MEASURING CORPORATE CULTURAL VALUES USING MACHINE LEARNING AND THE EFFECT ON FIRM VALUE: AN EMPIRICAL STUDY ON COMPANIES LISTED IN THE IDX PERIOD 2017 – 2019

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ABSTRACT

This research aims to discover which dimensions of corporate culture are related to firm value. The author studied the text analysis to measure the innovation value, integrity value, quality value, respect value, and teamwork value by creating a culture dictionary using machine learning techniques. Whereas the measurement of firm value itself was measured using the market-to-book value ratio. The population of this study consisted of numerous companies listed on Indonesia Stock Exchange from 2017 -2019. In order to obtain samples needed for this research, the purposive sampling method was executed, and 522 annual reports from 2017 – 2019 were selected as research samples. To achieve the primary purpose of this research, the researcher employed panel data regression analysis. The result conveys that the innovation value, integrity value, respect value, and teamwork value do not affect the firm value. Meanwhile, the quality value is the only value that does affect the firm value.

Keywords: *Corporate Culture, Firm Value, Text Analysis, Machine Learning, Natural Language Processing.*

ABSTRAK

Tujuan penelitian ini adalah untuk menemukan nilai dari budaya perusahaan yang memiliki pengaruh terhadap nilai perusahaan. Penulis mempelajari analisis teks untuk mengukur nilai inovasi, nilai integritas, nilai kualitas, nilai rasa hormat, dan nilai kerjasama tim dengan membuat kamus budaya menggunakan teknik pembelajaran mesin. Sedangkan pengukuran nilai perusahaan dilakukan dengan menggunakan rasio *market-to-book*. Populasi penelitian ini terdiri dari berbagai perusahaan yang tercatat di Bursa Efek Indonesia dari 2017 hingga 2019. Untuk mendapatkan sampel yang diperlukan dalam penelitian ini, metode *purposive sampling* dilakukan dengan menggunakan 522 laporan tahunan perusahaan dari tahun 2017 - 2019 yang dipilih sebagai sampel penelitian. Untuk mencapai tujuan penelitian, peneliti menggunakan teknik analisis regresi data panel. Dari hasil penelitian, dapat disimpulkan bahwa nilai inovasi, nilai integritas, nilai hormat dan nilai kerjasama tim tidak memiliki pengaruh terhadap nilai perusahaan. Sementara itu, hanya nilai kualitas yang memiliki pengaruh terhadap nilai perusahaan.

Kata Kunci: Budaya Perusahaan, Nilai Perusahaan, Analisis Teks, Pembelajaran Mesin, Pemrosesan Bahasa Alami.

BACKGROUND

Evaluating business performance is necessary to be done at least once a year. The assessment is used to examine a firm's weaknesses and strengths. In addition, it presents an indication of whether the firm is in a healthy business condition towards its objectives. It also provides an overview of how companies can compete with other companies in similar industries. From external parties' perspectives, such as stakeholders, creditors, and shareholders, business performance evaluation is also an essential tool for decision-making process. Various measurement tools are available to do the evaluation, for example, one can use financial indicators as a tool to analyse a firm's business activity and performance. However, it is not sufficient to rely solely on the financial numbers to make appropriate decisions in today's economic environment. This mainly happens when business becomes increasingly complex and dynamic from time to time. In that case, other evaluating tools are required.

In general, activities of three critical elements, company management, human capital (employees), and other third parties, significantly affecting non-financial aspects. Company's management is the leader in managing the business continuity and conducting business evaluations regularly; whereas employees are those with the ability and expertise to carry out the company's business activities every day in accordance with the direction and objectives that the company wants to achieve; and other third parties such as the customer is the target market of a business that determines the growth of a company. The corporate cultural values can describe the correlation and influence of these three elements.

Corporate culture is becoming increasingly more essential as the modern workplace continues to grow. Its existence has mostly been considered in improving business performance. One of the biggest motivating factors is that company culture is becoming a more popular consideration for a company development. More businesses are focusing on building brand cultures and preserving them through ongoing development. If the companies do not at least keep pace with a strong culture and find a method to differentiate themselves from their competitor, their business will fall behind (Forbes, 2017). This research is a replica of the research conducted by Li et al. (2020) since this research employs the same corporate cultural value variables which are Innovation, Integrity, Quality, Respect and Teamwork Value. In addition, this research study also applied the same method of data processing by utilizing machine learning, as well as many updates by adjusting the objectives of the research.

The reason why this study uses firm value as a dependent variable is because values can be an asset for businesses. It conveys to potential customers and employees what the firm believes in and reminds every component at any level in the organization about the preferred approach to establish business strategies and achieve the company's goals. In this study, the author uses firm value which is proxy by market-to-book value ratio. Market-to-book value is defined as the market capitalization divided by book value, in which the market capitalization describes how the market assesses the value of a company, while the book value describes how a company's growth is. This is in line with the use of corporate cultural value as a non-financial factor to see how the company's internal performance is, whether the company's internal factors can produce good output and whether the company has a growth trend as well as has a prospect. The use of market-to-book-value ratio and corporate cultural value is able to see the company's growth, both from the non-financial aspect (corporate cultural value) and from the financial aspect (market-to-book-value). The author uses data from annual reports collected from the Indonesia Stock Exchange (IDX) between 2017 and 2019. In total, there are 522 annual reports.

Signalling Theory

This theory focuses on the company's efforts in disclosing information as a signal in order to obtain certain reactions from stakeholders (Harmadji, Subroto, Saraswati & Prihatiningtyas, 2018). This signal can be either a positive signal (goods news) or a negative one (bad news). Positive signals will increase the confidence on the company's good performance and vice versa (Bae, Masud &Kim, 2018).

From the signal theory point of view, information disclosure is an indication that a management has a long-term commitment and policy to implement operational activities and establish good relations with the public (Taj, 2019; Connelly et al, 2011). The signals sent in the form of information in financial statements will reduce this risk because the public can obtain relevant and quality information related to the company's operational activities both financially and non-financially. This information will allow the public to better understand the condition and performance of the company. In addition, information disclosure may also indicate that the company has carried out operational practices responsibly and this can improve the company's reputation in the public eyes, that is, if the company grows, then the company is considered to have good prospects.

Corporate Culture and Firm Value

Corporate culture can improve performance and efficiency through three ways: improving the control and coordination within the firm (Jacobs et al., 2013 & Cremer, 1993), improving goal alignment between the firm and its employees by strengthening their bond with the firm as well as their interaction with one another (O'Reilly, 1989), and increasing employee's effort by supplementing traditional reward systems to motivate employees to achieve the firm's goals (Sørensen, 2002).

Similarly, O'Reilly and Chatman (1996) examined the association between strong corporate culture and the variability of firm value. They discovered that the volatility of the industries has an impact on the firm value. When industry volatility rises, value variability in organizations also increases with stronger corporate culture. They attribute this result to a strong corporate culture that codifies its beliefs and goals which can assist internal organizational processes.

Hypothesis Development

Building on this research background, this study aims to test whether each element of cultural values influence firm value. To do so, developmental hypotheses the author uses include:

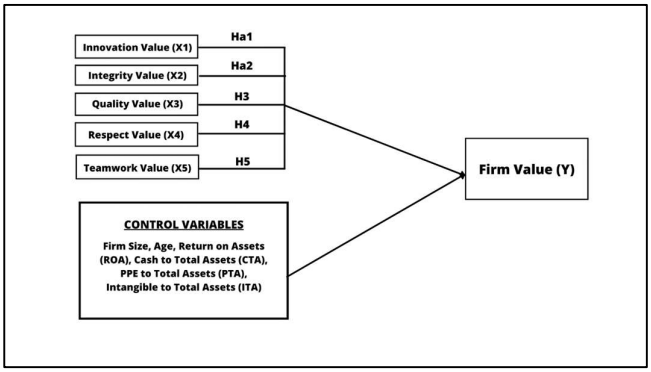

Table Hypothesis Development

1. Association Between Innovation Value and Firm Value

The example of the association between innovation value and firm value in Indonesia is Gojek which is constantly innovating from the *ojek* service business, then developing a food ordering and delivery service called GoFood. Even now, Gojek has more than ten services available in the application. This demonstrates that Gojek continues to innovate in response to public demands. When the innovations produced by Gojek get a good reaction from the public, we can see this by the growing number of people who use its services. If the public is satisfied with the service, then it can improve the public's assessment of Gojek that goes along with the increase in Gojek's firm value. As a result, it is necessary to explore whether innovation, as one of the corporate values, is associated with company performance across all industries. On this basis, the author proposes following hypothesis (stated in alternative form):

H_A1: Corporate cultural value of innovation is associated with the firm value.

2. Association Between Integrity Value and Firm Value

The example of the association between integrity value and firm value is as this explanation. According to the news on July 27, 2020 from Kontan.co.id, the Corruption Eradication Commission (KPK) has set five suspects for alleged corruption of fictitious projects at PT Waskita Karya Tbk (WSKT). The announcement caused a drop in WSKT's share price on July 24, estimated to fall 2.74 percent or Rp 710 per share. This suggests that the example of this fictitious project carried out by a internal component generates a negative signal for the company. Therefore, the public judges the company's integrity to be questionable while public trust in the company also decreased due to the corruption case that resulted in the decrease in the share price. From the example above, it can be described that the value of integrity has an association with the firm value. Thus, the author wants to explore whether integrity value affects firm value. The following is the formulated hypothesis (stated in alternative form):

H_A2: Corporate cultural value of integrity is associated with the firm value.

3. Association Between Quality Value and Firm Value

The example of the association between quality value and firm value can be seen from Gojek services described in the hypothesis related to innovation value. This happened when Gojek issued the latest services with good quality, it caused a positive signal from the public. Customers who are satisfied with gojek services tend to repeat orders that have an impact in creating customer loyalty as well as increasing the value of the company. Furthermore, by having high service quality and generating customer loyalty, it may help to create a brand image of Gojek in the public. It also illustrates that Gojek has a competitive advantage over its competitors. As a response to this, the author wants to analyze the influence of quality value on the firm's value in Indonesia which leads to the following hypothesis (stated in alternative form):

H_A3: Corporate cultural value of quality is associated with the firm value.

4. Association Between Respect Value and Firm Value

Respect is one of the values needed for a healthy work environment. It encourages collaboration and boosts workplace productivity and efficiencies. It shows to employees that their abilities, attributes, and successes are recognized and that their employment is vital to the success of the company. Companies that apply respect value logically will produce a good relationship among all elements of the company. It will have an impact on the increase in the productivity of the company because of the harmony and communication that is established from the respect of each employee.

In general, if respect is encouraged by the company, we can assume that the communication of each element of the company is going well to support the improvement of the company's productivity. However, is respect value implemented within the firms' internal environments and reflected in both business processes and firm value? This concern raises following hypothesis (stated in alternative form):

H_A4: Corporate cultural value of respect is associated with the value.

5. Association Between Teamwork Value and Firm Value

In Indonesia, nearly all firms put a strong emphasis on teamwork. This is due to the fact that every part of the company / each division is interconnected one another in order to fulfill the company's goals. For example, in order to meet the revenue targets, the marketing division can consult with the management and finance divisions about how much the target revenue should be generated, while the marketing division can adopt an appropriate strategy to meet the target. If teamwork can boost team productivity in generating good output for the company, this will enhance the company's business growth, which may also have an impact on increasing the firm value. However, does teamwork always have a positive impact on the firm value? The author expects that the teamwork value has a positive relationship with the firm value since firms with better collective work tend to have higher contributions. Therefore, the last formulated hypothesis:

H_A5: Corporate cultural value of teamwork is associated with the firm value.

OPERATIONALIZATION OF VARIABLES

Dependent Variables

Market-to-Book ratio has been used as an approximate proxy the company's market performance. However, the ratio has been interpreted in two ways. One highlights it as a measure of efficiency and growth, whereas the other emphasizes it as a measure of risk. The more the total assets and sales of a corporation, the larger its size or scale. A larger firm is more likely to have a higher market value and better financial performance than a smaller company.

Independent Variables

1. **Innovation Value**
   The value of innovation refers to a type of corporate culture that is primarily geared to support the creation of new ideas within the organization. To innovate is to successfully and consistently bring good ideas into practice. It entails translating knowledge and ideas into products or services, as well as enhancing existing processes to gain a competitive advantage. The innovation culture is a component of organizational culture that genuinely values and encourages new ideas; a positive innovation culture is the engine that drives the organization to continually improve, progress, and innovate.

2. **Integrity Value**

   Webster's New World Dictionary defines integrity as "the character or state of being of sound moral principle; uprightness, honesty, and sincerity." The meanings, in fact, match people's common impression and understanding of integrity. Someone with integrity will behave in accordance with moral ideals in a consistent manner, especially when times are tough or when one is faced with a difficult decision. Cultural values of integrity bring impact to the organization as it adheres to sincerity and honesty in all parts of employees' lives, both professionally and personally.

3. **Quality Value**

   According to Wikipedia (2021), quality is defined as being fit for its intended function while meeting consumer expectations. In most industries, quality refers to a wide range of aspects, including internal company's quality, goods, and services. For example, prospective employees can now explore and evaluate the quality of firms before they decide to apply for a job. They can go online and read feedbacks from current and former employees on sites like Kaskus, Jobstreet, and Glassdoor; these sources establish an early warning system that alerts the public about the firm's quality as a workplace. When employees are dissatisfied with their work environment, they might use social media to express their dissatisfaction.

4. **Respect Value**

   Respect is a positive feeling and action towards someone because of their characteristics or qualities. Respect is so strongly linked to social inclusion or a sense of belonging (Baumeister et al., 2003; Baumeister & Leary, 1995; Twenge & Campbbell, 2003). It suggests that people want to be respected because people believe they should or ought to respect others as an essential human value (and is thus not driven solely by personal desires). This concept relates to Kant and his categorical imperative (Hill, 2000), which states that respect is a part of moral behaviour. Respect, regardless of personal feelings, should be one of the values in the workplace. Employees and the management team should respect one another since it generates a positive work environment and increases employee productivity.

5. **Teamwork Value**

   Teamwork is the process of cooperating with a group of individuals to achieve a goal. According to Ohio University (2016), teamwork is a powerful concept that can be applied in any sector of industry. A company's culture should ideally encourage a spirit of collaboration that brings out the best in every employee, regardless of gender, ethnicity, or background. Building a team for important projects is an efficient strategy to address a company's difficulties. Teamwork is a vital aspect of the organization because it is frequently essential for co-workers to work together effectively and give their best in all circumstances. It implies that people would try to cooperate by maximizing their skills and providing feedback.

Control Variables

1. **Age**

   According to Mahajan and Singh (2013), many things can be attributed to the company age, namely the amount of experience, expertise, and risk reduction experienced because the old company is expected to have a large market share, high customer satisfaction, customer loyalty, good logistics channels, and business associates with various production factors. The younger firm typically has fewer resources, a lack of expertise among its personnel and external networks, which causes the company to be weak with business risk (Ahlstrom, Bruton, and Yeh, 2008).

2. **Size**

   A firm size reflects whether the firm is larger than other enterprises in the industry. The larger assets, turnover, capital, and the number of employees, the more complex its operation will be. The company's size is one of the most important financial performance influences (Beard and Dess, 1981). Larger companies are considered more efficient than smaller ones. According to Mathur and Kenyon (1998), size can positively affect the performance of larger companies to get better results in the financial markets.

3. **ROA**

   ROA assesses how effectively a company can extract profit from its assets. ROA measures how successful a company is based on its assets or resources. It can help investors identify potential stock opportunities because it reveals how efficient a firm is at leveraging its assets to produce

profits. A higher ROA indicates that the company successfully boosts earnings from every dollar spent. In contrast, a lower ROA shows that the firm may have over-invested in assets that have failed to generate revenue growth, indicating that the company is in difficulties. The formula shown below is used to calculate the return on assets (ROA):

$$\boldsymbol{ROA} = \left[\frac{Net\ Income}{Total\ Assets} \right]$$

4. **CTA**

Cash-to-Assets (CTA) is a ratio used to assess and compare companies' performances. The greater the excess cash owned by the company, the more appealing the firm value to investors. Companies with a large quantity of cash are more likely to survive in a depraved situation. A high ratio may suggest some degree of safety from the perspective of a creditor. Cash to Assets (CTA) ratio is calculated by the following formula:

$$\boldsymbol{CTA} = \left[\frac{Cash}{Total\ Assets} \right]$$

5. **PTA**

Property, plant, and equipment (PPE) are essential long-term assets for business operations but are difficult to convert into cash. PPE are tangible assets, which means the assets are physical. A higher PTA explains that the firm's PPE makes up the vast majority of total assets, indicating that it would be considered a capital-intensive firm. A higher PTA indicates that the company has large capital to attract more investors which positively influences the market-to-book value of the company. The formula shown below is used to calculate the PPE:

$$\boldsymbol{PTA} = \left[\frac{Property, Plant, Equipment}{Total\ Assets} \right]$$

6. **ITA**

Intangible assets are the company's non-current assets that are not physical in nature but are expected to provide current and future benefits. According to the IFRS Standard (IAS 38), intangible assets are defined as identifiable non-monetary assets that lack physical substance. Previous studies have found a statistically significant correlation between intangible assets and firm value. Management reporting and financial statements appear to provide an inadequate picture as a tool for assisting effective decision-making. In order to be sustainable, firms also must rely on intangible aspects, such as research and development, internal process efficiency, and consumer value proposition. ITA ratio is calculated by the following formula:

$$\boldsymbol{ITA} = \left[\frac{Intangible\ Assets}{Total\ Assets} \right]$$

DATA ANALYSIS METHOD

This study used two analytical tools: NLP as one of the machine learning models and STATA as the statistical software.

Text Analysis

In doing the text analysis using python, the author used google colaboratory to perform running terminal commands. The reason behind why the author used google colaboratory instead of the default application of python was because the size of the annual report data was very large, and it required a large RAM (Random Access Memory) as well. Because the RAM in the author's device was not large enough to process annual report data through python application, the author tried another alternative by using google colaboratory.

Before processing the data in google colaboratory, the author ensured that all data were collected and stored in google drive. Furthermore, google colaboratory read the data stored in the google drive, performed text analysis using python libraries such as Pandas and NumPy, as well as saved the analysis results into the google drive.

The author proposed a machine learning approach by creating seed words that define each cultural value and generate a high-quality vocabulary automatically from companies' reports. The author used a fastText model to develop a dictionary for measuring cultural values and compute the cosine similarity between any two-word vectors to quantify their association. The culture dictionary was then built using this ability by linking a set of terms obtained from annual reports with seed words describing each cultural value. The author performed three main steps: building tokens, applying similarity, and getting the report.

To explain briefly, there were several steps in determining cultural values using NLP, which include:

1. **Data Cleaning**
   Data cleaning involved preparing data for the analysis by removing or changing the unnecessary data and the data that lack format and duplicating them. Data cleaning was performed to ensure that the data used would produce good results; the occurrence of damaged data could affect data processing.

2. **Pre-Processing**
   In this process, Python reads the data. The pre-processing step was conducted to remove punctuation, lowercase, word tokenization using NLTK, stop words (irrelevant stop words such as and, of, the, so on), and to use the ngram (unigram, bigram, and trigram with NLTK).

3. **Word Representation**
   At this step, the process was to install the fastText library (https://fasttext.cc/docs/en/english-vectors.html) so that NLP might learn the text representation and text classifiers in the data utilized, as well as capture semantic links between terms (i.e., "allow" and "enable" have the same meaning). Furthermore, each term/word in the pdf was converted to a vector (1x300).

4. **Data Training**
   The next step was to use cosine similarity to calculate the similarity between texts. Cosine similarity is a metric between two non-zero vectors in an inner product space that measures the cosine of the angle between them. That vector space will have the same number of dimensions as the number of unique words in all sentences combined.

5. **Threshold Similarity**
   Threshold similarity is the process of setting the minimum word similarity limit on the data processing results. In this study, the author set a criterion of 75% (0.75), which implied that if the term in the annual report obtained was less than 75% compared to word similarity, it would be considered to have no association with the seed word.

Table 5.1 Applying Similarity

{"ADMG": {"94 profil": ["Quality", "end user", 0.19030503928661346], "profil perusahaan": ["Quality", "customer requirement", 0.21298408508300078], "perusahaan company": ["Teamwork", "business partner", 0.4769595265388489], "company profile": ["Innovation", "business model", 0.5213951468467712], "profile 24": ["Quality", "end user", 0.29573774337768555], "24 identitas": ["Quality", "end user", 0.19253942370414734], "identitas perusahaan": ["Integrity", "corporate governance", 0.2519646883010864], "perusahaan corporate": ["Integrity", "corporate governance", 0.6977547407150269], "corporate identity": ["Integrity", "corporate governance", 0.7487773895263672], "identity 26": ["Quality", "customer relationship", 0.26389542222023011], "26 sejarah": ["Teamwork", "team up", 0.16537396609783173], "sejarah perusahaan": ["Integrity", "corporate governance", 0.20527558028697968], "corporate history": ["Integrity", "corporate governance", 0.7163575291633606], "history 28": ["Quality", "end user", 0.23926760256290436], "28 jejak": ["Quality", "end user", 0.17644105124473571], "jejak langkah": ["Respect", "leadership skill", 0.12802904842840581], "langkah perusahaan": ["Integrity", "corporate governance", 0.18700741231441498], "corporate milestones": ["Integrity", "corporate governance", 0.646527111530304], "milestones 34": ["Innovation", "operational excellence", 0.25205788016319275], "34 bidang": ["Teamwork", "team up", 0.138996884226799], "bidang usaha": ["Innovation", "technology innovation", 0.14847822487354279], "usaha line": ["Integrity", "fiduciary duty", 0.28944426774978641, "line business": ["Innovation", "business model", 0.6888772845268251, "business 37": ["Teamwork", "business partner", 0.5998387336730957], "37 struktur": ["Teamwork", "team up", 0.12065551423986954], "struktur organisasi": ["Integrity", "corporate governance", 0.17329278588294983], "organisasi organization": ["Respect", "sakes organization", 0.5353193879127502], "organization structure": ["Respect", "sakes organization", 0.6078828573226929], "structure 38": ["Integrity", "corporate governance", 0.29872369766235351, "38 visi": ["Teamwork", "team up", 0.17188623547554016], "visi dan": ["Respect", "highly skilled", 0.14721788465976715], "dan misi": ["Quality", "end user", 0.11025930941104889], "misi vision": ["Innovation", "thought leadership", 0.33959850668907166], "vision mission": ["Respect", "leadership team", 0.45815104246139526], "mission 40": ["Teamwork", "team up", 0.34110575914382935], "40 budaya": ["Respect", "high caliber", 0.15930114686489105], "budaya perusahaan": ["Integrity", "corporate governance", 0.24865439534187317], "corporate culture": ["Integrity", "corporate governance", 0.7613165974617004], "culture 43": ["Integrity", "corporate governance", 0.31789031624794006], "43 pro": ["Teamwork", "team up", 0.29806727170944214], "pro il": ["Teamwork", "team up", 0.28074881434440613], "il dewan": ["Integrity", "corporate governance", 0.19985398650169373], "dewan komisaris": ["Integrity", "fiduciary duty", 0.23067352175712585], "komisaris pro": ["Respect", "high caliber", 0.26617440581321716], "pro ile": ["Respect", "high caliber", 0.25429323315620421, "ile board": ["Integrity", "board director", 0.57852566242218021, "board commissioners": ["Integrity", "board director", 0.7612766623497009], "commissioners 56": ["Integrity", "board director", 0.37598690390586853], "56 pro": ["Teamwork", "team up", 0.29799872636795044], "il direksi": ["Innovation", "operational excellence", 0.17307284474372864], "direksi pro": ["Respect", "high caliber",

Source: Google Colaboratory, 2021

6. **Getting Report**
   At this stage, the value determination of each culture was based on the number of terms - occurring in the annual report that are similar to the seed word. After filtering, the author downloaded three results from the text analysis process consisting of:

6.1 Word Lists

From the table below, we can find out the results of words that have an association rate of at least 75% with each corporate cultural value. These words are the words formed in the previous stage and generated into the culture dictionary.

6.2 Word Count

In the Word Count table, it is provided the number of occurrences of each word. For example, in companies with company's code: ADMG, the word "ability" reflecting the value of innovation appeared 15 times in the annual report. The frequency of each word's appearance can be viewed in this table.

Table 6.2 Word Count

	Innovation	Integrity	Quality	Respect	Teamwork
ADMG	{'ability': 15, 'agile': 2,	{'accountability': 12, 'a	{'achieve customer': 1,	{'advisor': 2, 'ceo':	{'assist': 8, 'assisting':
AGII	{'ability': 16, 'allow': 1	{'accountability': 6, 'ac	{'build': 6, 'capable': 3,	{'advisor': 6, 'audit	{'alliances': 2, 'assist':
AKPI	{'ability': 8, 'achieving	{'accountability': 3, 'ac	{'application quality': 1	{'advisor': 3, 'ceo':	{'assist': 2, 'associatio
ALKA	{'ability': 11, 'allow': 1,	{'accountability': 1, 'ac	{'best service': 1, 'capa	{'audit team': 2, 'c	{'assist': 1, 'assisting':
ALMI	{'ability': 3, 'advances	{'accountability': 3, 'ac	{'build': 1, 'commitme	{'company': 329, 'c	{'assist': 1, 'associatio
ANTM	{'ability': 32, 'agricultu	{'accountability': 17, 'a	{'ability service': 1, 'ac	{'administrator tea	{'align': 5, 'alliance': 1
AYLS	{'ability': 5, 'agricultur	{'accountability': 9, 'ac	{'best service': 1, 'capa	{'adviser': 1, 'advis	{'align': 1, 'assist': 4, '
BAJA	{'ability': 4, 'advanced	{'accountability': 5, 'ac	{'adequate level': 1, 'b	{'advisor': 2, 'comp	{'assist': 5, 'assisting':
BMSR	{'ability': 7, 'allow': 2, '	{'accountability': 3, 'ad	{'build': 1, 'commitme	{'adviser': 1, 'advis	{'assist': 1, 'associatio
BORN	{'ability': 5, 'best': 5, 'b	{'accountability': 1, 'au	{'availability quality': 1	{'advisor': 10, 'com	{'assist': 4, 'associatio

Source: Google Colaboratory, 2021

To check all other words that were clustered by five corporate culture values in each company and their frequency across companies, the author carried out six steps outlined above. After obtaining the cultural value results, STATA was implemented to perform a statistical test using the market-to-book value for regression analysis in determining if there is a relationship between corporate cultural value and firm value.

6.3 Report

From the report below, it can be known the value of each culture of each company. For example, in the ADMG annual report, there were the numbers of word types (Word List) and the frequency appearance in each word (Word Count) that had similarities with the word "innovation". If we summed the word list ofeach word count associated with "innovation", then the result obtained was as many as 263.

Table 6.3 Culture Report

	Innovation	**Integrity**	**Quality**	**Respect**	**Teamwork**
ADMG	263	1322	367	1340	228
AGII	291	1277	415	1439	328
AKPI	135	548	254	714	106
ALKA	67	683	126	611	113
ALMI	84	587	134	505	91
ANTM	1137	8693	1435	4263	1552
AYLS	310	1000	267	1134	231
BAJA	141	809	295	1025	141
BMSR	85	519	172	587	123
BORN	121	406	187	671	138

Source: Google Colaboratory, 2021

Statistical Analysis

In this section, the author explains the analysis processes and results of all variables using Descriptive Statistics, Estimation Model, and Panel Data Regression Analysis. First, the author performed the estimation mode, continued by the descriptive statistics, and finally, classical assumption test and regression model. Before performing the above steps, the author employed the Winsorization method to reduce the influence of outliers in the data by either assigning a lower weight to the outlier or adjusting the value to make it close to other values in the data set. According to Sugiyono (2018), multiple linear regression analysis can be carried out using the following formula:

$$\mathbf{Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + + \beta_9 X_{9+} + \beta_{10} X_{10} + \beta_{11} X_{11} \varepsilon}$$

Keterangan:

Y	*= Market to Book Ratio*	X_6	*= Age*
α	*= Constant*	X_7	*= Size*
β	*= Regression Coefficient*	X_8	*= Return-on-Assets (ROA)*
X_1	*= Integrity Value*	X_9	*= Cash-to-Assets (CTA)*
X_2	*= Innovation Value*	X_{10}	*= PPE to Total Assets (PTA)*
X_3	*= Quality Value*	X_{11}	*= Intangible-Assets-to-Total-Assets (ITA)*
X_4	*= Respect Value*		
X_5	*= Teamwork Value*	*ε*	*= Error*

1. Estimation of Regression Model

1.1 Common Effect Model (CEM)

The common effect model is the most basic panel data technique because it combines only time series and cross-section data. The calculation using the common effect model can be seen as follows:

Table 1.1 Common Effect Model

Variables	Coefficient
Constant	10,42281
X1	-0,0008751
X2	-0,0003601
X3	-0,0004561
X4	0,0002808
X5	0,0037162
C1	0,0027088
C2	-0,3040634
C3	9,498194
C4	-0,7905617
C5	0,2945672
C6	-3,301026

Notes: *X1 is defined as Innovation value, X2 is defined as Integrity value, X3 is defined as Quality value, X4 is defined as Respect value, X5 is defined as Teamwork value, C1 is defined as Firm's age, C2 is defined as Firm's size, C3 is defined as ROA (Return-on-Asset), C4 is defined as CTA (Cash-to-Asset), C5 is defined as PTA (PPE-to-Total-Asset), and C6 is defined as ITA (Intangible-to-Total-Asset).*

Source: STATA, 2021

1.2 Fixed Effect Model (FEM)

Fixed effect model is a statistical model in which the levels (i.e., values) of independent variables are assumed to be constant and only the dependent variable varies in response to the levels of independent variables. The calculation using the fixed effect model can be seen as follows:

Table 1.2 Fixed Effect Model

Variable	Coefficient
Constant	24.07383
X1	0.0003091
X2	0.0005721
X3	0.0000185
X4	-0.0010319
X5	-0.000304
C1	0.15111728
C2	-0.8937742
C3	-8.141884
C4	4.593827
C5	-2.514232
C6	1.360844

Notes: *X1 is defined as Innovation value, X2 is defined as Integrity value, X3 is defined as Quality value, X4 is defined as Respect value, X5 is defined as Teamwork value, C1 is defined as Firm's age, C2 is defined as Firm's size, C3 is defined as ROA (Return-on-Asset), C4 is defined as CTA (Cash-to-Asset), C5 is defined as PTA (PPE-to-Total-Asset), and C6 is defined as ITA (Intangible-to-Total-Asset).*

Source: STATA, 2021

1.3 Random Effect Model (REM)

Random effect model is a statistical model with random variables as model parameters. The calculation using the common effect model can be seen as follows:

Table 1.3 Random Effect Model

Variable	Coefficient
Constant	11,10732
X1	-0,0012363
X2	-0,0004532
X3	-0,0001934
X4	0,0006613
X5	0,0030667
C1	0,0086398
C2	-0,3383473
C3	3,590271
C4	0,6217498
C5	0,2642271
C6	-2,461771

Notes: *X1 is defined as Innovation value, X2 is defined as Integrity value, X3 is defined as Quality value, X4 is defined as Respect value, X5 is defined as Teamwork value, C1 is defined as Firm's age, C2 is defined as Firm's size, C3 is defined as ROA (Return-on-Asset), C4 is defined as CTA (Cash-to-Asset), C5 is defined as PTA (PPE-to-Total-Asset), and C6 is defined as ITA (Intangible-to-Total-Asset). In addition, X1, X2, X3, X4, X5 are utilized as independent variables while C1, C2, C3, C4, C5, C6 are used as control variables.*

Source: STATA, 2021

2. Regression Model Selection

In order to obtain the information on which estimation model is more appropriate to be used, the author conducted several tests with the following results:

2.1 Chow Test

Chow test is a test to determine which model between Common Effect Model and Fixed Effect Model is more appropriately used in estimating the panel data.

Table 2.1 Chow Test

F (284, 226)	Prob > F
5.38	0.0000

Source: Chow Test Result Using STATA, 2021

Based on the results, with a significance level of 5%, the author reject H0 as the probability value is 0.00 < 0.05. Thus, the chow test favors the Fixed Effect Model over the Common Effect Model.

2.2 Hausman Test

Hausman test is a test to determine which model between Fixed Effect Model and Random Effect Model is more appropriately used in estimating the panel data.

Table 2.2 Hausman Test Result

Chi-Sq. Statistic (11)	Prob > chi2
31.71	0.0008

Source: Hausman Test Result Using STATA, 2021

Based on the result above, when the level of significance 5%, H0 was rejected because the probability value showed 0.0008 < 0.05. Therefore, it can be concluded that the hausman test prefers Fixed Effect Model.

3. Descriptive Statistical Analysis

The purpose of descriptive statistical analysis is to provide a data overview of the data used in this research study. Descriptive statistics consist of mean, minimum values, maximum values, standard deviations, and percentiles for each variable. Before the author calculated the descriptive analysis, the author performed winsorizing method to convert outliers' values without deleting datasets.

Table 4.4 Descriptive Statistical Analysis

	N	Min	Max	Mean	Q1	Median	Q3	SD
MTB	522	-2.02	5.11	1.29	0.48	0.99	1.85	1.11
Innovation	522	2.89	7.02	5.26	4.73	5.28	5.80	0.80
Integrity	522	4.16	8.83	6.93	6.46	6.89	7.35	0.73
Quality	522	3.47	7.54	5.76	5.30	5.73	6.18	0.72
Respect	522	4.28	8.43	6.94	6.59	6.93	7.29	0.58
Teamwork	522	3.04	7.25	5.36	4.84	5.35	5.81	0.73
Age	522	3.00	100.00	34.10	22.00	33.00	44.00	18.13
Size	522	24.81	32.39	28.70	27.47	28.69	29.84	1.69
ROA	522	-0.32	0.26	0.03	0.00	0.03	0.07	0.08
CTA	522	0.00	0.69	0.10	0.02	0.06	0.13	0.12
PTA	522	0.00	1.16	0.34	0.11	0.29	0.51	0.26
ITA	522	0.00	0.64	0.03	0.00	0.00	0.01	0.09

Notes: MTB = defined as market-to-book value. INNOVATION = defined as total count word of the innovation value. INTEGRITY = defined as total count word of the integrity values. QUALITY = defined as total count word of the quality values. RESPECT = defined as total count word of the respect value. TEAMWORK = defined as total count word of the teamwork value. AGE = defined as the firm's age. SIZE = defined as the company's size. ROA = defined as return-on-asset ratio and calculated by dividing operating income to total assets. CTA = defined as cash-to-total-assets ratio and calculated by dividing cash to total assets. PTA = defined as property, plan, and equipment to total assets ratio and calculated by dividing PPE to total assets. ITA = defined as intangible-assets-to-total-assets ratio and calculated by dividing intangible assets to total assets.

Source: Result of Data Processing Using STATA, 2021

Hypothesis Testing

The following are the results of regression analysis using STATA. There will be analysis of coefficients of determination, simultaneous influence testing (F-test), and partial influence testing (t-test) in hypothesis testing.

Table Hypothesis Testing

Source	SS	df	MS		
				Num of obs.	522
				F (13, 508)	7.80
				Prob > F	0.0000
Model	105.865765	13	8.14352036	R-squared	0.1664
Residual	530.537311	508	1.04436478	Adj. R-squared	0.1450
Total	636.403075	521	1.22150302	Root MSE	1.0219

MTB	Coef.	Std. Err.	t	P > l t l	[95% Conf.	Interval]
Innovation	-0.0464296	0.1430119	-0.32	0.746	-0.3273971	0.2345379
Integrity	-0.3217372	0.1924018	-1.67	0.095	-0.6997384	0.0562640
Quality	0.3693008	0.1766231	2.09	0.037	0.0222991	0.7163026
Respect	0.0261483	0.2215891	0.12	0.906	-0.4091956	0.4614922
Teamwork	0.0500789	0.2098417	0.24	0.811	-0.3621854	0.4623432
Age	-0.0062411	0.0026058	-2.40	0.017	-0.0113605	-0.0011217
Size	0.0483468	0.0367873	1.31	0.189	-0.0239271	0.1206207
ROA	3.8042780	0.6053412	6.28	0.000	2.6149980	4.9935590
CTA	1.7481360	0.4136202	4.23	0.000	0.9355193	2.5607530
PTA	0.5704532	0.1846682	3.09	0.002	0.2076459	0.9332606
ITA	-0.3160315	0.5320995	-0.59	0.553	-1.3614180	0.7293550
Constant	-0.4301531	1.1062980	-0.39	0.698	-2.6036360	1.7433300

Notes: This table reports the regression analysis using year fixed effect method for the sample of 522 observations for the period 2017 – 2019. In addition, Innovation, Integrity, Quality, Respect, and Teamwork are utilized as independent variables, while AGE, SIZE, ROA, CTA, PTA, ITA are used as control variables.

Simultaneous Test F-Test Statistics

F Test results are presented in the probability value (Prob > F) section with the value of 0.000. As this value was less than 0.05, it can be concluded that the disclosure of Innovation, Integrity, Quality, Respect, and Teamwork value simultaneously affects Market-to-Book Value.

Independent Sample T-Test

Based on the results in the hypothesis testing table, the interpretation for each variable is as follows:

a. **Innovation value (X1)** served as the first independent variable showed the significance level of 0.746. This value was more than 0.05, suggesting that the Innovation value has no effect on the market-to-book value (dependent variable).
b. **Integrity value (X2)** served as the second independent variable showed a significance level of 0.095. This value was more than 0.05, suggesting that the Integrity value has no effect on the market-to-book value (dependent variable). It is important to note, however, that under 90 percent confidence level ($p < 0.10$), the variable can be considered as significant. Thus, there is a weak evidence that integrity value affect market to book value.
c. **Quality value (X3)** served as the third independent variable showed a significance level of 0.037. This value was less than 0.05, meaning that the Quality value affects the market-to-book value (dependent variable).
d. **Respect value (X4)** served as the fourth independent variable showed a significance level of 0.906. This value was more than 0.05, suggesting that the Respect value has no effect on the market-to-book value (dependent variable).
e. **Teamwork value (X5)** served as the fourth independent variable showed a significance level of 0.811. This value was more than 0.05, suggesting that the Teamwork value has no effect on the market-to-book value (dependent variable).

ANALYSIS RESULT AND DISCUSSION

Independent Variables	Coefficient	Significance	Interpretation
Innovation Value (x1)	-0.0464296	0.746	Has a negative effect yet it is not significant
Integrity Value (x2)	-0.3217372	0.095	Has a negative effect yet it is not significant
Quality Value (x3)	0.3693008	0.037	Has a positive effect and significant
Respect Value (x4)	0.0261483	0.906	Has a positive effect yet it is not significant
Teamwork Value (x5)	0.0500789	0.811	Has positive effect yet it is not significant

Table Analysis Result And Discussion

H_a1: Corporate cultural value of innovation is associated with the firm value.

According to the result of hypothesis testing, H_a1 in this study is not accepted. This result is in accordance with the research conducted by Zhao, Teng, and Wu (2017) in which they found that innovation culture is not related to firm value. Indonesian listed companies are less inclined to prioritize innovation values for enhancing firm value due to two main reasons: Firstly, technological innovation in Indonesia is still in the early stages of adoption and development. Secondly, according to the Global Innovation Index (GII) by Cornell University, INSEAD, and WIPO, Indonesia ranked 85th out of 131 economies globally in innovation in 2020, indicating a perceived deficiency in innovation efforts by the government and private institutions (Global Innovation Index, 2020).

H_a2: Corporate cultural value of integrity is associated with the firm value.

Based on the result of hypothesis testing, H_a2 in this study is not accepted. This is due to the fact that culture can take various forms. For instance, high-tech firms like Tokopedia emphasize innovation, while customer-centric companies like BCA prioritize integrity as their cultural foundation. Despite the divergence in cultural choices, companies tailor their culture to meet specific needs. Moreover, many companies prioritize maximizing shareholder value over values like integrity, which may not directly impact firm value. This aligns with previous research by Zingales (2015), indicating that integrity is infrequently mentioned as a cultural value and is not a primary focus for enhancing firm value.

H_a3: Corporate cultural value of quality is associated with the firm value.

According to the results of hypothesis testing, H_a3 in this study is accepted. The results show that the cultural value of quality is positively and significantlyassociated with firm value. Logically consumers are more likely to purchase a product or service from a reputable company. If a firm has a favorable brand image, it can create high sales, leading to high profitability and, eventually, high firm value. According to previous studies, companies have prioritized managing and developing brand image in order to considerably increase the company's value. A company with a strong brand has a competitive edge in the market, since a good brand is formed on a good product or excellent supporting factors such as different brand image and personality (Lehmann and Keller, 2003).

H_a4: Corporate cultural value of respect is associated with the firm value.

Based on the result of hypothesis testing, H_a4 in this study is not accepted. There was no research explaining the relationship between respect value and firm value. However, based on the author's understanding and relevant journals, the influence of respect value on the company's internals is acknowledged. It is suggested that respect value's connection to firm value might be limited due to its widespread application and may not necessarily add significant value. Furthermore, because the assessment of cultural culture is based on stated cultural value, there is a chance that it is not an actual cultural value of the firm, which might impact the difference in corporate cultural value measurement.

H_a5: Corporate cultural value of respect is associated with the firm value.

According to the result of hypothesis testing, H_a5 in this study is not accepted. Similarly, to respect value, research on the influence of teamwork value on firmvalue has not been conducted for Indonesia-listed companies. This finding may be due to the general application of teamwork and cannot be considered as a factor that can add value to the company. Furthermore, the assessment of cultural culture is based on stated cultural value (as reported in the annual report) rather than actual cultural value of the firm, which may impact the difference in corporate cultural value measurement.

CONCLUSION AND RECOMMENDATION

This research analyzed the influence of corporate cultural values on firm value. Based on the results of the analysis and the discussion carried out, several conclusions are obtained as follows:

1. The value of innovation has no substantial effect on the company value since innovation is less likely to be implemented in Indonesia. This is supported by an assessment completed by the Global Innovation Index (GII) in 2020, which showed that Indonesia is deficient in terms of innovation. This is also relevant to the findings of a previous study which discovered that innovation value is unrelated to the firm value.

2. Integrity value has no significant effect on the firm value because companies prefer maximizing shareholder value rather than looking at integrity value that directly affects the firm. A value that gives a direct effect is more likely to be applied than one that offers an indirect effect which normally has some short-term costs today.

3. The value of quality has a significant effect on the firm value. Despite the fact that there is little evidence explaining the relationship between these two variables, prior studies indicated that establishing brand image by improving quality services or products gives advantages to boost the firm value. This is supported by the perspective of investors who believe that the increase in company value will be entailed by an increase in quality.

4. Respect value has no significant effect on the firm value, and no previous research has been conducted to explain the relationship between the respect value and firm value. The application of respect value is not viewed as a factor influencing business value; it is rather an overview of the company's application of ethics and quality standards. Thus, based on the findings of this study, it can be concluded that respect value has no effect on the firm value.

5. Teamwork value has no significant effect on the firm value because it has no direct effect on generating profits. Teamwork is regarded as the most influential factor in improving productivity and performance. It is also considered as a morale booster and key to employee engagement. To conclude, teamwork is beneficial to the internal companies, but has no effect on the firm’s value.

RECOMMENDATION

Research Development for Future Research

1. In future research, it is recommended to assess the implementation of corporate cultural values in businesses, as this aspect is currently under-acknowledged by companies. Additionally, it is advisable to delve deeper into the application of cultural values specifically in the Indonesian context for an enhanced understanding and research quality.

2. In the future research, it is recommended to prolong the research period and the research method in order to gain a clearer understanding of the topic, specifically to the study about the implementation of corporate cultural values in Indonesia and howit affects business.

For Management Team

It is recommended for the management team to consider corporate cultural values as an essential non-financial factor to improve the firm's quality and performance.Cultural values should not only be used as a written vision and mission, but these should also reflect the company's identity in conducting their business. The management team should start to understand the importance of implementing cultural values in the workplace, as it may be an asset to create a sustainable business in the future.

For Investor

In general, investors rely on financial statements to analyze a company's performance.Nevertheless, a financial assessment of a company's performance is insufficient to comprehend the company's actual performance. There are various explanations that cannot be described by the figures in the financial statements, and this usuallyencourages investors to learn about the company’s operations beyond the financial numbers. Corporate cultural values offer investors an alternative means to comprehend the genuine business condition from a non-financial perspective, serving as both a novel approach and a potential indicator for investors and prospective investors seeking deeper insights into the firm.

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