A CONFIRMATORY FACTOR ANALYSIS OF THE FRAUD PENTAGON INSTRUMENTS FOR MEASUREMENT OF FRAUD IN THE CONTEXT OF ASSET MISAPPROPRIATION IN MALAYSIA

ⓘ **Radziah Mohd Dani**[1+]

ⓘ **Noorhayati Mansor**[2]

ⓘ **Zainudin Awang**[3]

ⓘ **Asyraf Afthanorhan**[4]

[1,2,3,4]*Faculty of Business and Management, Universiti Sultan Zainal Abidin, Gong Badak Campus, Terengganu, Malaysia.*
[1]*Email:* radziah2312@gmail.com
[2]*Email:* nhayatimansor@unisza.edu.my
[3]*Email:* zainudinawang@unisza.edu.my
[4]*Email:* asyrafafthanorhan@unisza.edu.my

(+ Corresponding author)

ABSTRACT

The purpose of this study is to create and validate a tool for measuring constructs in the context of asset misappropriation among Malaysian public sector employees. The instrument was adapted from a prior study and adjusted to meet the needs of the present study. The target audience consists of public sector employees in the Malaysian Accountant General's Department. Cluster and proportional stratified random sampling techniques were used to choose a sample of 300 participants from the sampling frame of selected Accountant's General Department personnel throughout the country. Before the confirmatory factor analysis, the instrument was subjected to content validity and exploratory factor analysis (EFA). The confirmatory factor analysis (CFA) approach proved the presence of the perceived pressure, opportunity, rationalization, capability and arrogance constructs from the fraud pentagon theory. The CFA procedure eliminated five items because of inadequate factor loading (less than 0.6). All fitness indexes for fit categories reached the required level of model fitness. In addition, the average variance extracted (AVE) and composite reliability (CR), which represent convergent validity and construct reliability, respectively, have met the acceptable degree of model fit. The revised instrument for evaluating the perceived pressure, perceived opportunity, rationalization, capability, and arrogance constructs of the public sector in Malaysia is therefore valid and trustworthy for determining the issue of asset misappropriation among public sector employees in Malaysia.

Contribution/Originality: This paper contributes to the literature by proposing a new model in the context of asset misappropriation in Malaysia. Incorporating different theories of pentagon fraud and risk capabilities creates a single framework that provides comprehensive information for practitioners on how to mitigate the issue of asset misappropriation among public sector employee in Malaysia.

1. INTRODUCTION

Globally, businesses are concerned about the rising prevalence of fraud. These concerns have become the greatest economic crime and threat facing businesses. Misappropriation of assets is one of the most prevalent kinds of commercial fraud and includes the theft of negligible amounts of a company's assets. Asset misappropriation happens when people responsible for managing a company's assets steal or misappropriate them for their personal

benefit (Albrecht, Albrecht, Albrecht, & Zimbelman, 2012). Also, employees frequently attempt to conceal their misappropriation of business assets in ways that are difficult to detect.

The ACFE (2020) divided asset misappropriation schemes into two categories: cash misappropriation and inventory/asset misappropriation. From the categories, five misappropriation schemes are acknowledged: "theft of petty cash; theft of cash receipts in the form of skimming or cash larceny; fraudulent disbursements in the form of billing, payroll, expense reimbursement schemes; cheque & payment tampering; and register disbursement; misuse of assets and asset larceny" (ACFE, 2018, 2020) occupational fraud (Fraud Tree), list 5 types of misappropriation scheme from the categories which are:

1. Theft on cash hand.
2. Theft of Cash Receipts in the form of skimming and cash larceny.
3. Fraudulent Disbursement in the form of:
   - Billing Schemes.
   - Payroll Schemes.
   - Expense Reimbursement Schemes.
   - Cheque and Payment Tempering.
   - Register Disbursements
4. Misuse of assets.
5. Asset larceny.

Misappropriation of assets entails more than petty theft as it encompasses any behavior that allows an employee to make personal gains from the organization's losses. Consistent misappropriation of an organization's assets will have a greater negative financial impact. Norziaton, Nur Adura, & Ridhuan (2018) discovered significant instances of asset misappropriation at the federal, state, and municipal levels of government; it is a major problem in the public sector and a common occurrence among businesses. The misuse of assets is sometimes referred to as "invoice fraud," which refers to billing fraud that is frequently associated with financial fraud. Misuse of a company's physical assets is the simplest to identify. Money is the most popular target of robbery since cash or bank funds may be used immediately by the thieves. At the moment, asset misappropriation usually occurs with both cash and non-cash assets. Because of this, asset misappropriation is split into two categories: (1) cash misappropriation, which is fraud related to cash assets and holding payment checks for vendors; and (2) non-cash misappropriation, which is fraud related to non-cash assets (such as using company facilities for personal gain) (Siahaan, Umar, & Purba, 2019). Numerous reports on workplace fraud have been produced over the years. Despite the growing interest in workplace fraud analysis, the majority of studies to date have focused primarily on financial statement fraud and fraud incidents (Abdullahi & Mansor, 2018; Akbar, 2017; Albrecht, Albrecht, & Albrecht, 2004; Dorminey, Fleming, Kranacher, & Riley Jr, 2012; Hasnan, Rahman, & Mahenthiran, 2013; Mohamed & Handley-Schachelor, 2014; Pamungkas, Ghozali, & Achmad, 2018; Rezaee, 2005; Skousen, Smith, & Wright, 2009; Vousinas, 2019; Wolfe & Hermanson, 2004) with little attention given to other forms of occupational fraud, particularly asset misappropriation.

In line with this, the present study objective is to validate the instruments for measuring constructs on fraud pentagon elements in the context of asset misappropriation in Malaysia. The structure of this paper is as follows: the following section discusses the literature review; Section 3 comprises the methodology; Section 4 explains the research instruments; Section 5 contains the findings from the CFA analysis; and the last section provides conclusions and recommendations for future research.

2. LITERATURE REVIEW

There are three major fraud theories that have been established—the Fraud Triangle, Fraud Diamond, and Fraud Pentagon theories (Akbar, 2017). The fundamental fraud theory was introduced by Cressey (1953), who

stated that the fraud triangle theory consists of three elements, which are pressure, opportunity and rationalization. In 2004, the fraud triangle theory was expanded to the fraud diamond theory by Wolfe and Hermanson with the additional element of capability or competency. Focusing on the fraud pentagon theory (FPT), that consists of five elements, which are perceived pressure, perceived opportunity, rationalization, capability, and arrogance, this study contributes to the current fraud theory developed by Horwath (2011) on detecting asset misappropriation among public sector employees in Malaysia.

2.1. Perceived Pressure

This is the first component of the original fraud theory articulated by Cressey (1953). It is of an individual nature and cannot be shared. A person may also be motivated to commit fraud by external forces. Perceived pressure can take many forms, including a person's desire to prove that he or she can beat the system, the need to meet deadlines with good results (especially during times of crisis), objections to the work environment, or a strong professional goal and the desire to reach it quickly (Dorminey et al., 2012; Vousinas, 2019).

2.2. Perceived Opportunity

Opportunity is the second component of the fraud pentagon hypothesis, which relates to a person's capacity to perpetrate fraud. This component has close ties to the organization's internal control system. The greater the anticipated chance for a culprit to commit fraud or misappropriate an asset, the weaker the internal control mechanism (Koomson, Owusu, Bekoe, & Oquaye, 2020).

The perpetrator feels that, if undiscovered, he or she will be able to devise and execute fraudulent actions. Individuals must view opportunities as genuine, indicating that they are inherently authentic. Therefore, perceived opportunity means that the door is wide open for fraud and that there is a control deficiency. In addition, the likelihood that the offender will be caught is extremely low. Therefore, perceived opportunity demands the ability to commit fraud without being discovered (Dorminey et al., 2012; Vousinas, 2019).

2.3. Rationalization

The third component of the fraud pentagon theory is rationalization. This element helps the perpetrator to recognize the fact that one's fraudulent act falls under illegal behavior. However, the individual perpetrator perceives oneself as a trusted individual and rationalizes their act. This is a critical aspect which must take place before a crime is committed (Abdullahi & Mansor, 2018).

2.4. Capability

Capability is the fourth element of fraud pentagon theory and reflects a situation where an individual who attempts to commit fraud has the requisite characteristics or skills and capabilities to perform the act. The fraudster also understands the specific probability of fraud and one's individual desire to make it a reality. The supporting elements of capability include the crime location, intellect, ego, manipulation, deception and stress (Wolfe & Hermanson, 2004).

2.5. Arrogance

The fifth element in fraud pentagon theory is arrogance. By default, an arrogant individual has a higher tendency to commit fraud than a more submissive individual. The sense of superiority and the need for power are two of the most important driving factors for fraud. Previous research defines arrogance as the lack of conscience and the superior attitude of someone who believes that internal control cannot be applied to them personally (Abdullahi & Mansor, 2018).

3. METHODOLOGY

This research employed a cross-sectional survey because its results are much more dependable than those from other survey designs (Schwab, 2014). A cross-sectional survey collects data from a population of interest at a single point in time, allowing conclusions to be formed (De Vaus & de Vaus, 2013). The respondents were selected using probability sampling from the sampling frame.

The sampling frame consists of eligible public sector employees, the target population in this study. The respondents from the northern, southern, eastern, and central regions of Peninsular Malaysia and East Malaysia are clustered by region to ensure representativeness. Then, using a proportional stratified random sample technique, 300 respondents were selected proportionally from each region. The selected respondents were then given a set of self-administered questionnaires for data collection. To ensure respondents' impartiality, they could complete the questionnaire at their own convenience, without fear or pressure, and without disclosing their identity.

4. RESEARCH INSTRUMENT

The questionnaires comprise five sections, namely perceived pressure, perceived opportunity, rationalization, capability and arrogance, and contain a total of 36 items. These questions are adapted from Koomson et al. (2020); Kazemian et al. (2018) and Abdullahi and Mansor (2018). The selected items of the fraud risk factors were evaluated on a five-point rating scale ranging from 1 = strongly disagree to 5 = strongly agree. Figure 1 shows the fraud pentagon chart and examples of items for each construct used in this study. Perceived pressure and arrogance consist of six items each; perceived opportunity contains nine items; and rationalization and capability consist of four items each. Details on the items for each of the constructs are explained in the next section.
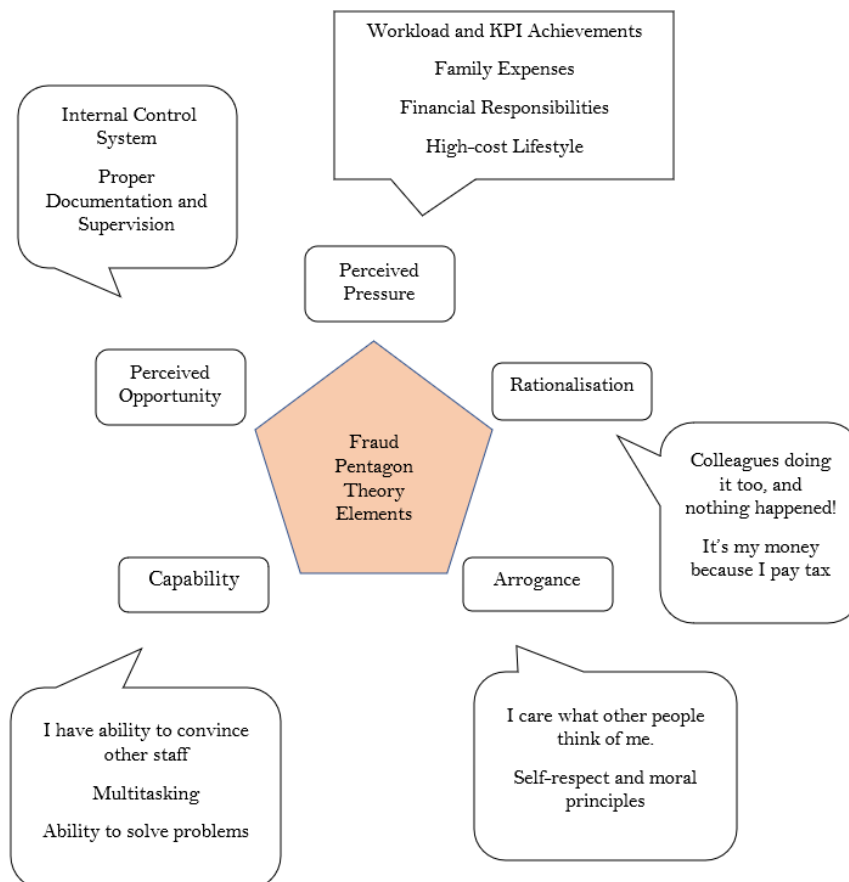

Figure 1: Fraud pentagon chart.
Source: Element of Fraud Pentagon Theory by Horwath (2011).

5. FINDINGS

Prior to conducting a field study, a pre-testing procedure was carried out to assess the instruments for content validity, face validity and criterion validity by the experts. Six experts in the field were selected to validate the instruments. Four experts in the disciplines of occupational fraud, risk management, and the public sector validated the instruments for content validity, one expert validated the instruments for criterion validity, and another expert validated the instruments for face validity. After all experts completed their validation process, the instruments were amended accordingly based on their comments and suggestions.

The study conducted an exploratory factor analysis (EFA) procedure to explore the usefulness of the modified items measuring their respective constructs and a confirmatory factor analysis (CFA) procedure to validate the measurement model of latent constructs for construct validity, convergent validity, discriminant validity and composite reliability (Alias, Awang, & Muda, 2019; Bahkia, Awang, Afthanorhan, Ghazali, & Foziah, 2019; Bahkia et al., 2022; Muda et al., 2020). The EFA was conducted using data from the pilot study, while the CFA was conducted with data from the field study (Baistaman, Awang, Afthanorhan, & Rahim, 2020; Ehido, Awang, Abdul Halim, & Ibeabuchi, 2020; Fitriana, Hutagalung, Awang, & Zaid, 2022). The results of the EFA found the KMO value for perceived pressure to be 0.856, perceived opportunity is 0.906, rationalization is 0.735, capability is 0.811 and arrogance is 0.863; these values are all higher than the threshold value of 0.5 (Awang, Afthanorhan, Mohamad, & Asri, 2015; Hair, Black, Babin, Anderson, & Tatham, 2010; Tabachnick & Fidell, 2007). Bartlett's Test of Sphericity was also significant (p-value 0.000).

The EFA results revealed the presence of five components with 36 retained items from 47 adapted and modified items. Another 11 items were removed due to low factor loading. According to Afthanorhan, Awang, & Fazella (2017); Rahlin, Awang, Afthanorhan, & Aimran (2019) and Muda et al. (2020), the minimum acceptable value of the factor loading for individual items should be at least 0.6 to ensure retention. The results of the CFA analysis revealed that fraud pentagon constructs emerged as second-order constructs with five components, as presented in Figure 2. Each component was measured with a certain number of items in the questionnaire. Figure 2 presents the initial measurement model of the fraud pentagon construct. The name of the component and their respective number of measuring items are perceived pressure (six items), perceived opportunity (nine items), rationalization (four items), capability (four items) and arrogance (six items).

The initial CFA results for validating the measurement model of the fraud pentagon construct are reported as follows: five items were detected to have a factor loading less than 0.6, even though the fitness indexes of the initial measurement model of the fraud pentagon construct achieved the required level of model fit. One item each, AM7 (from the asset misappropriation component), R4 (from the rationalization component), and A6 (from the arrogance component), were deleted due to low factor loading. Another two items, namely PO8 and PO9 from the perceived opportunity component, were also deleted due to low factor loading.

To ensure the validity and reliability of the instrument for measuring the fraud pentagon construct, any item with a factor loading less than 0.6 is dropped from the model since this item does not contribute to the measurement of the construct (Bahkia et al., 2019; Bahkia et al., 2022; Mohamad, Mohammad, Ali, & Awang, 2016; Mohamad, Awang, & Ali, 2017; Mohamad, Afthanorhan, Awang, & Mohammad, 2019; Rahlin et al., 2019; Rahlin, Awang, Afthanorhan, & Aimran, 2019). Five items (AM7, R4, A6, PO8 and PO9) were deleted one item at a time, and the CFA was repeated until the satisfactory model fit is obtained for the measurement model.

Figure 3 displays the revised measurement model for the fraud pentagon construct, which reveals that the factor loadings for 31 items in each sub-construct are larger than 0.60. In addition, the final measuring model of the fraud pentagon fulfilled the model fitness index results (Chisq/df = 1.835 < 3.0, RMSEA = 0.053, CFI = 0.940 > 0.90, and TLI = 0.934 > 0.09). Table 1 summarizes the full CFA results for the construct.
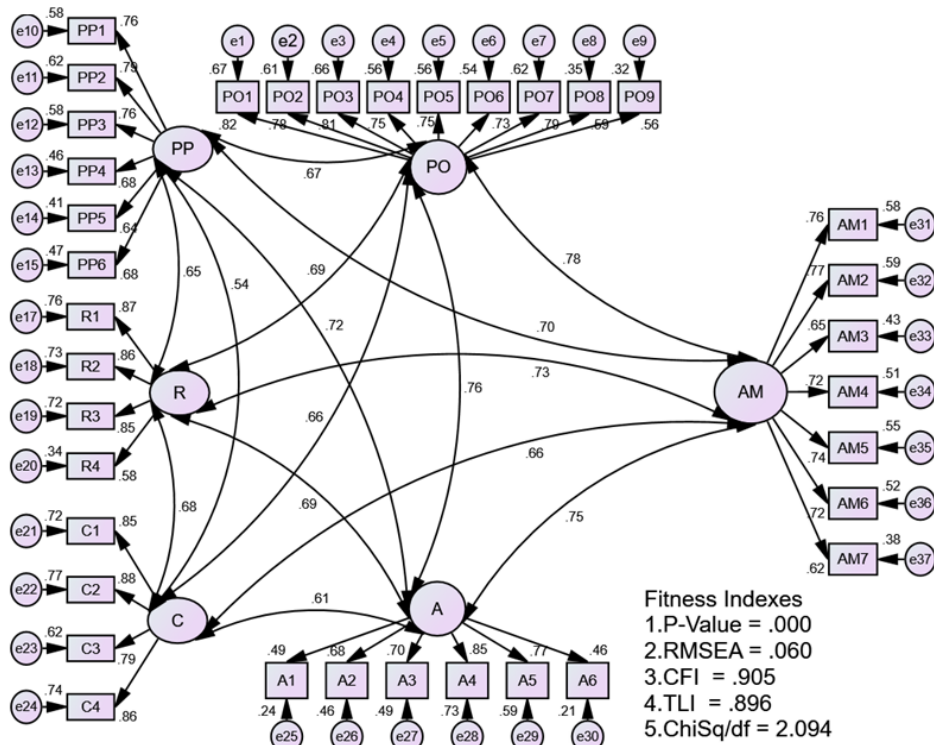
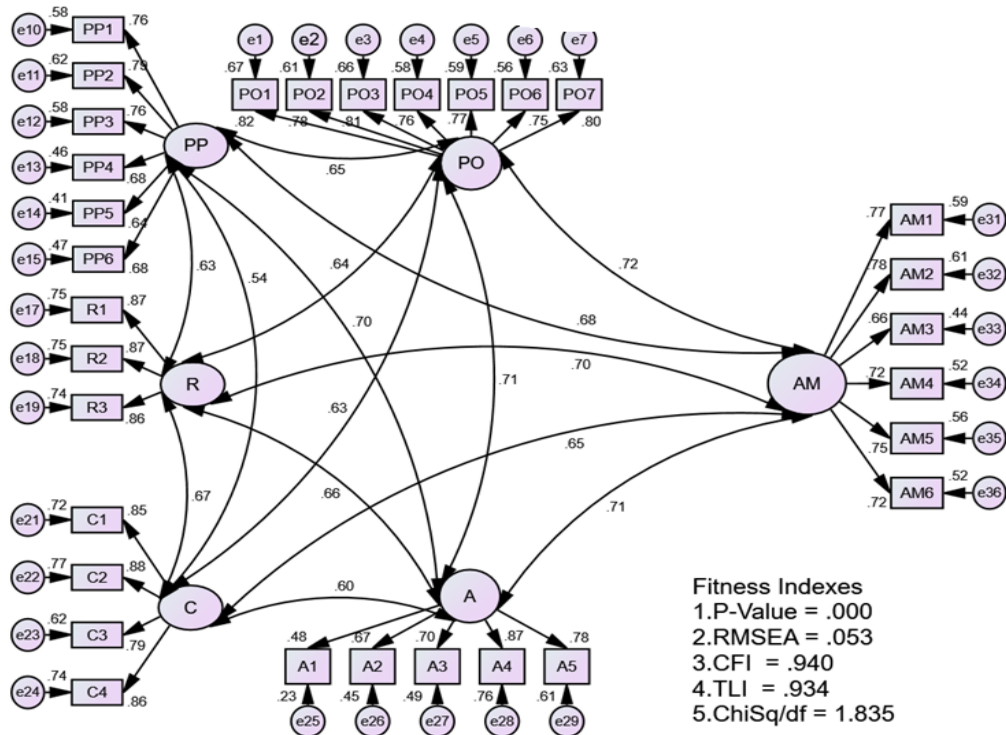**Figure 2.** Initial measurement model for fraud pentagon construct.

Figure 3. The final measurement model for fraud pentagon construct.

Table 1. CFA results: initial and final measurement models.

Fitness index	Level of acceptance	Initial measurement model	Final measurement model
RMSEA	Less than 0.08	0.06	0.053
TLI	Greater than 0.90	0.896	0.934
CFI	Greater than 0.90	0.905	0.940
Chi-Square/df	Less than 5.0	2.094	1.835

Table 2. AVE and CR for fraud pentagon constructs.

Construct	Item		Factor Loading	CR (Above 0.6)	AVE (Above 0.5)
PO	PO1	Every transaction has sufficient documentation and approval by an appropriate senior member of staff.	0.82	0.918	0.616
	PO2	Transactions are recorded within the stipulated time frame.	0.78		
	PO3	Separation of roles and responsibilities is clear.	0.81		
	PO4	Proper supervision, monitoring, and reviews of work are implemented.	0.76		
	PO5	Policies, procedures, and guidelines are well documented and communicated to employees proactively.	0.77		
	PO6	There are proper records and documentation for all resources.	0.75		
	PO7	There is proper supervision of the usage of the organization's facilities, such as telephones and internet connections.	0.80		
PP	PP1	My work needs me to achieve the company's key performance indicators (e.g., targets, achievements, workload, waiting times, audit, time frames and reviews).	0.78	0.890	0.576
	PP2	I have different tasks that must be done simultaneously.	0.79		
	PP3	I am faced with tension and frustration due to constant work pressure.	0.76		
	PP4	Spending on necessities must be reduced sometimes to ensure that my salary is sufficient until the end of the month.	0.68		
	PP5	Family expenses are extremely costly, which I cannot afford to pay in some cases.	0.64		
	PP6	I am fully responsible for supporting my family financially.	0.88		
R	R1	It is okay to use funds if you pay them back later.	0.87	0.901	0.751
	R2	Taking money from the government is acceptable because I'm a taxpayer.	0.87		
	R3	They will pay less than what they defraud the organization if they are docked before the court.	0.86		
C	C1	I have the ability to convince other staff members to go along with my suggestions.	0.85	0.909	0.715
	C2	My ability to multitask makes me superior at the workplace.	0.88		
	C3	My ability to solve problems of clients/stakeholders makes me trusted by my employer.	0.79		
	C4	I have influence over situations in my department because I believe I am good at what I do.	0.86		
A	A1	I could not respect myself if I did not live up to a moral code.	0.48	0.864	0.569
	A2	Whenever I follow my moral principles, my sense of self-respect increases.	0.87		
	A3	Doing something I know is wrong makes me lose my self-respect.	0.70		
	A4	I care what other people think of me.	0.87		
	A5	What others think of me has an effect on what I think about myself.	0.78		
AM	AM1	I often take some resources from the organization.	0.77	0.895	0.587
	AM2	I conduct personal work during office hours.	0.78		
	AM3	I do not comply with all policies regarding asset usage.	0.85		
	AM4	I use cash/cash equivalent for personal use.	0.72		
	AM5	I use office assets for personal purposes.	0.75		
	AM6	I use the internet service in the office for personal purposes.	0.72		

5.1. Construct Validity Assessment for the Constructs

The construct validity of the measurement model was assessed to ensure that the fitness indexes achieved the model fit for all categories (Aimran, Ahmad, Afthanorhan, & Awang, 2017; Aimran, Ahmad, Afthanorhan, & Awang, 2017a; Aziz, Afthanorhan, & Awang, 2016). As shown in Table 1, the results indicate that the measurement

model of the fraud pentagon construct (see Figure 3) had achieved the requirement for construct validity. The value of RMSEA under the Absolute Fit category was 0.053 (less than 0.08), while the value for CFI under the Incremental Fit category was 0.940 (greater than 0.9). In addition, the ratio of Chisq/df under the Parsimonious Fit category was 1.835, achieving the requirement of less than 3.0. The evidence presented thus far support the indication that the measurement model of fraud pentagon elements fulfilled the condition for construct validity.

5.2. Convergent Validity and Composite Reliability Assessment for the Constructs

To evaluate the convergent validity of the measurement model for the fraud pentagon construct, the average variance extracted (AVE) must be calculated. A construct has gained convergent validity, according to Awang (2015) and Awang et al. (2015), if the AVE value exceeds the threshold of 0.5. To establish the composite reliability (CR), however, this study must compute the CR for the construct and sub-constructs of fraud pentagon meaningfulness. To get the specified level of reliability, the CR values must surpass 0.6. (Bahkia et al., 2022; Fitriana et al., 2022; Noor, Aziz, Mostapa, & Awang, 2015). Table 2 presents the results of the AVE and the CR for the constructs of the fraud pentagon. From this table, we can see that the AVE and CR values are above the threshold values of 0.5 and 0.6, respectively. Hence, it can be concluded that the convergent validity and composite reliability for the fraud pentagon constructs have been accomplished accordingly.

6. CONCLUSION

This study aims to replicate the factor structure of the 31 items of the Fraud Pentagon construct using confirmatory factor analysis on a sample of 300 public sector personnel in Malaysia. The research has validated the measurement approach for gauging the fraud pentagon concept among Malaysian public sector employees. The measuring model of the elements confirmed the five constructs that comprise the fraud pentagon structure. The instruments attained construct validity, convergent validity, and discriminant validity. Regarding reliability, the instrument attained satisfactory composite reliability. The fraud pentagon instrument containing 31 items and five constructs, including perceived pressure, perceived opportunity, rationalization, capability, and arrogance, is recommended for determining the asset misappropriation of public sector employees in Malaysia and for other studies incorporating fraud pentagon theory elements into the research framework. Government officials and policymakers should increase their efforts and enhance their procedures to prevent the misuse of assets. Accountants and internal auditors will benefit from gaining a deeper understanding of the issue of asset misappropriation and the determinants of fraud to minimize the opportunities for asset misappropriation.

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