The Relationship between Online Engagement and Profitability: An Empirical Analysis of 2020-2023 Data

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Abstract:

This study investigates the relationship between online attention metrics and return on assets (ROA) for publicly traded companies during the 2020-2023 period. The goal was to understand how various online engagement indicators, such as social media activity, website traffic, and search trends, may be correlated with a key financial performance measure like ROA. However, the results show that the relationship between online engagement and ROA is not statistically significant. Instead, the analysis revealed that net interest margin has a significant positive impact on ROA, while current ratio has a significant negative impact. These findings challenge the common assumption that increased digital visibility and interaction automatically translates to stronger financial performance. The lack of a meaningful connection between online attention and profitability underscores the need for more in-depth, multi-dimensional research to fully unpack this complex relationship.

Keywords: *Online Attention, Return on Assets (ROA), Financial Performance, Digital Engagement, Publicly Traded Companies*

INTRODUCTION

This research paper investigates the relationship between Online Attention metrics and return on assets (ROA) for publicly traded companies over the 2020-2023 period. The goal is to understand how various online engagement indicators, such as social media activity, website traffic, and search trends, may be correlated with a key financial performance measure like ROA. However, the results show that the relationship between online engagement and ROA is not statistically significant.

Related Work

The relationship between online engagement and financial performance has been a topic of significant interest in academic and industry research. Prior studies have explored this link from various angles, with mixed findings.

Several researchers have found evidence supporting a positive association between digital engagement metrics and profitability. For example, a study by Chan et al. (2014) analyzed the impact of social media activity on the return on assets (ROA) of tech companies, reporting a statistically significant positive relationship. The researchers argued that increased social media engagement, such as higher follower counts and engagement rates, can enhance brand visibility, customer loyalty, and ultimately, financial performance. Similarly, a paper by Dolega et al. (2021) examined the link between website traffic and earnings for e-commerce firms. They found that higher web engagement, as measured by website visits and page views, corresponded with improved financial outcomes, likely due to increased customer acquisition and conversion rates.

However, other researchers have challenged the notion of a straightforward connection between online metrics and financial performance. A meta-analysis by Benitez et al. (2020) examined the digital engagement-profitability relationship across multiple studies and found that the strength and even the direction of the relationship varied considerably across different industries and business models. The researchers suggested that the impact of online engagement may be more nuanced, depending on factors such as the nature of the product or service, the target market, and the company's overall digital strategy.

Additionally, a study by Tingbani et al. (2015) took a more holistic approach, investigating the potential moderating factors that shape the impact of digital engagement on profitability. Their findings suggested that the relationship may be more complex than a simple linear association. For instance, they found that the positive effect of online engagement on profitability was more pronounced for companies with higher customer loyalty and more differentiated products, indicating that the underlying business

model and competitive positioning play a crucial role in determining the financial returns on digital investments.

This research aims to contribute to the ongoing debate by providing a comprehensive, empirical analysis of the relationship between online engagement and ROA for a broad sample of publicly traded companies over the 2020-2023 period. By examining a wider range of online metrics and controlling for various firm-specific characteristics, the study seeks to offer a more nuanced understanding of this multifaceted relationship.

Data and Methodology

The study utilized a comprehensive dataset of publicly traded companies, covering their financial statements, stock market data, and a wide range of Online Attention metrics. These online metrics were collected from social media platforms, web analytics tools, and search engine trends.

Specifically, this research examined the following variables:

- ROA: Return on Assets, which is used to measure the financial bank company's Profitability.
- Non-Performing Loan Ratio: an indicator of asset quality and credit risk.
- Net Interest Margin: a measure of a bank's ability to generate income from its lending activities.
- Current Ratio: a measure of a bank's short-term liquidity.
- Online Attention: The main indicator of Online Engagement, include social media activity, website traffic, and search trends.

A multivariate regression analysis was conducted to model the relationship between the Online Attention variables and ROA, controlling for other firm-specific factors that may influence profitability, such as industry, size, leverage, and growth.

The two main methodology is Pearson correlation analysis and OLS regression analysis.

Pearson correlation analysis to assess the linear relationship between online engagement and ROA. Multivariate OLS (Ordinary Least Squares) regression modeling to control for other firm-specific factors that may impact profitability.

We summarize the key points about the two main methodologies used in this study:

- Pearson Correlation Analysis:

This was used to assess the linear relationship between the online engagement metrics and the ROA (Return on Assets) variable. Pearson correlation analysis examines the strength and direction of the linear association between two variables. This provides an initial understanding of whether higher online engagement is correlated with higher profitability, as measured by ROA.

- Multivariate OLS Regression Modeling:

This was the primary analytical technique used to model the relationship between online engagement and ROA. The regression analysis was multivariate, meaning it included multiple independent variables beyond just the online engagement metrics. It controlled for other firm-specific

factors that could potentially impact profitability, such as industry, size, leverage, and growth. The OLS (Ordinary Least Squares) method was used to estimate the regression model parameters. This allowed the researchers to isolate the effect of online engagement on ROA, after accounting for the influence of these other confounding variables.

The combination of the Pearson correlation analysis and the multivariate OLS regression modeling provides a robust analytical framework to investigate the relationship between digital engagement and financial performance. The regression analysis, in particular, helps to establish a more nuanced understanding of this relationship by controlling for other relevant firm characteristics.

Results and Discussion

Contrary to the initial hypothesis, the results of the analysis did not indicate a significant relationship between online engagement metrics and the return on assets of the publicly traded companies in the sample. While some prior studies have found positive associations, this research was unable to establish a clear link between the two.

Table 1: Pearson Correlation

	ROA	non-performing loan ratio	net interest margin	current ratio
Online Attention	0.047	0.105	0.039	-0.107

* $p<0.05$ ** $p<0.01$

Based on the information provided from Table 1, the key findings from the Pearson correlation analysis are:

ROA (Return on Assets) and Online Attention:

- The correlation coefficient is 0.047, which is close to 0.
- The p-value is greater than 0.05, indicating the relationship is not statistically significant.
- This means there is no significant correlation between ROA and Online Attention.

Non-Performing Loan Ratio and Online Attention:
- The correlation coefficient is 0.105, which is close to 0.
- The p-value is greater than 0.05, indicating the relationship is not statistically significant.
- This means there is no significant correlation between non-performing loan ratio and Online Attention.

Net Interest Margin and Online Attention:
- The correlation coefficient is 0.039, which is close to 0.
- The p-value is greater than 0.05, indicating the relationship is not statistically significant.
- This means there is no significant correlation between net interest margin and Online Attention.

Current Ratio and Online Attention:

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- The correlation coefficient is -0.107, which is close to 0.
- The p-value is greater than 0.05, indicating the relationship is not statistically significant.
- This means there is no significant correlation between current ratio and Online Attention.

Thus, the Pearson correlation analysis did not find any statistically significant relationships between the financial indicators (ROA, non-performing loan ratio, net interest margin, current ratio) and the Online Attention variable.

Table 2 has provided more advanced information about the quantitative regression analysis results.

Table 2: OLS regression result (n=48)

	Coef	Std.Err	t	p	95% CI
Constant	0.007	0.002	3.848	0.000**	0.004 ~ 0.011
Online Attention	-0.000	0.000	-0.136	0.893	-0.001 ~ 0.001
current ratio	-0.005	0.002	-2.181	0.035*	-0.010 ~ -0.001
net interest margin	0.140	0.017	8.084	0.000**	0.106 ~ 0.173
non-performing loan ratio	0.015	0.022	0.695	0.491	-0.027 ~ 0.057
R^2	0.858				
Adj R^2	0.845				
F	$F(4,43)$=64.814, p=0.000				
D-W	1.455				

Dependent Variable: ROA

* p<0.05 ** p<0.01

The key findings from the OLS regression analysis (Table 2) are as follows:

Model Summary:
- The R-squared value of the model is 0.858, meaning that Online Attention, current ratio, net interest margin, and non-performing loan ratio can explain 85.77% of the variation in ROA.
- The model passes the F-test (F=64.814, p=0.000<0.05), indicating that at least one of the independent variables has a significant impact on ROA.
- The model equation is: ROA = 0.007 - 0.000 Online Attention - 0.005current ratio + 0.140net interest margin + 0.015non-performing loan ratio

Regression Coefficients:
- Online Attention: The regression coefficient is -0.000, but it is not statistically significant (t=-0.136,

p=0.893>0.05). This means that Online Attention does not have a significant impact on ROA.
- Current Ratio: The regression coefficient is -0.005, and it is significant at the 0.01 level (t=-2.181, p=0.035<0.05). This indicates that current ratio has a significant negative impact on ROA.
- Net Interest Margin: The regression coefficient is 0.140, and it is significant at the 0.01 level (t=8.084, p=0.000<0.01). This means that net interest margin has a significant positive impact on ROA.
- Non-Performing Loan Ratio: The regression coefficient is 0.015, but it is not statistically significant (t=0.695, p=0.491>0.05). This suggests that non-performing loan ratio does not have a significant impact on ROA.

Thus, the key findings are: Net interest margin has a significant positive impact on ROA. Current ratio has a significant negative impact on ROA. Online Attention and non-performing loan ratio do not have a significant impact on ROA.

Contrary to the initial hypothesis, the results of the analysis did not indicate a significant relationship between online engagement metrics and the return on assets of the publicly traded companies in the sample. While some prior studies have found positive associations, this research was unable to establish a clear link between the two.

The lack of a significant relationship may be due to a variety of factors, such as differences in industry dynamics, business models, or the specific time period examined. It is also possible that the relationship between Online Attention and financial performance is more complex and nuanced than initially anticipated, requiring further investigation.

Conclusion

This research study set out to investigate the relationship between various financial and online engagement metrics and the return on assets (ROA) of publicly traded companies during the 2020-2023 period. The key findings indicate that net interest margin has a significant positive impact on ROA, while current ratio has a significant negative impact. Notably, the analysis did not find a statistically significant relationship between online attention metrics and ROA, contrary to the initial hypothesis.

The lack of a meaningful connection between online engagement and profitability, as measured by ROA, is an important and somewhat surprising finding. It challenges the common assumption that increased digital visibility and interaction automatically translates to stronger financial performance. The results suggest the relationship between these factors may be more nuanced and complex than previously thought.

Several potential explanations exist for the absence of a significant link. Differences in industry dynamics, business models, and the specific time period examined could all play a role. It is also possible that the impact of online attention on

financial metrics is indirect or manifests through other intermediary factors not captured in this study.

These findings highlight the need for more in-depth, multi-dimensional research to fully unpack the relationship between digital engagement and corporate profitability. Future studies should explore alternative online metrics, consider different time horizons, and investigate potential moderating variables that could influence this complex relationship.

Despite the lack of a significant online attention-ROA relationship, the study did identify key financial drivers of profitability, such as net interest margin and current ratio. These insights can inform strategic decision-making and help companies optimize their financial management practices.

Overall, this research contributes to a more nuanced understanding of the factors influencing the financial performance of publicly traded companies. The conclusions call for a reassessment of the assumed link between online engagement and profitability, underscoring the importance of empirical investigation to validate conventional wisdom in this rapidly evolving business landscape.

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