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The Prevention of Bribery in Government Agencies: The Role of Big Data and Whistle-blowing Systems

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Abstract
Bribery has become the kind of corruption with the highest annual incidence rate. Therefore, the hunt for solutions to these problems must continue. Consequently, this research must be conducted. The objective is to examine how big data and the whistle-blowing system affect the prevention of bribery. This investigation was conducted utilizing a quantitative methodology. 191 auditors from the Financial and Development Supervisory Agency (BPKP), the Supreme Audit Agency (BPK), and the Indonesian Government Inspectorate were surveyed via distributing questionnaires. This research employs structural equation modeling (SEM) with the assistance of the smartPLS application for statistical testing. Both big data and the whistle-blowing system have proven to have a positive impact on bribery prevention, according to the findings of this study.

Keywords: big data; prevention of bribery; whistle-blowing system

INTRODUCTION

Indonesia can be considered as one of the countries with high levels of corruption. In fact, almost every year the number of corruption cases that occur always increases, especially corruption cases that occur in government institutions. Based on data reported by Indonesia Corruption Watch (ICW), in 2019 there have been at least 217 cases of corruption, with a value of state losses reaching IDR 8.04 trillion (Kompas, 2020). The condition was then exacerbated, because ICW again reported that, in 2020 there was a significant increase in the number of corruption cases in Indonesia. At least in 2020, there are 1,218 corruption cases that have been tried, with a total of 1,298 defendants. The state civil apparatus and village officials are known to be the largest

number of perpetrators of this action (Kompas, 2021a). Apart from that, it is also known that, in 2020, the state has recorded losses of Rp. 56.7 trillion in this case. This number has increased rapidly when compared to 2019.

The high corruption cases that have occurred in Indonesia are still dominated by acts of bribery. It is known that in the last 10 years (2010-2020), bribery is still a type of corruption with the highest number of cases each year (KPK, 2021). In fact, based on data submitted by ICW, at least in 2020, the state has suffered losses of Rp. 322.2 billion, as a result of acts of bribery (Kompas, 2021b).

Based on various data previously presented, it can be seen that the severity of corruption cases (especially bribery) has occurred in Indonesia, especially in government institutions. Of course, this is very concerning, so that later on there will be many parties who will be increasingly encouraged, to find a strategy or method, which has proven to be effective in preventing this case from happening. According to Hipgrave (2013), big data will be the right solution to this problem. This is because, through big data technology, it is known that the process of identifying signs of impending fraud including bribery, will be faster to detect. So that it can be used by an agency, to stop the possibility of fraud. Furthermore Hipgrave (2013) also explains that, big data will easily analyze trends and patterns of fraud, based on historical traces of previous data (both structured and unstructured data), which then this information can be utilized by agencies, as a input for developing strategies so that fraud do not recur (Sow et al., 2018; and Hartono, 2019). So, this will make big data very effective in preventing bribery in an institution.

Apart from big data, the whistle-blowing system is also believed to be an effective factor in preventing bribery (Suh & Shim, 2020; and Johansson & Carey, 2016). This is also supported by Francis & Armstrong (2011); and Al-Haidar (2018), which states that the whistle-blowing system mechanism anti-corruption a very effective. This is very possible, because with the application of a whistle-blowing system in an institution, will whistle-blowers have a legal forum, which can accommodate any complaints about acts of bribery they see, including reporting of actions that indicate bribery will occur (before the action is taken). conducted). Of course, information from whistle-blower can later be used as material for future evaluation for

an agency, so that it can develop various efforts and strategies to prevent bribery. In addition, the existence of a whistle-blowing system in an institution can actually have the effect of fear and reluctance for perpetrators to take bribes.

Until now, there have been several previous studies which have also examined the influence of big data detection fraud. As for one of the previous researchers, what helped prove the effectiveness of big data in detecting fraud was carried out by Tang & Karim, (2019). However, previous research analyzing the influence of big data prevention fraud, especially on bribery prevention, is still relatively rare, especially in Indonesia. In fact, by looking at its potential, big data course not only effective for use in the context of detecting fraud, but will also be very effective if used for the purpose of preventing acts of fraud (including bribery).

As for several previous studies, it is known that they have analyzed the influence of big data on bribery prevention, namely, research conducted by Chen et al. (2015); and Madhuri et al. (2021). Through these two studies, it is known that big data has proven to be effective as tool to prevent fraud (including bribery). In fact, through research conducted by Chen et al. (2015), it is known that the Alibaba Company is also an example of a large company today, which has proven the benefits of big data which has proven to be effective in detecting and preventing fraud in these companies.

Slightly different from the big data, research analyzing the effect of the whistle-blowing system on bribery prevention is known to have been carried out quite a lot by several previous researchers, including in Indonesia. Like the research conducted by Puryati & Febriani (2020); and Maulida & Bayunitri (2021), which also proves that the whistle-blowing system has proven to have a significant effect on fraud (including bribery). However, it turns out that there are still some previous studies in Indonesia, such as research conducted by Atmadja et al. (2019), which shows that the whistle-blowing system has not been proven to have any effect on preventing acts of fraud. There are still inconsistencies in the results of previous studies, as well as the large potential for whistle-blowing system to be used as a tool to prevent fraud (including bribery), ultimately encouraging this research to re-examine how these variables influence the prevention of bribery in government institutions. Another reason is that research that has

simultaneously tested the effect of whistle-blowing and big data on bribery prevention is also relatively rare, especially in Indonesia. So, it would be very appropriate to re-analyze how much influence these two variables have on bribery prevention.

Therefore, based on various previous explanations, it can be concluded that this research was conducted with the objectives: (1) to analyze the effect of the use of big data on bribery prevention; and (2) to analyze the effect of using a whistle-blowing system on bribery prevention. In addition, it should also be noted that the respondents targeted in this study are auditors who work in various state audit institutions, which are indeed very closely involved with various activities regarding testing and preparation of strategies or systems for preventing bribery in public sector institutions. The auditors in question are auditors known to work at the Financial and Development Supervisory Agency (BPKP), the Supreme Audit Agency (BPK), to auditors working at the Indonesian Government Inspectorate.

It is hoped that the results of this research will become a solution as a method or strategy, which can become a reference, and can even be implemented by various public sector institutions in Indonesia, in order to prevent acts of bribery in the future at these institutions.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Agency Theory

Agency Theory is a theory, which will explain that there is a relationship between the principal (owner) and agent (management). According to Parker et al. (2018); and Ali (2020), the relationship that is created between the principal and agent can occur, because the principal or who is known as the owner of an organization, will delegate his authority to the agent, in order to be asked to manage the principal by the agents. But in the process, it turns out that agents don't always carry out their jobs properly. This is because, in some cases, it turns out that these agents sometimes carry out various actions that are in fact very detrimental to principals, such as bribery, so that this then creates conflict between principals and agents (Anugerah, 2014; and Bendickson et al., 2016). The conflict that arises is then referred to as the agency problem. Several previous studies, which have been conducted by Boyle et al. (2015); Gonzales & Hoffman (2018); and Wijayanti & Hanafi (2018), are several studies that also show that one of the causes of the

agency problem is fraud. In the end, these three studies also used agency theory, to be used as a solution in order to solve the agency problem referred to in the research.

Based on the previous explanation, the presence of agency theory can basically be used as an approach and solution to solving the agency problem. In this study, agency theory will be realized through the use of big data and whistle-blowing systems, which are believed to be solutions to resolve and prevent agency problem referred to in this research. The agency problem referred to in this study is bribery, which is rife in Indonesian government institutions.

Fraud and The Causes

Fraud can be defined as an illegal action (unlawful), which is carried out with a certain expertise, in order to gain benefits from the party who is the victim of the action (Desai, 2020; and Vousinas, 2019). When viewed in general, fraud can be categorized into three types, namely acts of corruption, theft of assets, and manipulation of financial statements (ACFE, 2020).

According to Vousinas (2019) there are at least six main factors that cause a person/party to commit fraud. These six factors are then better known as the fraud hexagon. Based on the theory of fraud hexagon, it is known that stimulus, opportunity, rationalization, capability, ego and collusion are the 6 main causes that encourage someone to commit fraud. It should be noted that the hexagon fraud is basically a development of the previous theory of the causes of fraud, which was explained by Cressey (1953) who introduced the Fraud Triangle; Wolfe & Hermanson (2004) who introduced Fraud Diamond; and Crowe (2011) who later helped introduce pentagon fraud. An illustration of the development of the theory of causes of fraud is presented in Figure 1.

In the fraud hexagon, it is known that there is 1 factor that has been added from the previous theory of causes of fraud. The additional factor referred to is the collusion factor (Imtikhani & Sukirman, 2021).

Bribery

Bribery is one type of act of corruption. According to Jain (2020) bribery can be defined as an act of offering and or being asked to give something that is considered valuable in an illegal way, in order to influence or direct an official task/action, the results of which can be conditioned

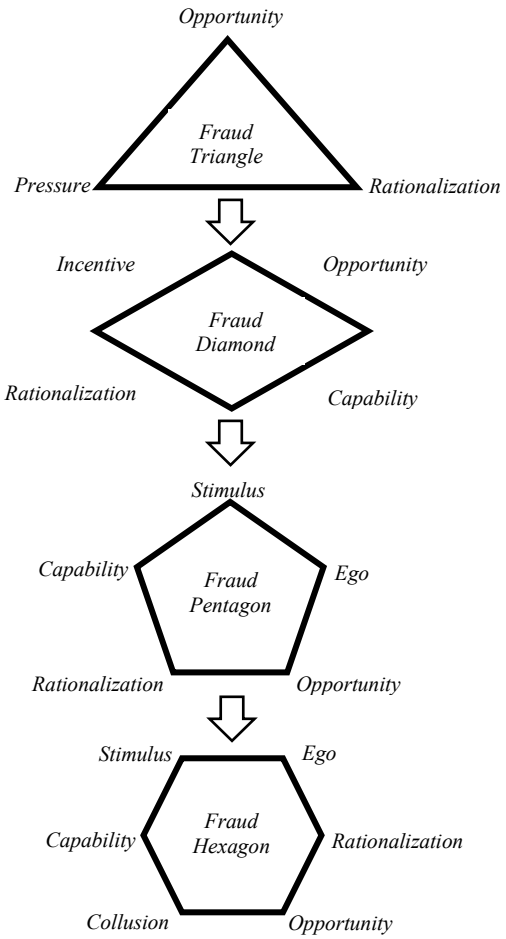

Figure 1. The Causes of Fraud

according to need. Meanwhile, according to Andresen & Button (2019), bribery can also be interpreted as an act of offering or promising something; and or an action to ask for or get something, which is classified as profitable financially.

Big Data and Prevention of Bribery

Ahmed & Ameen (2017) explains that big data can be interpreted as a very large data set (volume), data of very varied types (variety), very fast data creation process (velocity), has a high level of accuracy and high reliability (velocity), and a set of data that has certain values if processed properly (value). Through the large potential and advantages seen from the characteristics of big data, it is only natural that big datahas many potential roles, which can solve various types of problems, if used properly. One of the problems that this technology is very likely to solve is related to the prevention and detection of bribery (Hipgrave, 2013;

Bănărescu, 2015; Madhuri et al., 2021).

According to Hipgrave (2013) through big data, it is very possible to prevent bribery. This is because big data is able to provide very fast and comprehensive information to executives regarding the risk of fraud (bribery) before the case actually occurs. This condition is certainly very possible, because through current technological developments, the amount of data will be very abundant (both internal and external, as well as structured and unstructured data), and this is what then causes big data to be very effective. Through digital traces left behind (on various activities and transactions), big data will be easy to record and utilize, to then be processed using a data analytics tool, in order to analyze patterns and trends, and catch signs that indicate impending bribery in an institution (Bănărescu, 2015; Fredriksson et al. (2017); and Hartono, 2019). Of course, this information will be very much needed by executives from any agency, to utilize big data, as a risk management (prevention) tool, so that the number of bribery cases in that agency can be minimized.

H_1: The use of big data has a positive effect on bribery prevention

Whistle-blowing System and Prevention of Bribery

Whistle-blowing system is believed to be very effective and can be maximized by any agency, including government agencies, as a method that can be used to prevent bribery in that agency (Othman et al., 2015). In fact, research conducted by Maulida & Bayunitri (2021) shows that the whistle-blowing system has proven to be the most effective method for preventing fraud (including bribery) in an institution. Its effectiveness rate is known to reach 54.3%, when compared to other methods. This, in fact, is also supported by previous research conducted by Sow et al. (2018) and Al-Haidar (2018), which show that the whistle-blowing system mechanism anti-corruption a very effective. This is not surprising, because with the existence of a whistle-blowing system, it is actually capable of creating fear and reluctance for individuals, who originally intended to commit acts of fraud (including bribes). This is also proven through research conducted by Suh & Shim (2020), which shows that the number of frauds has decreased in several agencies, since these agencies implemented a whistle-blowing system.

So, it can be concluded that the whistle-blowing system is an effective

solution as a method that can be maximized to prevent bribery in various agencies, especially in government agencies, which are the agencies with the highest number of bribery cases. Based on the various previous explanations, the hypothesis can be formulated as follows:

H_2: The use of a whistle-blowing system has a positive effect on bribery prevention

METHOD

This study uses a quantitative approach. The method used in this study is the survey method by distributing questionnaires to auditors working at the BPK and BPKP RI, as well as auditors working at the Indonesian Government Inspectorate. The purposive sampling technique was also used in this study, in order to determine the sample.

In total there were 191 respondents who had completely filled out the research questionnaire. The details are that as many as 151 auditors come from BPK. To be precise, BPK auditors who work at the Representative Offices of the Special Region of Yogyakarta, West Java, East Java, Central Java, DKI Jakarta, East Kalimantan, West Kalimantan, Central Kalimantan, Papua, West Papua, Riau Islands, Riau, Jambi, South Sumatra, North Sumatra and West Sumatra. In addition, other respondents from this study also came from BPKP. The details are as many as 26 BPKP auditors working in Representative Offices for the Provinces of Aceh, West Java, Central Kalimantan, Riau, Lampung, West Nusa Tenggara and DKI Jakarta. The remaining 14 respondents in this study are auditors who work in various offices of the Indonesian Inspectorate such as those from the Special Region of Yogyakarta, South Sumatra and Central Java.

Operational Definition and Measurement of Variables

This study uses two independent variables, namely *big data* and *whistle-blowing system*, while the dependent variable is the prevention of bribery. As previously explained, a questionnaire was used in this study, as a tool to collect data. Each item of the questionnaire in this study was measured using a *Likert* with intervals of 1 to 6, with answer 1 indicating the answer strongly disagree, answer 2 indicating the answer disagree, answer 3 indicating the answer somewhat disagree, answer 4 indicating the answer somewhat agree, answer 5 indicates the answer agrees, and answer 6 indicates the answer strongly agrees.

Bribery prevention can be defined as an action taken by a certain person/party, which is known to be committed to give and or be given something that is considered valuable (financially), but is carried out in an illegal way, in order to influence/direct an official task, the result of which is can be adjusted according to needs. This variable has used references from research by Sow et al. (2018), in order to compile a list of question items on this variable (consisting of 6 items). The question items are in the form of: the importance of a positive work environment; the importance of the organization to carry out detailed background checks for prospective employees, when carrying out job recruitment; the organization must take consistent action, in order to respond to reported cases of bribery; the need for organizations to always identify and measure the risk of possible bribery; the need for the organization to establish a special department or appoint someone who is focused, to carry out management related to fraud prevention (including bribery); and the leadership of the organization must always encourage each of its employees to report immediately if they see an act of bribery taking place.

Ohlhorst (2015); Ahmed & Ameen (2017) and Kılıç (2020) explain that *big data* can be interpreted as a large data set which has the main characteristics of *volume, value, variety, veracity* and *velocity* (5V), which requires very sophisticated technology to manage. In its development, the use *of big data* can prevent acts of *fraud* (including bribery) in an institution. This has been proven in research conducted by Chen et al. (2015) prevention *fraud* by using *big data*. In order to compile questionnaire question items on *big data*, this study has used references from Rezaee & Wang (2019). The question items on this variable (consisting of 4 items): *big data* has a role to support the bribery prevention process; an institution will always maximize the use of *big data* owned by the company; the use *of big data* will in fact overlap, with the implementation of the company's policies/approaches to prevent bribery (-); and the use *of big data* will be limited, because it can pose a threat to data security (-).

Whistle-blowing system can be defined as a place that receives reports reported by someone (*whistle-blower)* who directly sees an act of *fraud* or other illegal action that occurs in an organization. In practice, the use *whistle-blowing system* in an

agency can increase the level of prevention of *fraud* (including bribery) in that institution (Suh & Shim, 2020). This is because the existence of a *whistle-blowing system* in an institution will give the effect of fear and reluctance for potential perpetrators to commit acts of *fraud* in that institution. Bearing in mind, *the whistle-blowing system* has proven to be very effective in disclosing the occurrence of *fraud* in an agency (Sow et al. 2018; and Al-Haidar, 2018). In order to develop questionnaire items for this variable, research references from Noor & Mansor (2019), Sihotang (2018), and Suh & Shim (2020) will be used. The question items on this variable consist of 8 items, including: there is an obligation for an employee to report if he sees/finds an ongoing violation or fraud (including bribery); the whistle-blowing systemis highly recommended to be implemented by all types of organizations, including for public sector institutions; an organization should socialize the existence of *whistle-blowing system* on all members of the organization; the need for a policy to provide protection for every *whistle-blower* (reporter); *the whistle-blowing system* must be managed by an independent special officer; a *whistle-blower* will feel more comfortable if his identity is covered (only recorded as anonymous); the need for ease of process in submitting/reporting indications of bribery at an institution; and the need for continuous evaluation and improvement, in order to increase the effectiveness of the implementation of the *whistle-blowing system* in an institution.

Data Analysis Techniques

The data obtained from this study will be analyzed simultaneously through the application of *partial least squares* (PLS). According to Latan & Ghozali (2012) in PLS, the data analysis process will be carried out through 2 testing sub-models, namely the measurement model and the structural model. In the measurement model it is known that there are 2 stages of testing that must be carried out, namely testing validity and reliability. Meanwhile, in the structural model there are tests on the value of r^2, path coefficient and significance test.

As previously explained, that in the measurement model there will be two stages of testing that must be carried out, namely testing validity and reliability. In the validity test, it is also known that there are two types of testing stages carried out, namely convergent validity test and discriminant validity. According to Chin (1988), a study can be said to

have met the requirements of convergent validity testing, if the study has variables, each question item has a *loading* greater than 0.5, with an *expected average variance* (AVE) value for each variable as well. more than 0.5. In addition, Chin (1988) also explained that, to meet the requirements of the discriminant validity test, a study must have the AVE square root value of a variable with the variable itself having the highest value, when compared to the correlation value of that variable with other variables. After the validity testing phase has been completed, other tests are carried out in the measurement model is reliability testing. Chin (1988) argues that, a study will be said to have tested the reliability test, if it has a *composite reliability* that exceeds 0.7.

Another testing stage in PLS is the structural model. This stage will be carried out after analysis in the measurement model completed. In the structural model, it is known that there will be 3 stages of assessment that will be carried out. The first stage is testing the value of r^2 resulting from. According to Latan & Ghozali (2012), testing the value of r^2 in a study needs to be done to see how much the variables used in the study affect the dependent variable. So that later it can be known the level of strength of the research model that was built. Furthermore, Latan & Ghozali (2012) also explained that the resulting r^2 value is categorized by groups, namely groups with strong model categories (0.67), moderate (0.33), and weak model categories (0.19).

The next step in the measurement model is the path coefficient and the significance test. These two tests will be carried out, in order to assess the hypotheses that have been built in a study. Fornell & Larcker (1981); Chin (1988); and Latan & Ghozali (2012), explained that in this stage, later the assessment will be divided based on several categories, adjusting the significance level used. Fornell & Larcker (1981); and Chin (1988) again explained that, there are three significance levels that can later be selected, namely 10%, 5% and 1%. If a study uses a significance level of 10%, then the hypothesis can be proven significant if it has a t-value, which is greater than 1.65. In addition, if a significance level of 5% is used, the hypothesis will be considered significant if it has a t-value higher than 1.96. Finally, when using a significance level of 1%, the hypothesis is considered proven significant, if it has a t-value higher than 2.58.

RESULTS AND DISCUSSION

Demographics

Overall, the total number of respondents in this study were 191 auditors, who worked at Indonesian government-owned audit/examination institutions. To be precise, they are auditors who work at the BPK, BPKP and the Inspectorate. All respondents in this study are government auditors who do have knowledge and competence related to *big data*, *whistle-blowing systems* and bribery prevention. As for the details of the number of respondents in this study, originating from the BPK RI were 151 respondents (79% presentation); auditors working at BPKP RI, namely as many as 26 respondents (14% presentation); and auditors who work at the Indonesian Government Inspectorate, with a total of 14 respondents (7% presentation).

Based on the data collection that was carried out in this study by filling out questionnaires, it was also known that the majority of respondents who had filled out the research questionnaire were male auditors, with a total of 109 respondents (57% presentation). In addition, it is also known that the majority of respondents who filled out the research questionnaire were respondents who had a Bachelor's degree or equivalent education level, with a total of 136 auditors as respondents, with a presentation reaching 71%. Finally, it can also be concluded that the majority of respondents from this study were respondents who were classified as experienced auditors (working for more than 6 years), with a total of 125 people, with a presentation rate of 65%.

Measurement Model Testing

In detail, the measurement model test results from this study have been presented in Tables 1 and 2. Based on Table 1, it is known that there is a question item that still has a *loading* lower than 0.5. The item is BP 2, which is one of the question items from the bribe prevention variable. Because these items have a loading value lower than 0.5, these items must be dropped. Thus, all the question items presented in Table 1 are question items that have a loading value, which is greater than 0.5. Apart from that, from Table 2, it is also shown that the AVE value for each variable in this study has a value higher than 0.5. So, based on the data presented in Table 1, it is concluded that this study has met the

Table 1. Loading Value and AVE (Measurement Model)

Variable	Item	*Loading*	AVE	Variable	Item	Loading	AVE
Whistle-blowing System (WBS)	WBS 1	0.7848	0.6614	*Big Data* (BD)	BD 1	0.7481	0.5206
	WBS 2	0 .9089			BD 2	0.6677	
	WBS 3	0.9236			BD 3	0.7293	
	WBS 4	0.8398			BD 4	0.7383	
	WBS 5	0.6590		Bribery Prevention (BP)	BP 1	0.7311	0.6189
	WBS 6	0.6076			BP 3	0.8301	
	WBS 7	0.8498			BP 4	0.8825	
	WBS 8	0.8750			BP 5	0.5639	
					BP 6	0.8799	

Table 2. CR Value and Correlation between Variables (Measurement Model)

Variable	CR	BD	BP	WBS
Big Data (BD)	0.8126	**0.7215**	0	0
Bribery Prevention (BP)	0.8880	0.4837	**0.7867**	0
Whistle-blowing System (WBS)	0.9388	0.4842	0.7796	**0.8133**

Note: the number in bold is the square root value of the AVE value for each variable

Table 3. Results of Structural Model Testing

	Path	*Coefficient*	*T-Value*	Decision
H_1	BD -> BP	0.1388	5.7617	Supported
H_2	WBS -> BP	0.7124	28.1219	Supported
R^2 0.6225				

requirements of convergent validity testing.

After the convergent validity test, the next step is the discriminant validity test. The results can be seen in Table 2, which also shows that this study has fulfilled the requirements of the discriminant validity test. This means that based on Tables 1 and 2, it was concluded that this study met the requirements in testing validity (both convergent validity and discriminant validity).

Structural Model Testing

The results of the structural model testing in this study have been presented in Table 3. From Table 3, it can be seen that the value of r^2 in this study it is equal to 0.6225, which means that *big data* and *whistle-blowing system* (independent variable) have influenced the bribery prevention variable (dependent variable) by 62.25%. As for the rest, 37.75% is influenced by other variables.

In addition to showing the results of the r^2 value also presents the results of the significance test in this study. Through Table 3, it can be concluded that all hypotheses in this study have been supported by data because all hypotheses in this study are proven to have positive path coefficient values and t-value of more than 1.96. Thus, it can be concluded that: (1) the use *of big data* has proven to have a positive effect on bribery prevention; and (2) The use of a whistle-blowing system has proven to have a positive effect on bribery prevention.

Discussion

The purpose of this research was to analyze how the use of *big data* and the whistle-blowing system influences bribery prevention. Based on the results of statistical testing in this study, it is known that all hypotheses in this research have been supported by data. This means that both big data and the whistle-blowing system have indeed been proven effective as methods that can be used to prevent bribery.

According to Chen et al. (2015); and Kılıç (2020) *big data* can be interpreted or defined as a very large, complex, and unstructured data set, which cannot be managed/processed in a traditional way. Based on this definition, it is also known that basically big data has 5 main characteristics, which then make this technology very valuable. The five characteristics are volume, variety, value, veracity and velocity (Jha et al., 2020). Seeing the huge potential of this technology, it is not surprising that at this time, many parties have started to look at using big data for various purposes. Given that, in the current conditions, with the abundance of digital data and transactions (especially external data, such as data obtained from *websites*, *blogs* to social media), big data will be more effective in solving various problems that occur, such as acts of bribery (fraud). Bănărescu (2015); Chen et al. (2015); Balasupramanian et al. (2018); and Jha et al. (2020) are a number of previous researchers/writers, who have also shown the huge potential of *big data*,

which in fact can be used to prevent *fraud* (including bribery).

According to Balasupramanian et al. (2018); and Bănărescu (2015) one of the main factors which then makes *big data* very effective for preventing *fraud*, because this technology is also capable of processing unstructured data and very large amounts of data in a short time. This ability, of course, is able to make *big data* very easy to capture and identify various suspicious-looking activities (*hidden patterns*). So it is only natural that a survey conducted by Ernst & Young (2014) also shows that many parties agree and acknowledge (reaching 72% of the total 466 companies surveyed) that *big data* is very powerful and effective as a tool to prevent various types of *fraud* (including bribes). These results were also strengthened based on the results of this study. Based on this research, it is also proven that the use of big data actually has a positive effect on bribery prevention. So, from this study it can also be concluded that big data is an effective solution to the possibility of agency problems in an agency (in this case, bribery). It is hoped that the results of this research will further encourage various agencies, especially government agencies, to immediately use big data in order to prevent bribery at these agencies. However, it should be noted that there are several things that must be considered before using this technology. Apart from the investment costs required are not cheap, other things that must be considered are related to the quantity and quality of the data that will be the input of the big data. Obviously, if the quantity and quality of the inputs are poor, then the results will not be maximized. It would even be misleading.

Fuller & Shawver (2020) explains that whistle-blowing can be defined as an act of reporting/disclosure, carried out by members of an organization for the illegal or immoral they see, to the authorities, who are known to be capable of taking certain actions to overcome these illegal actions. According to Suh & Shim (2020), it turns out that the existence of a whistle-blowing system in an institution can reduce the number of fraud in that institution. The decline in these cases makes a lot of sense. This is because, with the existence of a whistle-blowing system, it turns out that it can give the effect of a feeling of fear that is felt by the perpetrators when they are about to commit acts of fraud (including bribes). They will always feel that they are being watched by many parties (members of

the organization themselves) every time they commit an illegal act (Agusyani et al. 2016); and Wahyudi et al. 2021). So, it is very natural, if the results of this study also show the same thing. This means that the use of the whistleblowing system has again proven to have a positive effect on bribery prevention.

So, through this research, it is again shown that there are other effective solutions to the possibility of agency problems occurring in an agency, if the problems that occur are related to bribery. In addition, based on the results of this research, it is also hoped that it will further encourage various agencies, especially government agencies, to immediately implement a whistle-blowing system. However, before implementing a whistle-blowing system in an institution, there are several things that must be considered so that the method can run optimally and effectively. This is related to the commitment of the relevant agencies, to participate in making policies and rules, which can protect whistle-blowers from various risks that arise when they become reporters. Fact, this policy must be made, before *the* whistle-blowing system in the agency. This is very important, because if the protection policy does not exist, it will make many members of the organization reluctant to become *whistle-blowers*. This is because without certainty of such protection, there will be many whistle-blowers who will receive various actions or very bad treatment from their co-workers (isolated), even by their own superiors. The whistle-blower will usually be referred to as a traitor. The condition is getting worse, because the whistle-blowers will usually also accept various acts of revenge carried out by the perpetrators of the fraud.

In fact, in several cases, there were also many whistle-blowers who had to lose their jobs after carrying out these reporting actions (Elias, 2008; Shonhadji & Maulidi, 2021). Therefore, it can also be concluded that the implementation of a *whistle-*blowing system must also be accompanied by the creation of protective policies/rules needed by whistle-blowers. Through this policy, it is highly believed that the whistle-blowing system will become very effective as a method of preventing bribery.

CONCLUSION, IMPLICATION AND LIMITATION

This study aims to analyze the effect of the use of big data and whistle-blowing systems on bribery prevention. It is known that the respondents of this study were 191

auditors working at the BPK and BPKP RI, as well as auditors working at the Indonesian Government Inspectorate.

The results of this study have proven that both big data and the whistle-blowing system have proven to have a positive effect on bribery prevention. Therefore, it is hoped that this research can be used as an additional reference in the future by various agencies, especially government agencies, to start using or applying big data and whistle-blowing systems at these agencies, in order to prevent bribery. It won't be easy and cheap, especially investing in technology like big data. However, considering the effectiveness of this technology to prevent acts of bribery and fraud, it is felt that this investment will not be detrimental at all, in fact the benefits will be felt, both in the present and in the future (long term in nature). In addition, to government agencies that already have a whistle-blowing system and or do not yet have one, so that in the future using this method, it must be accompanied by regulations or policies, which can protect whistle-blowers. This is done so that the function of the whistle-blowing system can work optimally, so that it can be effective as a method capable of preventing bribery.

The limitations of this study are related to the distribution of the questionnaire. As is known, the process of distributing this research questionnaire was distributed at a time when there were still high cases of the spread of the Covid-19 pandemic in Indonesia. The respondent's intended agency was less responsive when contacted at that time, due to the many limitations. Of course, these conditions were enough to hinder the process of distributing the research questionnaire to the respondents of this study, which resulted in the time for distributing the research questionnaire to be longer than the target. The only solution that can be done for this condition is to distribute the research questionnaire online, and the next writer can take advantage of the online, so that it can make it easier for respondents to fill out the questionnaire. In addition, it is expected that future researchers who obtain the same conditions, will always periodically follow up both to the respondent's agency, as well as to the respondent directly, during the process of distributing and filling out the questionnaire, so that the time to fill out the questionnaire is on time, as expected.

REFERENCES

ACFE. (2020). *2020 Report to The Nations*. https://acfepublic.s3-us-west-2.amazonaws.com/2020-Report-to-the-Nations.pdf

Agusyani, N. K. S., Sujana, E., & Wahyuni, M. A. (2016). Pengaruh Whistleblowing System dan Kompetensi Sumber Daya Manusia terhadap Pencegahan Fraud pada Pengelolaan Keuangan Penerimaan Pendapatan Asli Daerah (Studi Pada Dinas Pendapatan Daerah Kabupaten Buleleng). *JIMAT (Jurnal Ilmiah Mahasiswa Akuntansi) Undiksha*, *6*(3).

Ahmed, W., & Ameen, K. (2017). Defining Big Data and Measuring Its Associated Trends in the Field of Information and Library Management. *Library Hi Tech News*, *9*, 21–24.

Al-Haidar, F. (2018). Whistleblowing in Kuwait and UK Against Corruption and Misconduct. *International Journal of Law and Management*, *60*(4), 1020–1033.

Ali, C. Ben. (2020). Agency Theory and Fraud. In H. K. Baker, L. Purda-Heeler, & S. Saadi (Eds.), *Corporate Fraud Exposed* (pp. 149–167). Emerald Group Publishing Limited.

Andresen, M. S., & Button, M. (2019). The Profile and Detection of Bribery in Norway and England & Wales: A Comparative Study. *European Journal of Criminology*, *16*(1), 1–23.

Anugerah, R. (2014). Peranan Good Corporate Governance dalam Pencegahan Fraud. *Jurnal Akuntansi*, *3*(1), 101–113.

Atmadja, A. T., Saputra, K. A. K., & Manurung, D. T. H. (2019). Proactive Fraud Audit, Whistleblowing and Cultural Implementation of Tri Hita Karana for Fraud Prevention. *European Research Studies Journal*, *22*(3), 2019.

Balasupramanian, N., Ephrem, B. G., & Al-Barwani, I. S. (2018). User Pattern Based Online Fraud Detection and Prevention using Big Data Analytics and Self oOganizing Maps. *2017 International Conference on Intelligent Computing, Instrumentation and Control Technologies (ICICICT)*, 691–694.

Bănărescu, A. (2015). Detecting and Preventing Fraud with Data Analytics. *Procedia Economics and Finance*, *32*(15), 1827–1836.

Bendickson, J., Muldoon, J., Liguori, E., & Davis, P. E. (2016). Agency Theory: the times, they are a-changin'. *Management Decision*, *54*(1), 174–193.

Boyle, D. M., DeZoort, F. T., & Hermanson, D. R. (2015). The Effect of Alternatove Fraud Model Use on Auditor's Fraud Risk Judgments. *Journal of Accounting and Public Policy*, *34*(6), 578–596.

Chen, J., Tao, Y., Wang, H., & Chen, T. (2015). Big Data Based Fraud Risk Management at Alibaba. *The Journal of Finance and Data Science*, *1*(1), 1–10.

Chin, W. W. (1988). *The Partial Least Square Approach for Structural Equation Modeling. in G.A. Marcoulides (Ed.), Modern*

Methods for Businnes Research. Lawrence Erlbaum Associates.

Cressey, D. (1953). *Other People's Money: A Study in the Social Psychology of Embezzlement*. FreePress.

Crowe, H. (2011). Why the Fraud Triangle is no Longer Enough. In *Horwath, Crowe LLP*.

Desai, N. (2020). Understanding the Theoretical Underpinnings of Corporate Fraud. *The Journal for Decision Makers*, *45*(1), 22–31.

Elias, R. Z. (2008). Auditing Students' Professional Commitment and Anticipatory Socialization and Their Relationship to Whistleblowing. *Managerial Auditing Journal*, *23*(3), 283–294.

Ernst & Young. (2014). *Global EY FIDS Forensic Data Analytics Survey 2014: Big Risks Require Big Data Thinking*. 2014 EYGM Limited, SCORE no. DQ0037.

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, *18*(1), 39–50.

Francis, R. D., & Armstrong, A. (2011). Corruption and Whistleblowing in International Humanitarian Aid Agencies. *Journal of Financial Crime*, *18*(4), 319–335.

Fredriksson, C., Mubarak, F., Tuohimaa, M., & Zhan, M. (2017). Big Data in The Public Sector: A Systematic Literature Review. *Scandinavian Journal of Public Administration*, *21*(3), 39–61.

Fuller, L. R., & Shawver, T. J. (2020). Will Cognitive Style Impact Whistleblowing Intentions? In *Research on Professional Responsibility and Ethics in Accounting* (Vol. 23, pp. 47–62). Emerald Publishing Limited.

Gonzales, G. C., & Hoffman, V. B. (2018). Continuous Auditing's Effectiveness as a Fraud Deterrent. *AUDITING: A Journal of Practice and Theory*, *37*(2), 225–247.

Hartono, J. (2019). *Kajian Topik-Topik Mutakhir dan Agenda Riset ke Depan* (1st ed.). Penerbit Andi.

Hipgrave, S. (2013). Smarter Fraud Investigations with Big Data Analytics. *Network Security*, *12*, 7–9.

Imtikhani, L., & Sukirman. (2021). Determinan Fradulent Financial Statemen melalui Perpektif Fraud Hexagon Theory pada Perusahaan Pertambangan. *Jurnal Akuntansi Bisnis*, *19*(1), 2541–5204.

Jain, R. (2020). Briibery and Firm Performance in India: A Political Economy Perpective. *Journal of Asian Economics*, *68*, 1–13.

Jha, B. K., Sivasankari, G. G., & Venugopal, K. R. (2020). Fraud Detection and Prevention by Using Big Data Analytics. *Proceedings of the 4th International Conference on Computing Methodologies and Communication (ICCMC) 2020*, 267–274.

Johansson, E., & Carey, P. (2016). Detecting Fraud: The Role of the Anonymous Reporting Channel. *Journal Business Ethics*, *139*, 391–409.

Kılıç, B. İ. (2020). The Effect of Big Data on Forensic Accounting Practices and Education. In S. Grima, E. Boztepe, & P. J. Baldacchino (Eds.), *Contemporary Studies in Economic and Financial Analysis* (Vol. 102, pp. 11–26). Emerald Publishing Limited.

Kompas. (2020). *Catatan ICW, Tren Penindakan Korupsi Turun 271 Kasus*. Kompas. https://nasional.kompas.com/read/2020/02/18/16532131/catatan-icw-tren-penindakan-korupsi-turun-jadi-271-kasus

Kompas. (2021a). *Data ICW 2020: Kerugian Negara Rp 56,7 Triliun, Uang Pengganti dari Koruptor Rp 8,9 Trilliun*. Kompas. https://nasional.kompas.com/read/2021/03/22/19301891/data-icw-2020-kerugian-negara-rp-567-triliun-uang-pengganti-dari-koruptor-rp

Kompas. (2021b). *ICW: Sepanjang 2020 Ada 1.298 Terdakwa Kasus Korupsi, Kerugian Negara Rp 56,7 Triliun*. Kompas. https://nasional.kompas.com/read/2021/04/09/18483491/icw-sepanjang-2020-ada-1298-terdakwa-kasus-korupsi-kerugian-negara-rp-567

KPK. (2021). *Tindak Pidana Korupsi Berdasarkan Jenis Perkara*. Komisi Pemberantasan Korupsi (KPK).

Latan, H., & Ghozali, I. (2012). *Partial Least Squares Konsep, Teknik, dan Aplikasi Menggunakan Program SmartPLS 2.0 M3* (P. P. Harto (ed.)). Badan Penerbit Universitas Dipenogoro.

Madhuri, S. T., Babu, R. E., Uma, B., & Lakshmi, M. B. (2021). Big-Data Driven Approaches in Materials Science for Real-Time Detection and Prevention of Fraud. *Materials Today: Proceedings*, 2–9.

Maulida, W. Y., & Bayunitri, B. I. (2021). The Influence of Whistleblowing System Toward Fraud Prevention. *International Journal of Financial, Accounting, and Management*, *2*(4), 275–294.

Maulida, Wi. Y., & Bayunitri, B. I. (2021). The Influence of Whistleblowing System Toward Fraud Prevention. *International Journal of Financial, Accounting and Management*, *2*(4), 275–294.

Noor, N. R. A. M., & Mansor, N. (2019). Exploring the Adaptation of Artificial Intelligence in Whistleblowing Practice of the Internal Auditors in Malaysia. *Procedia Computer Science*, *163*, 434–439.

Ohlhorst, F. (2015). *Big Data Analytics: Turning Big Data Into Big Money*. John Wiley & Sons Inc.

Othman, R., Aris, N. A., Mardziyah, A., Zainan, N., & Amin, N. M. (2015). Fraud Detection and Prevention Methods in The Malaysian Public Sector: Accountants' and Internal Auditors' Perceptions. *Procedia Economics and Finance*, *28*, 59–67.

Parker, D. W., Dressel, U., Chevers, D., & Zeppetella, L. (2018). Agency Theory Perpective on Public-Private-Patnerships: International Development Project. *International Journal of Productivity and Performance*

Management, *67*(2), 239–259.

Puryati, D., & Febriani, S. (2020). The Consequence of Whistleblowing System and Internal Control Toward Fraud Prevention: A Study on Indonesian State Owned Enterprise. *International Journal of Business and Technology Management*, *2*(3), 35–48.

Rezaee, Z., & Wang, J. (2019). Relevance of Big Data to Forensic Accounting Practice and Education. *Managerial Auditing Journal*, *34*(3), 268–288.

Shonhadji, N., & Maulidi, A. (2021). The Roles of Whistleblowing System and Fraud Awareness as Financial Statement Fraud Deterrent. *International Journal of Ethics and Systems*, *37*(3), 370–389.

Sihotang, A. R. (2018). *Pengaruh Persepsi Karyawan Mengenai Whistleblowing System dan Moralitas Individu terhadap Pencegahan Fraud pada Universitas Sriwijaya*. Politeknik Negeri Sriwijaya.

Sow, A. N., Basiruddin, R., Mohammad, J., & Rasid, S. Z. A. (2018). Fraud Prevention in Malaysian Small and Medium Enterprises (SMEs). *Journal of Financial Crime*, *25*(2), 499–517.

Suh, J. B., & Shim, H. S. (2020a). The Effect of Ethical Corporate Culture on Anti-fraud Strategies in South Korean Financial Companies: Mediation of Whistleblowing and A Sectoral Comparison Approach in Depository institutions. *International Journal of Law, Crime and Justice*, *60*, 1–12.

Suh, J. B., & Shim, H. S. (2020b). The Effect of Ethical Corporate Culture on Anti-Fraud Strategies in South Korean Financial Companies: Mediation of Whistleblowing and A Sectoral Comparison Approach in Depository Intitutions. *International Journal of Law, Crime and Justice*, *60*, 1–12.

Tang, J., & Karim, K. E. (2019). Financial Fraud Detection and Big Data Analytics – Implications on Auditors' Use of Fraud Brainstorming Session. *Managerial Auditing Journal*, *34*(3), 324–337.

Vousinas, G. L. (2019). Advancing Theory of Fraud: The S.C.O.R.E. Model. *Journal of Financial Crime*, *26*(1), 372–381.

Wahyudi, S., Achmad, T., & Pamungkas, I. D. (2021). Village Apparatus Competence, Individual Morality, Internal Control System and Whistleblowing System on Village Fund Fraud. *WSEAS Transactions on Environment and Development*, *17*(6), 672–684.

Wijayanti, P., & Hanafi, R. (2018). Pencegahan Fraud pada Pemerintahan Desa. *Jurnal Akuntansi Multiparadigma*, *9*(2), 331–345.

Wolfe, D., & Hermanson, D. R. (2004). The Fraud Diamond: Considering Four Elements of Fraud. *The CPA Journal*, *74*(12), 38–42.