Value rate per share	VRpS	0.0009	0.0007	1.2418	0.2146	0.0016	3
Price value ratio	PVR	0.0002	0.0003	0.6313	0.5280	0.0004	7
Value performance ratio	VPR	-0.0000	0.0000	-0.0320	0.9745	0.0000	19
EVA per share	EVApS	0.0000	0.0003	0.0565	0.9550	0.0000	18
Price Value ratio EVA	PEVAR	0.0001	0.0001	0.4487	0.6537	0.0002	8

Source: Authors' compilation

Results multiple panel regression analysis

To better understand the interactions and the incremental knowledge from combining the individual performance indicators we ran a combination of two-factor panel regression analysis. We compared the predictive power of a two-factor regression model using the two highest ranked traditional performance indicator with a two-factor regression model using the highest ranked performance indicator from the subgroup of traditional performance indicator with the highest ranked performance indicator from the subgroup of value-oriented performance indicators. As a multiple regression approach introduces the potential challenge of multicollinearity the variables chosen for the multiple regression were reviewed for critical levels of correlation before the regression is performed. However, the correlation between the two pairs of variables TQ/RpS (correlation: 0.0634) and TQ/VRpS (correlation: 0.0293) did not reach a critical level.

We ran two multiple panel regression analysis for all the companies in the CAC, DAX, IBEX and MIB

over a ten-year time span (as shown in Table 13 and 14). The multiple regression analysis for the whole data set showed statistically significant results in both of the models at the 5% significance level (as shown in Table 13 and 14). Divided by subgroups we found that using the two highest ranked traditional performance indicators shows a higher predictive power (indicated by r-squared) as using a combination of traditional and value-based performance indicators. The results show that the predictive power using the two highest ranked traditional performance indicators is higher than the predictive power of a model using the highest ranked traditional and value-oriented performance indicators.

Table 13. Independent variables: traditional performance indicators

Independent variables	**Variable abbreviation**	**Regression model**
Revenue per share, Tobin's Q	RpS, TQ	$TSR = \alpha + \beta_1*RpS + \beta_2* TQ + \varepsilon$
Tobin's Q, Value rate per share	TQ, VRpS	$TSR = \alpha + \beta_1*TQ + \beta_2* VRpS + \varepsilon$

Source: Authors' compilation

Table 14. Two factor regression model using the two highest ranked traditional performance indicators

Performance indicators	**Variable Abbreviation**	**Coefficient**	**Std. Error**	**t-Statistic**	**p-Value**	**R2**	**Rank**
Revenue per share	RpS	0.5584	0.0412	13.5623	0.00	0.36907	1
Tobin's Q	TQ	23.2050	1.4604	15.8890	0.00		

Source: Authors' compilation

Table 15. Two factor regression model using the highest ranked traditional and value-oriented performance indicators

Performance Indicators	**Variable Abbreviation**	**Coefficient**	**Std. Error**	**t-Statistic**	**p-Value**	**R2**	**Rank**
Tobin's Q	TQ	28.7588	1.5180	18.9455	0.0000	0.26019	2
Value rate per share	VRpS	18.9156	8.7410	2.1640	0.0307		

Source: Authors' compilation

DISCUSSION

This study examines the role that key performance indicators play in changes in total stockholder return. Specifically, the paper examines the differences in traditional performance indicators and value-oriented performance indicators. Based on an extensive dataset of European companies listed in standard indices – the CAC 40, DAX 40, MIB and IBEX 35 – and the analysis for data over a time period of 10 years we examined the predictive power of traditional and value-based performance measures for total stockholder return. Of the 19 analyzed performance indicators 2 traditional KPIs showed a significant prediction ability for the TSR while none of the 7 value-based performance indicators showed a similar significance. Among the traditional performance indicators Tobin's Q was the strongest predictor for TSR. In contrast the value-oriented indicators were not significant, so we cannot assume any predictive power.

These results imply that traditional performance indicators still play an important role in explaining total shareholder return despite the theoretical advantages that value based performance indicators could have. This might be caused by the established processes to evaluate these indicators and the availability of the data for these indicators for investors and analysts. An additional role might play, that the traditional indicators offer a more straight forward approach in interpreting the performance of a company.

Our results are in line with a current study that examined the efficacy of value-based indicators in relation to TSR prediction. A study of Makhija and Trivedi (2021), that examined a sample of Indian-listed companies analyzed that performance indicators like Economic Value Added (EVA) and Cash Value Added (CVA) offer noteworthy insights into a company but do not offer the same precise prediction ability as traditional performance indicators. The authors Hauser et al. (2022) conclude similar results, that traditional performance indicators like return on capital invested and earnings per share correlate stronger with market reactions in short to medium time horizons, especially if market conditions are volatile. While these analyses found varying degrees of predictive power of the value-oriented performance indicators the strong focus lay on the EVA model.

In contrast to this our research focuses on novel performance indicators that incrementally build on previous studies that have shown results using a more differentiated approach regarding value-oriented

performance indicators. Previous studies into the concept of novel performance indicators have shown, that the predictive power of novel performance indicators offers predictive powers that lie between 7,7 and 19,4 % (see table below).

Table 16. Independent variables: traditional performance indicators

Previous research	Value oriented performance indicator	R-Squared of Model
Kümpel et al. (2021a)	Value added and Value Rate (cfrv/FOM)	0.1937
Kümpel et al. (2021b)	Price Value Ratio (cfrv/FOM)	0.077

Source: Authors' compilation

The findings in this paper show that value-oriented performance indicators have less predictive power than traditional performance indicators. The cause for the relatively high predictive power of traditional performance indicators can be caused by a number of factors. However, one explanation might be that value-based management principles have not penetrated the approaches to strategic controlling as much as one would expect in light of the popularity of the shareholder-based management approach. This could lead to the conclusion that an increase in shareholder value could be possible if value-based management approaches were applied more widely in practice. Further research is necessary to evaluate which reasons are responsible reserved attitudes toward the application of these models.

REFERENCES

Akerlof, G. A. 1970. The Market for 'Lemons': Quality Uncertainty and the Market Mechanism. *Quarterly Journal of Economics*, 84(3): 488–500. The MIT Press. https://www.sfu.ca/~wainwrig/Econ400/akerlof.pdf

Ali, A. and L. S. Hwang. 2000. Country-specific factors related to financial reporting and the value relevance of accounting data. *Journal of Accounting Research*, 38(1): 1–21. https://www.jstor.org/stable/2672920.

Ball, R. and P. Brown. 1968. An empirical evaluation of accounting income numbers. *Journal of Accounting Research*, 6(2): 159–178. https://www.jstor.org/stable/2490232.

Barth, M. E., W. H. Beaver, J. R. Hand, and W. R. Landsman. 1998. Accruals, cash flows, and equity values. *Review of Accounting Studies*, 3(3): 205–229.

Burgstahler, D. and I. Dichev. 1997. Earnings, adaptation, and equity value. *The Accounting Review*, 72(2): 187–215. https://www.jstor.org/stable/248552.

Collins, D. W., E. L. Maydew, and I. S. Weiss. 1997. Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting and Economics*, 24(1): 39–67. https://doi.org/10.1016/S0165-4101(97)00015-3.

DeAngelo, H., L. DeAngelo, and D. Skinner. 2000. Special dividends and the evolution of dividend signaling. *Journal of Financial Economics*, 57(3): 309–354. https://doi.org/10.1016/S0304-405X(00)00060-X.

Dechow, P. M. 1994. Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. *Journal of Accounting and Economics*, 18(1): 3–42. https://doi.org/10.1016/0165-4101(94)90016-7.

Fama, E. 1970. Efficient capital markets: A review of theory and empirical work. *The Journal of Finance*, 25(2), 383–417. https://www.jstor.org/stable/2325486.

Feltham, G. A., and J. A. Ohlson. 1995. Valuation and clean surplus accounting for operating and financial activities. *Contemporary Accounting Research*, 11(2): 689–731. https://doi.org/10.1111/j.1911-3846.1995.tb00462.x.

Friedman, M. 1970. The social responsibility of business is to increase its profits. *New York Times Magazine*.

Gailmard, S. 2014. Accountability and Principal–Agent Theory. In Bovens, M., Goodin, R. E., and Schillemans, T. (Eds.), *The Oxford Handbook of Public Accountability* (online ed.). Oxford Academic. doi:10.1093/oxfordhb/9780199641253.013.0016.

Gompers, P. A., J. L. Ishii, and A. Metrick. 2003. Corporate governance and equity prices. *The Quarterly Journal of Economics*, 118(1): 107–156.

Hauser, M., R. Koch, and E. Turnes. 2019. Wie gut erklären EVA & Co. den Schweizer Aktienindex? *Controlling & Management Review*, 63: 50–55.

Jensen, M. C., and W. H. Meckling. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4): 305–360. https://doi.org/10.1016/0304-405X(76)90026-X.

Klein, A. 2002. Audit committee, board of director characteristics, and earnings management. *Journal of Accounting and Economics*, 33(3): 375–400. https://doi.org/10.1016/S0165-4101(02)00059-9.

Kothari, S. P. and Zimmerman, J. L. 1995. Price and return models. *Journal of Accounting and Economics*, 20(2),

155–192. https://doi.org/10.1016/0165-4101(95)00399-4.

Kümpel, T., T. Greling, and R. Wolf. 2021a. Kapitalmarktorientierte, erfolgswirtschaftliche und wertorientierte Kennzahlen als Prädiktoren für die Aktienperformance der Unternehmen BOVESPA30 zu NZX30. *IRZ*: 443–444.

Kümpel, T., J. Werner, and R. Wolf. 2021b. Erklärungsgehalt wertorientierter Kennzahlen zur Performancemessung der Unternehmen des BEL20 aus Sicht der Behavioral Finance. *IRZ*: 277–278.

Lintner, J. 1956. Distribution of incomes of corporations among dividends, retained earnings, and taxes. *American Economic Review*, 46(2): 97–113. https://www.jstor.org/stable/1910664.

Makhija, H., and T. Pankaj. 2021. An empirical investigation of the relationship between TSR, value-based and accounting-based performance measures. *International Journal of Productivity and Performance Management*, 70(5):1118–1136. https://doi.org/10.1108/IJPPM-05-2019-0231.

Martin, J. D., J. W. Petty, and J. S. Wallace. 2009. Value Based Management with Corporate Social Responsibility. Vereinigtes Königreich, Oxford University Press.

Ohlson, J. A. 1995. Earnings, book values, and dividends in equity valuation. *Contemporary Accounting Research*, 11(2): 661–687. https://doi.org/10.1111/j.1911-3846.1995.tb00461.x.

Pauly, M. V. 1968. The economics of moral hazard: Comment. *The American Economic Review*, 58(3): 531–537.

Penman, S., and T. Sougiannis. 1998. A comparison of dividend, cash flow, and earnings approaches to equity valuation. *Contemporary Accounting Research*, 15(3): 343–383. https://doi.org/10.1111/j.1911-3846.1998.tb00564.x.

Rappaport, A. 1986. *Creating Shareholder Value: The New Standard for Business Performance*.

Weber, J., U. Bramsemann, C. Heineke, and B. Hirsch. 2017. *Wertorientierte Unternehmenssteuerung: Konzepte - Implementierung - Praxis-Statement* (2nd ed.). Springer Fachmedien.

Wobst, J., P. Tanikulova, and R. Lueg. 2025. Value-based management: A review of its conceptualizations and a research agenda toward sustainable governance. *Journal of Accounting Literature*. https://doi.org/10.1108/JAL-11-2022-0123.

Wolf, R. 2017. KGV oder KVV zur Performance-Messung der TOP-Unternehmen in Deutschland, Frankreich und Italien? *Betriebswirtschaftliche Fragen zu Steuern, Finanzierung, Banken und Management*: 205–224. https://doi.org/10.1007/978-3-658-16730-1_13