

# The mediating effect of fraud awareness on the relationship between risk management and integrity system

Risk  
management  
and integrity  
system

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## Abstract

**Purpose** – Government institutions in Indonesia have implemented an integrity system as a strategy to prevent fraud and corruption by integrating the risk management and organizational ethics. This integration is important to increase the awareness of fraud in the organization. Based on self-determination theory, this study examines the mediating effect of fraud awareness on risk management and integrity systems.

**Design/methodology/approach** – The study was carried out by using a quantitative approach. The participants of the survey were auditors of the inspectorate of Ministries and Government Agencies in Indonesia. The number of respondents was 103 auditors. The hypothesis testing method used the partial least squares structural equation modeling (PLS-SEM) approach. The data were processed by using WarpPLs 7.0 software.

**Findings** – There are two main results in this study. First, risk management directly affect the integrity of the system. Second, fraud awareness mediates the relationship between risk management and integrity systems.

**Practical implications** – The result of this study implicates the policymakers in Ministries and Government Agencies in Indonesia to increase organizational fraud awareness through the involvement of internal audits with risk management. The fraud awareness will greatly improve the performance of the integrity system.

**Originality/value** – This is the first study examined fraud awareness of integrity systems and risk management. This study can enrich the literature on internal audits, especially the duties of auditors with risk management.

**Keywords** Risk management, Fraud awareness, Integrity system, Internal audit

**Paper type** Research paper

## Introduction

Indonesia as a developing country is also still facing problems related to fraud and corruption. This can be seen from the Corruption Perception Index (CPI) of Indonesia which is still low compared to other ASEAN countries. Based on the data released by



The researcher is sincerely grateful to Endang Suryani Sihombing, S.E., Ak., M.Ak., QIA; Junior Auditor of the Inspectorate of the Meteorology, Climatology and Geophysics Agency as one of the non-ministerial government agencies in Indonesia that assisted the researcher in collecting respondent data.

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[Transparency International \(2021\)](#), Indonesia's CPI for the last 5 years has not experienced a significant increase. Compared with Singapore and Malaysia, Indonesia's ranking is still below those two countries.

Encouraging the creation of integrity is an important element in the innovation process of government in almost all countries in the world ([Siddiquee, 2010](#); [Johari et al., 2020](#)). Indonesia has attempted to carry out bureaucratic reform since 1998 ([Haning, 2018](#)). According to [Lukito \(2016\)](#), Indonesia has built compliance with anti-corruption by implementing a national integrity system following Law Number 31 of 1999 and had been amended by Law Number 20 of 2001. According to this law, government and private institutions must together build a national integrity system in various forms and levels.

This study aims to examine the mediating effect of fraud awareness on the relationship between risk management and the integrity system. According to [Huberts \(2018\)](#), integrity is the consistency and coherence between behavior and the prevailing norms or values in an organization. He also said that integrity can be analogous to someone who acts professionally in carrying out his duties carefully and responsibly. From an organizational perspective, integrity can become a system if the behavior of individuals is in accordance with the standards and rules that apply in an organization ([Bauman, 2013](#); [Breakey et al., 2015](#)).

[Molina \(2016\)](#) and [Zahari et al. \(2021\)](#) explain that there are two integrity problems that must be monitored by organizations: integrity violations and integrity risks. Integrity violations are actions by members of an organization that impair their ability to act in a way that is consistent with their goals and values. Meanwhile, integrity risk is a condition and behavior that increases an organization's vulnerability to integrity violations ([Molina, 2016](#)). Further, he explained the risk of the integrity of the system can be managed properly by involving identification, monitoring and even if it is possible, eliminating the risk factors.

Risk management correlates with organizational integrity and ethical standards ([Khalid et al., 2016](#); [Joseph et al., 2018](#)). [Hart \(2016\)](#) said that the integration of risk management and organizational ethics is an important part of the integrity system in overcoming the occurrence of fraud. The case of fraud that is still often faced by government organizations in Indonesia is corruption. Indonesia as a developing country faces the problem of corruption ([Lukito, 2016](#)). Several cases of corruption still occur in Indonesia. The corruption case against the Covid-19 social assistance fund cost the state IDR 14.59 billion. In addition, there were also cases of fraud in the financial management of investment funds during the 2012–2019 period which caused a loss of IDR 2.78 trillion ([Surya, 2021](#)). As the various cases of corruption and fraud still occur, there is a question on how high the level of integrity is in government organizations to make public trust increase ([Johari et al., 2020](#)).

[Zanzig and Flesher \(2011\)](#) stated that fraud awareness affects a person's integrity. Individuals who have a high level of fraud awareness can prevent individuals with low integrity from committing fraud. To increase organizational fraud awareness requires risk management support ([Iyer and Samociuk, 2006](#); [Siregar and Tenoyo, 2015](#); [Chowdhury and Shil, 2019](#)). This argument is reinforced by self-determination theory which states that individuals who feel that there are more people internalizing and integrating the values and norms prevailing in the organization into their actions, will encourage the individual to conform to the prevailing values and norms.

Fraud awareness is awareness about the importance of fraud prevention efforts by all stakeholders in the organization ([Yuniarti, 2017](#)). A high level of fraud awareness can raise awareness of all elements in the organization to exercise control over fraud through every policy and rule that applies within the organization ([Viton, 2003](#); [Murphy and Dacin, 2011](#); [Zanzig and Flesher, 2011](#); [Hodge and Carla Hodge, 2012](#); [Mat et al., 2013](#); [Eutsler et al., Nickell and Robb, 2016](#); [Yuniarti, 2017](#); [Abdullahi and Mansor, 2018](#)).

There are three main contributions of this study. First, it contributes to supporting self-determination theory to increase organizational awareness of fraud. The second contribution to the literature showing that risk management affects integrity system. The third contribution is for government organizations to improve the integrity system through risk management and fraud awareness.

The second part of this section describes the integrity initiatives carried out by Indonesia. The third section describes the literature review and hypothesis. The fourth section describes the methodology. The last section will explain the results and conclusions.

#### *Integrity initiatives by Indonesia government*

Fraud and corruption are serious problems faced by every public sector organization in almost all countries in the world (DuHadway *et al.*, 2019; Paterson *et al.*, 2019; Mackey and Cuomo, 2020). One way to overcome the problem of corruption is by building an integrity system because corruption is a problem involving individual behavior in organizations (Head, 2012; Six and Lawton, 2013; Rosli *et al.*, 2015; Said *et al.*, 2016; Molina, 2018; Johari *et al.*, 2020). Apart from being a way to fight corruption, several studies have found that an integrity system can improve governance processes, transparency and accountability to the public (Aziz *et al.*, 2015; Said *et al.*, 2016; Alam *et al.*, 2019).

In the context of bureaucratic reform, the government had issued Presidential Regulation (*Peraturan Presiden (PERPRES)*) Number 81 of 2010 concerning the grand design of bureaucratic reform regulating the implementation of the bureaucratic reform program (Tiwisia *et al.*, 2020). Based on PERPRES, there are 3 targets to be achieved by the regulation. First, capacity enhancement and organizational accountability. Second, a clean government and free from corruption, collusion and nepotism. Lastly is the improvement of services to the public. To accelerate the achievement of the targets set, the Indonesian government issued Regulation of the Minister for Empowerment of State Apparatus and Bureaucratic Reform Number 52 of 2014 and later it was updated with Regulation Number 10 of 2019 concerning guidelines for the development of integrity zone towards areas free from corruption and clean bureaucratic area and serving in the environment of government agencies.

The regulation is a reference for government institutions and other stakeholders in building an integrity zone towards a corruption-free area (*wilayah bebas dari korupsi (WBK)*) and a clean bureaucratic service area (*wilayah birokrasi bersih melayani (WBBM)*), (PermenPAN-RB No 10, 2019). The regulation explains that the zone of integrity (ZI) is a predicate given to government agencies whose leaders and staff are committed to realizing WBK/WBBM through bureaucratic reform, especially in terms of preventing corruption and improving the quality of public services. This can be achieved if a work unit/region fulfills most of the change management, management arrangements, human resource management (HR), strengthening supervision and performance accountability.

In Indonesia, the involvement of an internal auditor with risk management is regulated in Government Regulation (*Peraturan Pemerintah (PP)*) No 60 of 2008, one of the duties of the government's internal auditor is to provide early warning and increase the effectiveness of risk management (Kuntadi, 2019). This role is further strengthened in the context of integrity system, namely reducing the risk of failure caused by the possibility of resistance to change. In addition, internal auditors identify and clarify if there are complaints against maladministration in units that have received the WBK/WBBM predicate and encourage and monitor the resolution of these maladministration complaints (PermenPAN-RB No 10, 2019).

Indonesia as a developing country has succeeded in building a system that encourages government organizations to prioritize integrity in implementing organizational governance. This is evident from the increasing number of Ministries and institutions that want to propose to get the WBK/WBMM predicate (Kemenpan RB, 2021). Although there are still several cases related to integrity violations. This shows that the organization still needs to improve the performance of the integrity system to prevent fraud and corruption.

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## Literature review and hypotheses development

### *Risk management and integrity system*

Every organization, both private and public sector, faces risks that can obstruct the achievement of the goals that have been set. There are many concepts about risk and it is difficult to define (Ahmeti and Vladi, 2017). In simple terms, they explain that risk is an individual's perception or reaction to the unknown. According to Jackson (2013), fraud and corruption are some of the risks that can threaten the achievement of organizational goals in the public sector.

The risk management process according to Ahmeti and Vladi (2017) is a step-by-step approach to identify, assess and respond to risks. Meanwhile, the definition of risk management according to Chowdhury and Shil (2019) is a tool to help make the right decisions in planning, policy development, project management and service delivery. This can be achieved by providing a framework to assist management in identifying, analyzing, evaluating, monitoring and communicating risks effectively.

Besides that, The Committee of Sponsoring Organizations of the Treadway Commission (COSO) defines risk management as a process designed to identify potential events that may affect the entity and manage risk under risk appetite and provide reasonable assurance concerning the achievement of the entity's objectives (COSO, 2004). Risk management is crucial for proper organizational governance because it includes strategic and operational decision-making (Said *et al.*, 2016). Risk management can be part of the strategic thinking and ethical standards of an organization (Francis and Armstrong, 2003; Jondle *et al.*, 2013; Said *et al.*, 2016)

Six and Lawton (2013) explained that the integrity system is an effort to manage organizational ethics both within government administration including internal and external audits such as external financial audits, ombudsman as well as police and justice systems. They said that the integrity system can work effectively if there is an integration of risk into a control mechanism. So that the higher the risk management performance in determining control, the higher the integrity system performance. The results of the study Said *et al.* (2016) found that risk management has no effect on integrity systems. In contrast to the results of the study of Johari *et al.* (2020), found that risk management has a positive effect on integrity systems. Based on the mix results of the previous hypothesis testing, the first hypothesis to be tested is:

*H1. risk management has a positive effect on integrity system*

### *Risk management and fraud awareness*

Jackson (2013) said that if fraud and corruption in government institutions can be reduced it will contribute to securing jobs in the public sector, improving the quality of public services and providing value for money to the public as taxpayers. Therefore, according to Chowdhury and Shil (2019), the process of reforming the public sector bureaucracy is needed to create various changes in providing services to the community. The results of the

[Chowdhury and Shil \(2019\)](#) study found that risk management, fraud and corruption control as well as internal audits can increase the effectiveness of bureaucratic reforms carried out.

[Juillet et al. \(2016\)](#) and [Drogalas \(2017\)](#) suggest that organizations need to improve their internal audit function to detect fraud risks that may occur. This is further strengthened by the results of the study by [Chowdhury and Shil \(2019\)](#) which found that the high involvement of internal audit in risk management can minimize the occurrence of fraud and corruption through risk identification, development and implementation as well as regular reviews of various prevention and detection strategies. In fact, they found that the level of individual awareness of fraud was higher when the audit committee monitored and implemented fraud control strategies. This argument is supported by the results of studies in Indonesia conducted by [Siregar and Tenoyo \(2015\)](#) and [Ariyanto and Hariman \(2020\)](#) which state that fraud risk management can increase fraud awareness in both private and public organizations. Therefore, the second hypothesis to be tested is:

*H2. Risk management has a positive effect on fraud awareness*

#### *Fraud awareness and integrity system*

According to Luhmann's General System Theory, integrity can be divided into 3 parts, namely personal integrity, moral integrity and organizational integrity ([Govekar and Nelly Trevinyo-Rodreguez, 2007](#)). Furthermore, they explain that organization is a means through which individuals communicate with society, so organizational integrity cannot be separated from personal integrity because individuals must be aware and consistent with their own principles with the organization so that both must be in line with the moral standards of the organization. Thus, the integrity system can be concluded as the actions of individuals in accordance with moral values and normal within an organization to improve the quality of public services.

Fraud has the potential to occur in every organization, including the public sector. [Abdullahi and Mansor \(2018\)](#) argue that fraud is a deliberate act that is illegal and benefits certain parties but harms others. According to [Law \(2011\)](#), the cause of fraud is due to poor organizational governance and accounting practices. Therefore, awareness of all employees in an organization is needed to prevent fraud ([Yuniarti, 2017](#); [Shonhadji and Maulidi, 2021](#)).

[Yuniarti \(2017\)](#) stated fraud awareness is an effort to increase awareness about the importance of fraud prevention efforts with all parties involved in the organization. Furthermore, she added that high fraud awareness is expected to raise awareness of all elements in the organization to control fraud through every policy and rule applied within the organization.

[Zanzig and Flesher \(2011\)](#) stated that fraud awareness has a positive effect on the level of individual integrity. Individuals having high fraud awareness can prevent people with low integrity from committing fraud or corruption. From the organizational point of view, integrity or ethical behavior is not only in the sense of corruption or fraud but lies in the quality or behavioral characteristics of individuals or organizations that act under moral values, standards and rules accepted by the organizations ([Ashari et al., 2018](#); [Alam et al., 2019](#)). This is also supported by the self-determination theory presented by ([Deci and Ryan, 2000](#)). They state that the more people internalize and integrate social values and norms, the more their actions conform to the prevailing values and norms. Therefore, it can be said that the higher the performance level of the organization's fraud awareness, the higher the integrity system will be. The third hypothesis is as follows.

*H3. Fraud awareness has a positive effect on integrity system*

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*Fraud awareness mediates the relationship between risk management and integrity system*

Corruption is an important concern for most developing countries, including Indonesia (Prabowo and Cooper, 2016). Bandaranayake (2014) states that preventing fraud and corruption is better than improving the consequences it will cause. There is no one powerful way that can overcome fraud and corruption that may occur (Bandaranayake, 2014; Abdullahi and Mansor, 2018; Peltier-Rivest, 2018). One way that organizations can do to prevent corruption is to build an integrity system (Head, 2012; Breakey *et al.*, 2015; Zahari *et al.*, 2021).

Organizational fraud awareness affects personal integrity so that it can prevent individuals from committing fraud and corruption (Zanzig and Flesher, 2011; Ashari *et al.*, 2018). Zanzig and Flesher (2011) add that people who have a high level of fraud awareness will act according to ethics.

Apart from being a tool for assessing risk profiles, Francis and Armstrong (2003) and Jondle *et al.* (2013) can be used to assess the suitability of ethical standards that apply in the organization. They also explained that the higher the involvement of risk management with organizational rules and ethics, the higher the organization's awareness of possible fraud and corruption. Therefore, fraud awareness mediates the relationship between risk management and the integrity system. The fourth hypothesis to be tested is:

*H4. Fraud awareness mediates the relationship between risk management and integrity system*

### **Underpinning theory and framework**

Rosli *et al.* (2015) and Said *et al.* (2016) stated that a good governance system places an emphasis on achieving integrity. According to Molina (2018), the integrity system is a component consisting of policies, actors and practices that can promote organizational integrity, including compliance-based mechanisms, values and everyday informal practices that contribute to the organizational climate.

From a sociological perspective, individual behavior will have an impact on group behavior (Govekar and Nelly Trevinyo-Rodreguez, 2007). Likewise, the integrity of an organization will be reflected in the behavior of the individuals in it. This study adopts self-determination theory (Deci and Ryan, 2000). They explain that individuals in organizations will behave naturally and spontaneously when they feel free to follow the prevailing values and norms. The more people internalize and integrate socially agreed values and norms, the more they strive to internalize and act in accordance with the values that exist within the organization.

To encourage more individuals in the organization to internalize the prevailing values and norms, risk management is needed. As previously explained, risk management is needed as a tool to assess the suitability between organizational values and individual behavior (Francis and Armstrong, 2003; Jondle *et al.*, 2013). The higher the application of risk management, the more individuals who are aware of fraud, so the higher the fraud awareness, the higher the integrity system in the organization. Therefore, self-determination theory can be used as a basis to explain the influence of risk management on the integrity system through fraud awareness. The conceptual framework of this study is shown in Figure 1.

### **Methodology**

#### *Sample selection*

The sample of this study were ministries and non-ministerial government agencies. The two types of organizations were sampled for the study because they have attempted to implement an integrity system in accordance with the regulations set by the Ministry of

Administrative Reform (Kemenpan RB) in 2014. The total sample of ministries and government institutions is 21, consisting of 12 ministries and 9 government agencies. non-ministerial.

### Data collection

Data collection was carried out by distributing questionnaires to inspectorate auditors in ministries and government agencies from March to July 2021. Questionnaires were distributed through a network of inspectorate auditors in each ministry and government agency. Inspectorate auditors were chosen as respondents in this study because they are one of the parts that play a role in building integrity systems in government organizations. The data was obtained by applying the purposive sampling method.

## Analysis

### Demographic profiles

The demographic table of respondents is shown in [Table 1](#) below. The total of respondents were 103 auditors (51.5%) from 200 questionnaires distributed. Based on [Table 1](#) above, most of the respondents in this study were male at 64.1%. The average age of respondents is in the range of 35–45 years as much as 51.5%. The highest level of education is bachelor's as much 52.4%.

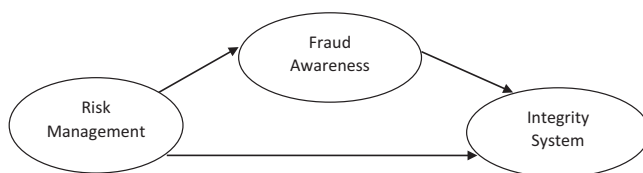
Most of the respondents are inspectorate auditors in the ministry as much as 63.1%. The position of most of the respondents is as a young auditor as much as 50.5% with the longest working period between 10–20 years as much as 46.6%. A total of 32% of respondents have qualified internal auditor certification. Most of the respondents had attended only 7.8% fraud training. However, there are also 67.9% of these respondents who have attended training risk-based auditing.

### Measurements

The instrument used was adopted from the previous study. The instrument was arranged to measure respondents' perceptions using a Likert scale of 1–5. Scale 1 indicates strongly disagree, scale 2 disagree, scale 3 is neutral, scale 4 agree and scale 5 indicates strongly agree.

Risk management measures the inspectorate auditors' perception about how much the organization where I perform the audit function considers risks in achieving organizational goals. The higher the respondent's answer score, the more my organization prioritizes risk in achieving organizational goals. The instrument adopted and modified was an instrument developed by [Said et al. \(2016\)](#).

Fraud awareness measures the auditor's perception of the inspectorate about how big the response of the organization where I do the audit function is in trying to overcome the occurrence of fraud. The higher the score, the more proactive my organization is overcoming possible fraud. The instrument used is an instrument developed by [Ariyanto and Hariman \(2020\)](#) with some



**Figure 1.** Conceptual framework of risk management, fraud awareness and integrity system

Variable		N = 103	(%)
Sex	Male	66	64.1
	Female	37	35.9
Age	<35 years	22	21.4
	35 – 45 years	53	51.5
	>45 years	28	27.1
Education	Bachelor	54	52.4
	Master	46	44.7
	Doctor	3	2.9
Agency	Government Institution	38	36.9
	Ministry	65	63.1
Position	First Auditor	33	32
	Young Auditor	52	50.5
	Intermediate Auditor	18	17.5
Length of work	<5 years	18	17.6
	5–10 years	20	19.4
	10–20 years	48	46.6
	>20 years	17	16.4
Certification	Do not have IA Certification	26	25.2
	Qualified Internal Auditor	33	32
	Certified Internal Auditor	1	1
	Certified Fraud Audit	1	1
	Others	42	40.8
Training	Never	5	4.9
	Others	20	19.4
	Fraud Audit	8	7.8
	Risk-based Audit	70	67.9

**Table 1.**  
Demographic table of  
respondents

modifications. They adopted instrument that has been developed from study conducted by [Siregar and Tenoyo \(2015\)](#).

The integrity system measures the inspectorate auditor's perception about how far aspects of ethics and integrity become the basis for carrying out organizational activities in the place I do the role as audit. The higher the score, the ethics and integrity will become the basis for all aspects of the organization's activities. The instrument was developed by ([Said et al., 2016](#)). This instrument has been adopted in studies conducted by [Alam et al. \(2019\)](#) and [Johari et al. \(2020\)](#).

To ensure the similarity of meaning between the original and distributed questionnaires, the questionnaire was translated into Indonesian and later be retranslated into English to ensure that the meaning of the questionnaire was the same as the original one. Before being distributed, the researcher together with 3 inspectorate auditors asked for their opinion to review the statements contained in the questionnaire so that the instruments used could be easily understood. The instrument used had also passed the pilot study.

#### *Data treatment*

Researchers used skewness and kurtosis to test the normality of the data. Based on the two tests, the data is not normally distributed. In addition, this study also conducted a bias test on respondents' answers. [Podsakoff \(2003\)](#) explains that if data is collected from one type of source at almost the same time, it can cause common method bias (CMB) problems. To find out if there is a CMB problem, the author applies Hermann's one factor. The single factor



value using SPSS obtained a figure of 38.36%, smaller than 50%. This means that there is no threat of CMB in this study.

### Measurement model

Before testing the hypothesis, the researchers tested the validity and reliability of the construct. The data was processed using Partial Least Square-Structural Equation Modeling (PLS-SEM). According to [Hair et al. \(2017\)](#), this method does not require the data to be normally distributed and has been used in business science studies ([Manley et al., 2020](#)). The data was processed using WarpPLs 7.0 software. The value of the factor loading of each construct is presented in [Table 2](#) below.

According to [Hair et al. \(2017\)](#) there are 5 test components needed to assess the reflective measurement model using PLS-SEM: factor loadings, composite reliability, Cronbach's alpha, average variance extracted (AVE) and discriminant validity. According to them, a good factor loading criterion value is  $> 0.5$ . From [Table 2](#), there are two indicators that were deleted in this study, they are IS2 and FA8. It is because the factor loading value is  $< 0.5$ .

[Hair et al. \(2020\)](#) said there are two ways to measure construct reliability, first, by using Cronbach's alpha and composite reliability values. The rule of thumb for both criteria should be  $> 0.7$ . According to them, Cronbach's alpha is used as a more conservative item measure and estimates the scale reliability of some items. In contrast to Cronbach's alpha, composite reliability pays more attention to the reliability of each item that is different from the indicator variable. From [Table 3](#) the value of Cronbach's alpha and composite reliability is  $> 0.7$ .

Survey items	Mean	SD	Factor Loading	p-values
<i>Risk Management</i>				
RM1	4.106	0.670	0.766	<0.001
RM2	3.82	0.746	0.701	<0.001
RM3	3.98	0.699	0.808	<0.001
RM4	4.13	0.626	0.891	<0.001
RM5	4.05	0.668	0.876	<0.001
<i>Integrity System</i>				
IS1	3.99	0.773	0.567	<0.001
IS3	3.91	0.875	0.784	<0.001
IS4	3.66	0.891	0.832	<0.001
IS5	3.75	0.772	0.755	<0.001
IS6	3.64	0.838	0.818	<0.001
IS7	3.27	0.951	0.822	<0.001
IS8	3.83	0.701	0.761	<0.001
IS9	3.31	0.960	0.803	<0.001
IS10	3.55	0.871	0.806	<0.001
IS11	3.52	0.998	0.820	<0.001
IS12	3.49	0.938	0.817	<0.001
<i>Fraud Awareness</i>				
FA1	4.14	0.809	0.596	<0.001
FA2	3.86	0.864	0.779	<0.001
FA3	3.66	0.900	0.818	<0.001
FA4	3.69	0.849	0.737	<0.001
FA5	3.92	0.788	0.781	<0.001
FA6	3.42	0.935	0.824	<0.001
FA7	3.39	0.963	0.816	<0.001

**Table 2.**  
Results of mean,  
standard deviation  
and factor loading

Sekaran and Bougie (2016) state that construct validity is used to assess whether the instrument used is under the theoretical basis used. There are two types of validity carried out on the measurement scale, namely convergent validity and discriminant validity. Convergent validity is the extent to which a measure is positively correlated with alternative measures of the same construct. To assess convergent validity, the AVE value is used. The rule of thumb value is  $> 0.5$ , which means that the average construct explains more than half of the indicator variance Hair *et al.* (2020). Table 3 shows that the AVE value is already  $> 0.5$ .

Discriminant validity is used to assess whether the phenomenon captured by a construct is unique and not represented by other constructs in a research model (Hair *et al.*, 2017). They further said that discriminant validity could be evaluated by assessing cross-loading between constructs using the Fornel-Larcker criterion. Based on the criterion, when the square root of the AVE of a construct is greater than the correlation between the construct and other constructs, it is valid. Based on Table 4, all the constructs tested in this study were in accordance with the established criteria, so it can be concluded that the constructs have passed the discriminant validity test.

In addition, table 4 also shows that organizational risk management is positively and significantly correlated with the integrity system ( $r = 0.218$ ;  $< 0.05$ ). Risk management is also an important variable in relation to increasing fraud awareness ( $r = 0.269$ ;  $< 0.001$ ). Furthermore, fraud awareness is positively and significantly correlated with integrity systems ( $r = 0.713$ ;  $< 0.001$ ).

#### *Descriptive statistics*

Table 5 illustrates the average score and standard deviation of all variables based on respondents' answers.

From the results of Table 5, the average score of respondents' answers for the variables of risk management, integrity system and fraud awareness is in the high category (agree). The value of the standard deviation of the three variables is in the range of 0.55–0.68 which is relatively small. This value means that the diversity of respondents' answers is at a low level.

The average score of respondents' answers for the risk management variable is 4.02 (agree). This value means that the inspectorate auditors feel that their high involvement with risk management is a source of innovation in ministries and institutions. The average

	Cronbach's alpha	Composite reliability	AVE
Risk Management	0.868	0.905	0.658
Integrity System	0.929	0.940	0.575
Fraud Awareness	0.875	0.903	0.545

**Table 3.**  
Convergent validity

	Risk management	Integrity system	Fraud awareness
Risk Management	0.811 <sup>(dv)</sup>		
Integrity System	0.218**	0.758 <sup>(dv)</sup>	
Fraud Awareness	0.269***	0.713***	0.738 <sup>(dv)</sup>

**Table 4.**  
Discriminant validity **Notes:** \*\*\* $p < 0.001$ ; \*\* $p < 0.05$

score of respondents' answers for the integrity system variable is 3.63 (agree). This means that the aspects of ethics and integrity are the basis for carrying out the activities of government organizations. While the average score of respondents' answers for the fraud awareness variable is 3.73 (agree). This value means that government organizations are proactive in dealing with fraud that may occur.

### Structural model

There are two focuses of testing in this study. The first is to examine the effect of risk management on the integrity system. The second is to examine indirect risk management on integrity systems through fraud awareness. Figure 2 below presents a structural equation modeling test model.

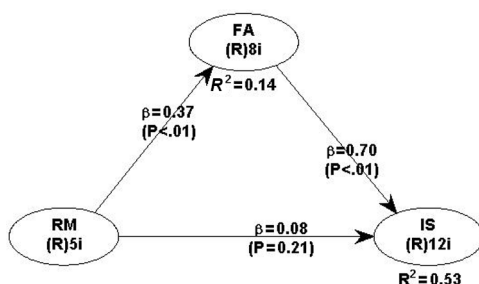
As can be seen in Figure 2, the value of the determinant coefficient ( $R^2$ ) of fraud awareness is 0.14. This means that fraud awareness can be explained by risk management only by 14%. While the value of the determinant coefficient ( $R^2$ ) integrity system is 0.53. This means that the integrity of the system can be explained by the variation between risk management and fraud awareness. Table 6 shows the direct and indirect effects for each tested variable.

Table 6 provides an overview of the latent variable test results either directly (panel A and B) or indirectly (panel C). Based on the mediation test model of Baron and Kenny (1986), the first step is to test the direct effect and the test results must have a significant effect.

The second step is to test risk management as a mediating variable. Table 6 panels B and C show the results of the structural model analysis. According to Hair et al. (2017), there are 3 requirements for mediating effects that must be met. First, the path coefficient of the independent variable to the dependent variable must be significant. Second, the path coefficient of the independent variable on the intervening variable must be significant.

Constructs	Mean	SD	Category
Risk Management (RM)	4.02	0.550	Agree
Integrity System (IS)	3.63	0.683	Agree
Fraud Awareness (FA)	3.73	0.671	Agree

**Table 5.** Results of descriptive statistics



**Figure 2.** Structural equation modelling

**Table 6.**  
Summary of the  
structural model  
analysis

Panel A	B coefficient	Probability	Decision
Before including fraud awareness as the mediating variable			
Direct effect			
RM → IS	0.333	$p < 0.001^{***}$	Significant, <i>H1</i> is supported
Panel B			
After including fraud awareness as the mediating variable			
RM → IS	0.078	0.210	Not significant
RM → FA	0.368	$p < 0.001^{***}$	Significant, <i>H2</i> is supported
FA → IS	0.697	$p < 0.001^{***}$	Significant, <i>H3</i> is supported
Panel C			
Indirect effect			
RM → FA → IS	0.256	$p < 0.001^{***}$	Decision H4 is supported, full mediation
<b>Note:</b> $***p < 0.001$			

Finally, the path coefficient of the intervening variable on the dependent variable must also be significant.

## Discussions

This study examines the effect of risk management and fraud awareness in government organizations to improve integrity systems. Based on 103 respondents, several analyzes have been conducted to test the hypothesis. The main objective of this study is to examine the mediating effect of fraud awareness on the relationship between risk management and integrity systems. Based on the support of self-determination theory, this study finds that fraud awareness mediates risk management and integrity systems.

Based on [table 6](#) panel A, *H1* states that risk management has a positive effect on integrity systems. Based on the results of statistical tests, it was obtained ( $\beta = 0.333$ ;  $p < 0.001$ ). Thus, *H1* is supported. This means that the higher the level of organizational risk management, the higher the integrity of the system. This result is different from the study conducted by [Said et al. \(2016\)](#). However, it is supported by the study of [Baharud-din et al. \(2014\)](#) and [Johari et al. \(2020\)](#) who found that increasing the level of organizational integrity is influenced by risk management. This shows that the more the organization considers the risk factors that will be faced in achieving organizational goals, the higher the implementation of the integrity system.

*H2* states that risk management has a positive effect on fraud awareness. Based on the results of statistical tests, it was obtained ( $\beta = 0.368$ ;  $p < 0.001$ ;  $R^2 = 0.14$ ). Thus, *H2* is supported. This means that the higher the level of organizational risk management is, the higher the organization's fraud awareness is. This finding supports the results of studies conducted by [Hess and Cottrell \(2016\)](#) and [Alazzabi et al. \(2020\)](#) who found that preventing fraud and developing fraud awareness took more than 1 year, thus requiring risk management in the organization's operational activities.

*H3* states that fraud awareness has a positive effect on integrity systems. Based on the results of the statistical test, it was obtained ( $\beta = 0.697$ ;  $p < 0.001$ ). Thus, *H3* is supported. This means that the higher the level of organizational fraud awareness, the higher the integrity system. These results are supported by a study conducted by [Biegelman et al. \(2007\)](#) and [Turner \(2015\)](#) which state that fraud awareness can encourage a culture of organizational behavior that is ethical and with integrity.

Based on the results of the PLS test, the path coefficient from fraud awareness to integrity system was obtained ( $\beta = 0.256$ ;  $p < 0.001$ ). Thus, *H4* is supported. This means

that fraud awareness mediates the relationship between risk management and the integrity system. This means that fraud awareness stemming from risk management practices can improve integrity systems although this is the first study to find that fraud awareness can mediate risk management and integrity systems. This is logical because risk management applied in achieving organizational goals can increase organizational awareness of the possibility of fraud so that it can encourage individuals within the organization to act in accordance with applicable norms and ethics.

## Conclusion

The findings of this study indicate that risk management and fraud awareness have an effect on integrity systems, especially in government organizations. The conclusion that can be formulated from the results of this study is that risk management can improve the practice of organizational integrity systems through fraud awareness. This means that organizational awareness of fraud can be increased through risk management with various regular reviews of fraud prevention and detection strategies.

In addition, the findings of this study support the self-determination theory. More and more individuals are aware of the importance of preventing and detecting fraud through risk management mechanisms. It will encourage individuals in the organization to act in accordance with the norms and ethics in the organization.

Building a zone of integrity is not related to administration, but rather to change behavior so that all elements of the organization make ethics and integrity as the basis for managing the organization. The predicate of government institutions getting a corruption-free area (corruption-free area (WBK)) and a free-serving bureaucratic area (free-serving bureaucratic area (WBBM)) will be achieved if everyone has awareness of fraud and corruption. To increase organizational fraud awareness requires the involvement of internal audit with risk management to provide advice on prevention strategies and conduct training on fraud awareness to the management and employees of the organization (Iyer and Samociuk, 2006; Mat *et al.*, 2013; Abdullahi and Mansor, 2018).

Further study will be carried out with larger sample and not only limited to government organizations but also private sector organizations. Personal and organizational factors such as organizational ethics, commitment and leadership so that they can be used as variables for further research. In addition, further research can be carried out with a qualitative approach to find out more deeply about the integrity system in an organization, both in the private and public sectors.

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