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# Online Search Frequency and Financial Performance: The Moderating Effect of Business Sector

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## Abstract

This study aims to examine the effect of online search frequency on financial performance with the business sector as a moderating variable. This study also uses the level of internet users and the inflation rate as control variables. The population in this study were 400 financial statements of companies registered at IDX80 for the period 2018 – 2022. The research sample was selected using a purposive sampling method and produced a sample with a total of 215 financial statements from 43 companies divided into 8 business sectors. Data were analyzed using multivariate analysis of variance in the IBM-SPSS-24 application. The frequency of online searches was measured using Google Trends. Financial performance is measured using the proportional assets ratio (PAR) and anchored ratio (AR). The results show that the frequency of online searches has a significant effect on financial performance. In detail, it has a significant effect on current assets, current liabilities, expenses and profit before tax. In addition, the business sector also significantly moderates the relationship between online search frequency and financial performance except for the Industrials, and Properties & Real Estate sectors. Testing of control variables also shows that the level of internet users significantly influences financial performance. The findings from the research indicate that the frequency of online searches has the potential to negatively impact companies considering the level of internet users.

**Keywords:** Online Search Engine, Financial Performance, Google Trends, Proportional Asset Ratio, Anchored Ratio

## 1. Introduction

The financial performance is determined based on the information presented in the financial statements. However, these figures still have an element of uncertainty in predicting profits or business sustainability in the future (Breton, 2019). This uncertainty does not mean that financial statements cannot be used as a basis for making

future decisions but that additional information is needed. This phenomenon is illustrated in the stock market in Indonesia. In 2019, the Indonesia Stock Exchange (IDX) released a new method for calculating the index named Capped Free Float Adjusted Market Capitalization Weighted (Indonesia Stock Exchange, 2021). This method considers transactions from minority investors with share ownership below 5% (Indonesia Stock Exchange, 2023). Changes in the index measurement methodology indicate the need for more relevant information to reduce the risk of errors in decision-making.

The digital era makes it easy to sell their products through digital platforms such as social media and e-commerce. Social media can increase customer loyalty to company brands (Bilgin, 2018). Social media is used to maintain customer engagement with company products and e-commerce, which is directly related to increased sales (Jovanovic et al., 2020). This pattern of branding using the internet is termed digital branding.

Research examining the relationship between digital branding and financial performance is not recent. Literature studies on articles published from 1969 – 2008 show a positive relationship between company branding and financial performance (Fetscherin & Usunier, 2012). Repeated research does not necessarily provide clear and generalizable results. Research gaps in studies using branding as a research variable also still have bias. This bias lies in the terminology of branding, which is often interpreted with reputation, image, and identity, even though the meaning is different (Fetscherin & Usunier, 2012). As a result, the research results on branding cannot be generalized.

Difficulties in generalizing research results also occur in studies involving financial performance as a variable. The many types of measuring instruments in assessing financial performance are the main cause. Financial ratios do not have a positive impact on financial statement disclosure but have an impact on reducing negative information in financial statements (Mushtaq et al., 2022). As a result, there has yet to be a consensus regarding the quality of the company's financial performance (Rosa, 2021). Financial performance can not only be measured through existing financial ratios. However, it can also use opinions from experts regarding the impact of branding on finance in the future (Ribeiro-Navarrete et al., 2021). Expert opinions and projections are needed as additional references, but of course, the level of accuracy of these assessments needs to be tested first and cannot be generalized.

Research limitations related to branding and financial performance are limited to the measurement tools, the research location, and the business sector. Most research related to branding is only carried out in England and the United States, so many locations in the world still need to be included in the scope of this research (Fetscherin & Usunier, 2012). The complexity of research by looking at the business sector also needs to be considered in order to provide a more complex picture of the relationship between financial performance and branding in each business sector (Fraccastoro et al., 2021; Liu et al., 2021; Strebing, 2014).

The difference between this research and previous research lies in the measuring instrument, location, and business sector. As a tool to measure the frequency of online searches, Google Trends is likely to provide a more relevant picture in assessing the company's branding performance. Using ratios such as the Proportional Asset Ratio (PAR) and the Anchored Ratio (AR) is also expected to provide a more detailed picture of the company's financial performance. The expected result of using this measuring instrument is a more detailed explanation of the impact of branding on each component in the financial statements. In addition, the use of business sectors and research locations in Indonesia is expected to provide a more detailed picture with a narrower scope.

This study aims to examine the effect of online search frequency on financial performance and the business sector's role in moderating this relationship. Theoretically, Bayes' theory will explain the potential use of other information in assessing financial performance based on the business sector. Practically, information about the frequency of online searches can be used to predict financial performance before the company's financial statements are released by considering the company's business sector.

## 2. Literature Review

### 2.1 Bayesian theory

Bayes' theory is a theory that appears to answer the probability of an event occurring (Bayes, 1763). The use of Bayes Theory in accounting raises the concept that the numbers in accounting are seen as statistical signals and not as measuring tools (Johnstone, 2018). This concept then gave rise to financial ratios known today in assessing financial performance (Beaver et al., 2010).

Bayesian accounting theory describes Bayes' theory in five general discussions. First, all levels of trust in information must have a starting point and are subjective (Johnstone, 2018). Second, the more risks that can be studied, the flatter the posterior probability distribution will be (Johnstone, 2018). Third, generating more information does not necessarily reduce the risk of uncertainty from information (Johnstone, 2018). Fourth, any information has the potential to provide uncertainty, but in Bayes' theory, any information can potentially be wrong or even provide new certainty when combined with other information (Johnstone, 2018). Fifth, any quality accounting information will provide a signal that can be used to predict (Johnstone, 2018).

### 2.2 Financial performance

The financial statements produced by company directors are still informational. This information can be useful for stakeholders when considering other factors such as risk, uncertainty, time, rate of return, and security (Jones et al., 2015). Assessment of financial performance is also subjective. This subjectivity in assessing the company's financial performance gives rise to analytical techniques such as analysis by comparing similar industries or within a certain time span (Davidson, 2019).

Three measurement tools are generally used: currency, percentages, and ratios (Rosa, 2021). Each measuring tool has its weaknesses. Measurement with currencies will make direct comparisons difficult to make if companies use different currencies (Rosa, 2021). Measurements with percentages do not consider the company's valuation value in comparisons (Rosa, 2021). Ratio measurements are often used in analyses that consider the same period and cannot be used to analyze timeframes (Rosa, 2021).

### 2.3 Online Search Frequency

The discussion of the theory regarding the online search frequency in this study will be associated with the company's digital branding. By definition, digital branding can be linked to the character of a company, service, or product that emerges from its users through social media interactions or online reviews (Rowles, 2018). For companies, branding has two functions: determining the company's marketing direction and maintaining company value on the stock market (Swaminathan et al., 2020). For consumers, company branding will determine product quality and customer knowledge or understanding of company products (Swaminathan et al., 2020). For the community, company branding will be associated with its impact on the community and culture that exists in society (Swaminathan et al., 2020).

## 3. Theoretical and Conceptual Background

A decision making is always based on information that is processed first. In general, financial performance is certainly assessed from financial statements. The financial statements are based on all the company's financial activities. Two financial statement risks are commonly used in audits, namely business risk and inherent risk. Business risk is the probability that a company suffers a loss due to its business (Colbert, 1991). the inherent risk appears in financial statement accounts or financial transactions (Colbert, 1991).

Referring to Bayes' theory, other information needs to be presented to describe the risks more clearly. Financial statements as the basis for performance appraisal have involved two parties, management, and auditors. The

existence of information that appears from the customer's point of view will complete the information needed to assess the company's performance. This information can be linked to the results of company branding.

The link between accounting science and marketing science is the basis for the emergence of this research. Every activity related to branding will appear in the cost component, which is then evaluated by analyzing income and ability to generate net profit (Keller & Brexendorf, 2019; Köylüoğlu et al., 2021). The ability to generate net profit is then interrelated with company equity, such as share value (Keller & Brexendorf, 2019). Companies with big brands tend to have less cash because companies with large funds tend to aggressively allocate funds to increase their brand value (Larkin, 2013).

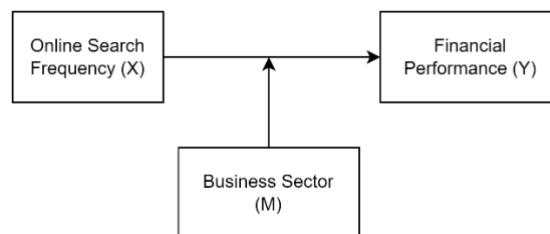


Figure 1: Conceptual Model of the Study; *Source: Authors*

#### 4. Empirical Review and Hypothesis Development

The theoretical explanation regarding the relationship between online search frequency and financial performance can also be seen through the company's business process flow in interacting with its consumers. Using social media and other digital communication tools can enable companies to increase their market reach (Fraccastoro et al., 2021). This interaction ultimately impacts improving financial performance (Ribeiro-Navarrete et al., 2021). The ease of interaction will increase brand awareness, ultimately positively impacting financial performance due to the increased credibility of the company's brand (Anees-ur-Rehman et al., 2018). Previous research has shown a positive effect between the two variables (Bayer et al., 2020; Liu et al., 2021; Yang et al., 2015).

*H<sub>1</sub>: Online search frequency has a significant effect on financial performance.*

According to Bayes' theory, the subjectivity of evaluating information is not only based on its users but also on information regarding the impact of the company's business patterns. Mistakes in understanding business patterns will cause bias in the information used in assessing performance. Each industry has a different strategy for generating profits depending on the company, customers, and competition (Ohmae, 1982). Based on these three strategies, the main focus is on meeting customer needs because a business aims to serve customers better than its competitors (Iruthayasamy, 2021). In addition, each business sector has a different way of budgeting depending on the scarcity and demand for goods (Kengatharan, 2016).

*H<sub>2</sub>: Business sector significantly moderate the relationship between online search frequency and financial performance.*

#### 5. Research and Methodology

##### 5.1 Population and Sample

The population in this study is 400 financial statements of companies listed on IDX80 from 2018 – 2022. The IDX80 is an index that measures the price performance of 80 stocks with a high free float ratio, high liquidity, and large market capitalization, supported by good fundamentals (Indonesia Stock Exchange, 2021). The sample was selected by purposive sampling with two criteria based on the consistency of stocks and non-financial business sectors. Samples with consistency criteria will be selected by looking at stocks that have always been listed in IDX80 from 2018 – 2022. The financial business sector will be removed from the research sample due to differences in reporting models in financial statements. As a result, 215 samples of 48 companies divided into eight business sectors were selected. These business sectors are Basic Materials, Consumer Non-Cyclicals, Consumer Cyclicals, Energy, Infrastructures, Healthcare, Industrials, and Properties & Real Estate.

### 5.2 Data Measurement

Financial performance is measured using a ratio based on total asset value. The method is called Proportional Asset Ratio (PAR) and Anchored Ratio (AR) (Rosa, 2021). This ratio measures a component of financial statements compared to total assets. PAR analysis can be used for comparative analysis with similar industries in the same period (Rosa, 2021). The AR ratio is used for the horizontal analysis of timeframes or trends (Rosa, 2021). This study will measure 18 ratios consisting of PAR and AR ratios for current assets, non-current assets, current liabilities, non-current liabilities, equity, revenue, cost of sales, expense, and profit before tax.

The online search frequency data is obtained from the Google Trends website. This data set contains digital popularity values with a scale from 0 – 100, which is assessed based on total searches for certain keywords (Google, 2021). The keyword used in this research is company name. Weekly online search frequency data is averaged using the Exponential Weighted Moving Average (EWMA) because the research data is time series (Newbold et al., 2020).

The company's business sector is measured using a nominal scale. The numbering in this classification is equivalent or not graded. Based on the existing sample, there are eight classifications used in this study, namely (1) Basic Materials, (2) Consumer Non-Cyclicals, (3) Consumer Cyclicals, (4) Energy, (5) Infrastructures, (6) Healthcare, (7) Industrials, and (8) Properties & Real Estate.

This study uses two control variables: the level of internet users and the inflation rate. The selection is based on potential theoretical explanations rather than focusing solely on the characteristics of the research sample (Carlson & Wu, 2012). The level of internet users was chosen because the industrial revolution 4.0, with its interconnection via the internet, has formed a digital society with its digital culture (Nikitenko, 2019). The inflation rate was chosen because the inflation rate will provide an overview of the economic conditions in the country where the company is located. Inflation conditions will affect the company's ability to generate profits (Tarkom & Ujah, 2023).

### 5.3 Data Analysis

Hypothesis testing will use Multivariate Analysis of Variance (Manova) in IBM-SPSS-24. The Manova test explores the relationship between the independent variables and two or more dependent variables (Srivastava & Rego, 2011). Hypothesis testing using moderating variables will use interaction as a benchmark (Baron & Kenny, 1986). PROCESS v4.3 in IBM-SPSS-24 will be used to test the effect of moderating variables. This test is commonly referred to as Moderated Regression Analysis (MRA) and is usually used to determine the limits of the interaction of the relationship between the independent variable and the dependent variable (Hayes, 2022).

The regression model to test hypothesis 1 is as follows:

$$Y_{ij} = \alpha X + \alpha_2 \Sigma(\text{Control variables}) + \varepsilon_{ij} \dots(1)$$

The regression model to test hypothesis 2 is as follows:

$$Y = \alpha_1 + \alpha_2 X + \alpha_3 M + \alpha_4 XM + \alpha_5 \Sigma(\text{Control variables}) + \varepsilon_{ij} \dots\dots (2)$$

Where  $Y_{ij}$  is the company's financial performance as measured by PAR and AR for current assets, non-current assets, current liabilities, non-current liabilities, equity, revenue, cost of sales, expense, and profit before tax. The coefficient  $\alpha$  is the regression coefficient for the dependent, moderating, and control variables.  $X$  is the dependent variable of online search frequency.  $M$  is the business sector as a moderating variable.

## 6. Findings and Discussions

### 6.1 Findings

#### 6.1.1 Descriptive Statistic

The results of the descriptive statistics are shown in Table 1. Based on this table, the maximum value of online search frequency is 83.84, and the minimum value is 0.34. This information illustrates that there are companies in IDX80 that have very low digital activity at 0.34 while the average value is 33.60. Based on the PAR - Profit Before Tax ratio, some companies experience losses equivalent to 0.07 or 7% of total assets, and others generate profits equivalent to 0.59 or 59% of their total assets even though the average is only at 0.106. Some companies are able to generate revenue equivalent to 3.8 times the value of their total assets, even though the average is only 0.7. In the company's performance from year to year, the highest maximum value is seen in the ratio of AR - Revenue and AR - Cost of Sales which are 3.9 and 3.47, whereas the average is only 0.86 and 0.59. This indicates that some companies can generate income equivalent to 3.9 times the value of their assets in 2018.

Table 1: Summary Statistic

VARIABLE	Mean	Median	Mode	Minimum	Maximum
Online Search Frequency	33.60	33.23	17.93	0.34	83.84
PAR - Current Assets (CA)	0.4194	0.4363	0.4660	0.0556	0.8272
PAR - Non-Current Assets (NCA)	0.5806	0.5637	0.5340	0.1728	0.9444
PAR - Current Liabilities (CL)	0.2422	0.2098	0.2731	0.0457	0.6792
PAR - Non-Current Liabilities (NCL)	0.2098	0.1799	0.0092	0.0092	0.6749
PAR - Equity (EQU)	0.5480	0.5519	0.1264	0.1264	0.8879
PAR - Revenue (REV)	0.7686	0.5526	0.1016	0.1016	3.8222
PAR - Cost of Sales (COS)	0.5427	0.3730	0.6325	0.0269	3.3996
PAR - Expenses (EXP)	0.1031	0.0520	0.1777	0.0032	0.6548
PAR - Profit Before Tax (PBT)	0.1064	0.0821	-0.0763	-0.0763	0.5976
AR - Current Assets (CA)	0.4830	0.4731	0.0004	0.0003	1.3229
AR - Non-Current Assets (NCA)	0.6897	0.6195	0.0007	0.0007	2.6993
AR - Current Liabilities (CL)	0.2777	0.2466	0.1637	0.0002	0.9530
AR - Non-Current Liabilities (NCL)	0.2597	0.2068	0.0001	0.0001	1.6005
AR - Equity (EQU)	0.6347	0.6045	0.7666	0.0006	1.6723
AR - Revenue (REV)	0.8623	0.6618	0.0009	0.0009	3.9006
AR - Cost of Sales (COS)	0.5981	0.4073	0.1179	0.0007	3.4779
AR - Expenses (EXP)	0.1184	0.0544	0.0001	0.0001	0.7093
AR - Profit Before Tax (PBT)	0.1251	0.0866	0.1244	-0.0763	1.0707

Source: Author

#### 6.1.2 Assumption

The Manova test can be done with five assumptions: the dependent variable using categorical measurements, the dependent variable using interval/ratio measurements, data normality, homogeneity of variance, and correlation between groups (Denis, 2021; Mayers, 2013). This study then divided the online search frequency variable into four categories, namely Group 1 (0 – 20), Group 2 (20 – 40), Group 3 (40 – 60), and Group 4 (> 60). The normality test results show a normal distribution of all ratios with a sig value > .05. The results of the homogeneity of the variance tested with Levene's Test also show that 17 ratios have sig > .05 and one ratio sig < .05 (0.0442).

The correlation test between groups showed results of sig < .05 when it should have been sig > .05 (see Table 3). This study uses KMO (Kaiser-Meyer-Olkin) and Bartlett's test to overcome these problems. As a result, the KMO test for each group is > .500, and Bartlett's test is .000 with sig < .001. Group 1 has KMO 0.721. Group 2 has KMO 0.666. Group 3 has KMO 0.562. Group 4 has 0.509. These results indicate that the dependent variable does not have a multicollinearity relationship and has an adequate sample.

### 6.1.3 Assessment of the hypothesized relationships

Testing the hypothesis using the control variable shows that H1 is accepted with a value of  $\lambda = .436$ ,  $F = 2.755$  and sig .000. The results of testing the control variables show that internet users influence the relationship between variables with a value of  $\lambda = .602$ ,  $F = 5.703$  and sig .000, but the inflation rate does not have a significant effect with a value of  $\lambda = .877$ ,  $F = 1.204$  and sig .264. The Manova test also provides univariate analysis examining the relationship between online search frequency and each ratio in the dependent variable. As a result, online search frequency significantly affects eight ratios, namely PAR\_CA, PAR\_CL, PAR\_EXP, PAR\_PBT, AR\_CA, AR\_CL, AR\_EXP, and AR\_PBT.

The results of the moderation test show that there are 17 significant ratios and one insignificant ratio for AR\_PBT with a p-value of .508. In general regression testing or summary models, the results of all ratios give significant results (p-value <.05) with an R-Squared between 0.28 – 0.63 if the average is 0.47. Based on these results, this study's moderating variable (business sector) significantly moderates the effect of online search frequency on company financial performance, or H2 is accepted.

## 6.2 Discussions

The results of this study are consistent with previous studies, which state a relationship between online search frequency and financial performance (Bayer et al., 2020; Liu et al., 2021; Yang et al., 2015). This also shows that digital activities that occur in Indonesia have the potential to influence the company's financial performance. This study uses the term potential because not all digital activities impact a company's financial performance. It should be understood that this research only includes company names in digital frequency-level data collection.

This research also shows different results from previous studies, which say that a company's digital activities will positively impact financial performance (Fetscherin & Usunier, 2012; Park & Jiang, 2020; Yoon et al., 2018). This difference is because the online search frequency only has an impact on expenses and profit before tax and does not have an impact on revenue. Referring to the concepts in the financial statements, the frequency of online searches has a negative impact on the company because it only results in an increase in expenses and a decrease in profit before tax. If it is associated with the potential reasons for the company's popularity in the digital world, the negative information will impact decreasing the company's image (Maslikhan, 2019). Negative information will cost the company to restore its image.

Testing the moderating variable shows that the business sector strengthens the effect of online search frequency on company financial performance. This is in line with the development of previous research hypotheses explaining that each industrial sector has a different business strategy to meet consumer needs (Iruthayasamy, 2021; Ohmae, 1982).

The results of the moderation test in this study can be used to assess a company's business risk. If related to Bayes' theory, every business sector has a different potential for error in decision-making. Every stakeholder needs to consider their business decision-making by studying each business sector's risks. Two things can be considered in making decisions based on the company's business sector, namely market conditions and key reasons for business success/failure in that business sector (Ohmae, 1982).

It is important for stakeholders to consider any information in assessing financial performance. The results of this study indicate that information about online search frequency and internet user levels can be used as initial information to assess financial performance before financial statements are published. This initial information can be used by stakeholders to take anticipatory steps to protect their interests. Stakeholders must also be careful when the company's brand is viral on the internet. They have to look at the reasons for popularity and impact on the company.

The results of this study indicate that management needs to maintain their company's image in society, especially on the internet. This research and previous studies show that the popularity of a company can have a positive or



negative impact depending on the cause. Based on this, management must increase their awareness of any information on the internet related to their company. Management can take advantage of online social networks and use IT technology related to customer service to support their business (Horváth & Szerb, 2018; Ribeiro-Navarrete et al., 2021). Good service will make the company's image positive. For external stakeholders such as shareholders, information regarding the frequency of online searches and business characteristics can be used to predict their decision-making. If the frequency of company online searches increases due to positive or negative information, shareholders can predict whether their share value will increase or decrease (Huang et al., 2020).

## 7. Conclusions

The results of this study show that the frequency of online searches has a significant effect, and the business sector significantly moderates the relationship between the two variables. Tests for control variables also show that only the level of internet users significantly controls the company's financial performance. Based on these results, the online search frequency, the business sector, and the level of internet users can be used as supporting information to assess financial performance. If stakeholders want to assess financial performance by considering a company's digital activities, then information about the online search frequency taking into account the internet users and the business sector can be used to measure this. In addition, information about a company's digital activity can be used to predict financial performance.

There are three limitations to this research. First, the frequency of online searches is limited to company names and does not show any information about the products of that company. This allows for differences in results on online search frequency using the name of the goods/services produced by the company. Second, data sourced from Google trends basically cannot distinguish searches resulting from negative or positive information. This has the potential to result in a biased interpretation when trying to explain the direction of the correlation of high or low online search frequency. Third, the measurement of the dependent variable with many ratios makes it difficult to interpret the results and has the potential to give wrong interpretation results. Based on these limitations, this study suggests further research that focuses on each business sector by using negative/positive information in assessing the online search frequency with keywords for the names of goods/services produced by companies and using ratios that focus on assessing profit before tax.

There are three limitations to this research. First, the online search frequency is limited to company names and does not show any information about the products of the company. This allows for differences in results on online search frequency using the name of the goods/services produced by the company. Second, data sourced from Google Trends cannot distinguish searches resulting from negative or positive information. This can result in a biased interpretation when explaining the direction of the high or low online search frequency correlation. Third, the measurement of the dependent variable with many ratios makes it difficult to interpret the results and can potentially give wrong interpretation results. Based on these limitations, this study suggests further research that focuses on each business sector by using negative/positive information in assessing the online search frequency with keywords for the names of goods/services produced by companies and using ratios that focus on assessing profit before tax.

This research produces two theoretical implications. First, the results of this research analysis show that not all online search frequencies have a positive impact on a company's financial performance. These results indicate that the character of the information that causes an increase in the online search frequency needs to be considered in assessing financial performance. The character of the information can be associated with information that can reduce or enhance the company's image. Second, the business sector and the level of internet users need to be considered when conducting research related to online search frequency and financial performance.

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## Data Availability Statement

The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy.

## Conflicts of Interest

The authors declare no conflict of interest.

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