Validation of Arnaud's ethical climate index by public sector auditors in Malaysia

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Abstract

Purpose – The purpose of this paper is to empirically test Arnaud's (2010) ethical climate index (ECI) of measuring ethical work climate (EWC) in the context of Malaysian public sector auditors (PSAs).

Design/methodology/approach – EWC is conceptualized as four main components with two sub-components. Questionnaires were distributed to the population of PSAs in the Malaysian National Audit Department (NAD). Factor analysis (principal component analysis [PCA]) was used to verify the components of EWC.

Findings – Results from PCA revealed that EWC, indeed, has four main components. Therefore, the findings of this study provide empirical evidence that validates Arnaud's (2010) EWC model, although tested on PSAs in Malaysia.

Research limitations/implications – This paper has a limited purpose, which is to test whether the ECI could be applied to PSAs in Malaysia to derive the original four main components of Arnaud's EWC. Thus, this study does not evaluate the EWC of PSAs or determine causal relationships between EWC and other variables; these are left to future studies.

Practical implications – The findings of this study confirm that Arnaud's (2010) ECI is sufficiently resilient to be applied to the context of PSAs in Malaysia. Hence, future studies could use this index to measure EWC not only in the public sector but also in the private sector. Future research could also further test this index in different contexts.

Originality/value – Arnaud's (2010) ECI was originally applied in the context of the private sector in a developed country. Hence, this study adds value by extending the ECI to the public sector in a developing country, Malaysia.

Keywords Malaysia, PCA, Ethical climate, Arnaud, EWC, Public sector auditing

Paper type Research paper

1. Introduction

An ethical work climate (EWC) is essential in any organization, and particularly crucial in the public sector. EWC may be considered, especially important in relation to the public sector of developing countries. This is because, in comparison to developed countries, the former may have certain deficiencies in implementing comprehensive systematic controls. Martin and Cullen (2006) defined EWC as a shared perception of what constitutes right behavior in relation to organizational goals, objectives, policies and procedures. The essence of having a strong EWC is to disseminate organizational ethical practices to organizational members for their daily and future operational references.

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Public sector auditors (PSAs) have the responsibility to audit governmental organizations, divisions and units to ensure that these administrative bodies are, indeed, accountable to the nation. Therefore, it is imperative for PSAs to uphold their professionalism and ethical judgment. Over the past decade, a number of ethical scandals that could be linked to governmental agencies (Youth and Sport Ministry involved an embezzlement in procurement, Klang Free Trade Zone and National Feedlot Centre) have occurred in Malaysia. As the auditors in the National Audit Department (NAD) are responsible to carry out audits of government agencies; hence, it is especially essential for these PSAs to assure the public of their EWC.

Victor and Cullen (1988) developed a model to measure EWC, focusing on the component of moral judgment. Later, Arnaud (2010) developed the psychological process model (PPM) by extending Victor and Cullen's (1988) model and referring to Rest's (1994) four components of moral decision-making, namely: moral sensitivity, moral judgment, moral motivation and moral character. However, the PPM measures these four components as "shared perception" to be consistent with the definition of EWC. Consequently, Arnaud (2010) developed an ethical climate index (ECI) to measure EWC in the PPM. The development of EWC is further elaborated in Section 2.

The ECI by Arnaud (2010) was originally developed to be applied to the context of the private sector in the USA, a developed country. Hence, it is uncertain whether the same index can be applied and useable in the context of a developing country, Malaysia, specifically in relation to PSAs. Hence, this paper's objective is to empirically test the ECI on the Malaysian PSAs. Then, using PCA, this study determines whether the four components of ethical decision-making can be derived in line with the model of Arnaud (2010).

Section 2 further explains the development of the EWC model and the studies that have tested Arnaud's (2010) model. The subsequent sections describe the research method prior to presenting the results in Section 3 and Section 4, respectively. Section 5 concludes the study with a discussion of the implications of findings, limitations of the current study and suggestions for future research.

2. Ethical work climate

There are several ethical decision-making process (EDMP) models used in various disciplines (Ferrell and Gresham, 1985; Trevino, 1986; Hunt and Vitell, 1986; Dubinsky and Loken, 1989; Jones, 1991). The models that are particularly relevant to this study are Rest's (1994) moral development model, Victor and Cullen's (1988) EWC model, and finally, Arnaud's (2010) PPM. This is because they refer to similar components in a decision-making process.

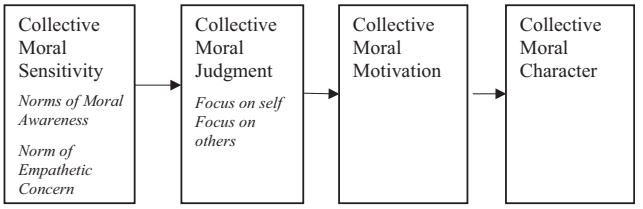
Rest (1994) posits that an individual experiences four stages of moral development during ethical decision-making. These stages are the four components of moral development, namely: moral sensitivity, moral judgment, moral motivation and moral character. Thus, the EDMP by Rest (1994) focuses on the individual. On the other hand, Victor and Cullen (1988) stress the EWC, which involves a collection of individuals in an organization. However, Victor and Cullen's (1988) EWC model only consists of one component of moral development, i.e. moral judgment (Trevino, 1986; Rest, 1994; Simha and Cullen, 2012), as it was derived from Kohlberg's (1976) cognitive moral development model. As Victor and Cullen's (1988) EWC model is limited to only one component of EDMP, it is considered insufficient to encompass the whole process of ethical decision-making (Hunt and Vitell, 1986; Jones, 1991; Arnaud, 2010). Therefore, Arnaud (2010) improves on the two prior models of Rest (1994) and Victor and Cullen (1988) to develop the PPM, as elaborated below.

It is undoubted that Victor and Cullen's (1988) work is seminal in EWC literature; hence, Arnaud (2010) refers to Victor and Cullen's (1988) model. However, due to the limitation of having only one component, Arnaud (2010) relied on Rest's EDMP model (Rest and Narvaez, 1994) to extend EWC into four components. Furthermore, Arnaud (2010) was mindful of the definition of EWC by Martin and Cullen (2006), which stresses on the notion of "shared perception." In an organization, this shared perception is that of employees regarding the organization's ethical norm. Based on this definition, EWC has to be measured in a collective manner that is at the social system level (unit, group, department and organization). Even though Rest (1994) and Victor and Cullen (1988) measured their respective EDMPs, both models were measured at an individual level. Therefore, in refining the two predecessor models, Arnaud (2006, 2010) derived a new model to measure EWC. Specifically, she modified Rest's (1994) EDMP model, i.e. moral sensitivity, moral judgment, moral motivation and moral character into "collective moral sensitivity, collective moral judgment, collective moral motivation and collective moral character" in measuring EWC. The term "collective" means that the perception on ethical climate is measured at a higher level, and no longer refers to individual perception. In fact, John B. Cullen, one of the originators of Victor and Cullen's (1988) EWC model, supports the use of Arnaud's (2010) PPM (Simha and Cullen, 2012).

As seen earlier, the definition of EWC implies that perception on EWC is at shared perception among a social unit, i.e. a group, a department or an organization. However, to date, this has not been properly reflected in the ethical climate research. Even though Victor and Cullen's (1988) work is seminal, their ethical climate questionnaire measures EWC at individual perspective, i.e. at the individual level. Furthermore, only a few prior studies analyzed EWC at shared perception, i.e. using a multilevel approach (Wang *et al.*, 2012). Therefore, there seems to be a mismatch between definition and measurement of EWC as EWC is defined as shared perception, but it is measured at the individual level by most prior studies (Arnaud, 2010; Simha and Cullen, 2012). Thus, from now on, EWC should be tested using multilevel techniques.

Arnaud's (2010) PPM (Figure 1) depicts the psychological process undertaken by employees in relation to ethics, consequently, leading to ethical behavior. This process is collective, hence, reflects EWC in an organization. The first process in PPM refers to collective moral sensitivity, which has two subcomponents, namely: norms of moral awareness and norms of empathetic concern. Basically, collective moral sensitivity refers to the consideration of possible ethical actions (awareness) and assessing the consequences to others (empathetic concern). The achievement of a higher level of moral sensitivity is expected to lead to ethical moral judgment.

At the collective moral judgment level, this is the right time to apply prevailing norms in assessing the morally right action at a group-level. A morally right choice will be selected



Source: (Arnaud, 2010)

Figure 1.
PPM

among the possible ethical acts after considering the consequences to oneself (focus on self) and others (focus on others) (Arnaud, 2010). Therefore, at this process, the audit team needs to decide on a morally right option, which normally refers to the option that is a concern for others. If members of the organization can make a morally right choice, then they will make an ethical decision. When the audit team has decided on a moral course of action, they have made a "moral judgment". The EDMP continues to the next component, collective moral (CM) motivation.

Next, the collective moral motivation stage shows whether a moral value of an organization is given priority over self or over other values while making ethical decisions. Other values of concern are authoritative power, personal status, biasness or super achievement. This stage would reveal whether moral values take preference over other values in decision-making.

The final component of PPM is a collective moral character. Organizational members consistently implement a planned course of action based on the norms of self-control or norms for assuming responsibility. Self-control reflects controlling ability in undertaking a planned action. In this case, moral values are always the first consideration. The organizational members should also take into consideration others' welfare; maintain moral commitment; and comply with underlying rules, while taking an action. Overall, if an organization attains a positive evaluation at this process, it shows that the organizational members are capable to solve ethical problems ethically. To continue with the previous example, if audit teams are able to act according to their planned action (which has been decided at a moral motivation stage), they behave ethically. For example, if an audit team was presented with an expensive gift by a client, moral character is only achieved if the audit team actually declines the gift. The actual declining of the gift is putting the decision into action. This implies that a high EWC exists in the audit firm if audit teams behave ethically collectively. After undergoing all four of PPM's processes as stated above, the employees are deemed to have behaved ethically; hence, creating an EWC in the organization.

A growing number of studies have been undertaken on EWC (Qualls and Puto, 1989; Wimbush and Shepard, 1994; Wyld and Jones, 1997; Bulutlar and Oz, 2009; Cullen *et al.*, 2003; Laratta, 2011; Shacklock *et al.*, 2011; Wang *et al.*, 2012; Shafer, 2015; Hageman and Fisher, 2016; Goebel and Weißenberger, 2017). In reviewing the empirical studies on EWC, Victor and Cullen's (1988) EWC model has been widely tested by prior studies (Cohen, 1993; Wittmer and Coursey, 1996; Barnett, 2001; Shacklock *et al.*, 2011) and the measurement of EWC was based on individual's perception. However, EWC is more appropriate to be measured at multilevel (Kuenzi and Schminke, 2009), but there are limited empirical studies examining EWC at multilevel. Arnaud (2010) developed a questionnaire instrument, ECI in the Western perspective to measure EWC of a workplace. There is a gap in the literature, which tests the applicability of Arnaud's (2010) ECI to the context of a developing country. Thus, this study aims to validate the instrument in the Asian's public sector context.

3. Research method

3.1 Population and questionnaire instrument

This paper collected data from the population of PSAs in the NAD of Malaysia. Official permission was requested from the former auditor general (AG) of Malaysia, H.E. Tan Sri Dato' Setia Haji Ambrin Bin Buang[1] to distribute the questionnaires to the NAD staff, specifically PSAs. In total, 1,252 set of questionnaires were distributed to PSAs in 213 audit teams at federal and state levels in the whole of Malaysia. 765 useable

questionnaires were returned by PSAs from 149 audit teams, corresponding to response rates of 61 and 70 per cent, respectively. All the participants were guaranteed confidentiality and anonymity. The majority (71 per cent) of the respondents was female. This result is consistent with the statistics provided by the NAD, which indicated that the majority of Malaysian PSAs are women. Almost, 45 per cent of respondents have gained more than nine years of audit experience in the NAD, and 56 per cent of them have been with their audit teams for more than two years. These statistics indicate that the respondents are sufficiently experienced and have been with their audit teams long enough to answer questions about the EWC in the NAD, specifically within the context of their audit teams.

EWC was measured using ECI developed by Arnaud (2010) in relation to the PPM. As mentioned earlier, this construct of EWC is conceptualized as four main components of ethical decision-making. Specifically, collective moral sensitivity (ten items), collective moral judgment (ten items), collective moral motivation (eight items) and collective moral character (six items). The first two components are further divided into two subcomponents each. They are: norms of moral awareness and norms of empathetic concern for moral sensitivity; and focus on oneself and focus on others for moral judgment. Therefore, to measure EWC, this study used an index with a total of 34 items. Each item is measured on a seven-point Likert scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). Necessary reverse recoding was completed before PCA. The lower the scale indicates weaker EWC, while the higher the scale implies stronger EWC.

3.2 Principal component analysis

The purpose of this paper is to extract underlying components of EWC from the data and to ascertain whether these components are, in fact, in line with Arnaud's (2010) proposed model. Hence, to address the objective of this study, the data were subjected to the procedures of PCA.

To perform PCA, Pallant (2002) specified that a data set should have more than 150 cases and ideally have a minimum of five cases for each of the items (Pallant, 2010, p. 187). As this study has 34 items, the required sample size is at least 170 cases (34-items $\times$ 5 cases). Thus, the current study's number of 765 usable questionnaires, as mentioned above, is deemed an adequate sample size.

Next, the factorability of the current data is tested using Kaiser–Meyer–Olkin (KMO) (Kaiser, 1970, 1974) and Bartlett's test of sphericity (Bartlett, 1954). KMO statistical values range between 0 and 1, and a value of more than 0.60 is recommended. A value, which is close to 1 indicates that patterns of correlations are relatively close, and therefore, factor analysis should yield distinct and reliable factors. While Bartlett's test of sphericity (p-value) should be at least statistically significant at $p < 0.05$ as an indication of the sufficiency of sample size (Tabachnick and Fidell, 2007).

Then, the correlation matrix table is used to determine the inter-correlations among items. The correlation matrix should show some correlations of at least $r = 0.30$ or greater (Tabachnick and Fidell, 2007) to indicate that there are ample inter-correlations. In addition, the singularity[2] check was performed to ensure that r was less than 0.90 for all items (Bagozzi *et al.*, 1991).

The next step is to select a technique to apply factor extraction; this study used principal components technique because it is the most commonly used approach (Pallant, 2010). Based on Kaiser's criterion, the eigenvalue of 1.0 or more has to be retained for further investigation (Pallant, 2010). The results present the components with more than 1.0

eigenvalues followed by those components that are less than 1.0 and the percentage of variance explained by the components.

The third step to perform PCA is to choose a method for factor rotation. The present study used Varimax with Kaiser Normalization as the rotation method. This is because, it is the "most commonly used orthogonal approach, which attempts to minimize the number of variables that have high loadings on each factor" (Pallant, 2010, p. 165). After completing all the three steps, PCA output is generated and ready for interpretation. Following the PCA, mean values, standard deviation and reliabilities for each of the EWC's items and its components are assessed.

4. Results

4.1 Pre-principal component analysis

Analyzing the pre-test results, the KMO has a value of 0.933, which indicates sampling adequacy, as the recommended value is 0.60 (Kaiser, 1974). Furthermore, Bartlett's test of sphericity was statistically significant at $p < 0.001$, again indicating the suitability of the data for factor analysis. As the data met all the requirements of factorability, the study proceeds with PCA procedures.

4.2 Principal component analysis

An initial PCA on ECI without a fixed number of factors was performed. The PCA results reported six factors extracted with eigenvalues more than 1.00. These six factors explained 64.88 per cent of the total variance. More importantly, these factors' loading is consistent with the four main components and two sub-components as developed by Arnaud (2010). Of the ECI's 34 items, 32 items were found to represent meaningful and interpretable components of EWC. However, two items loaded onto dissimilar factors with loading value of 0.47 for item 5[3] (was loaded with Factor 1, collective moral character) and −0.38 for item 9[4] (was loaded with Factor 5, norms of moral awareness) at communalities values of 0.43 and 0.20, respectively. A further PCA was performed to handle the item five and item nine from the data until a better PCA result was obtained.

Finally, subsequent to removing Items 5 and 9, analyzing factor extraction was performed on the ECI with 32 items. The result demonstrates six factors to be extracted and accounted for 67.39 per cent of the total variance explained of EWC. The first component (Factor 1) explained 34.28 per cent of the variance with the largest eigenvalue at 10.97. While the remaining eigenvalues were 4.71, 1.86, 1.45, 1.37 and 1.2 for Factors 2-6, respectively.

In terms of the factor loading, rotated component matrix as presented in Table I was reviewed to confirm that the items of ECI loaded properly to the appropriate components. The discussion on these factors follow the sequence of the four main components of EWC. All items have a loading value of 0.50 and above, in which gives a good loading. The first discussed component of EWC is collective moral sensitivity. This component has two sub-components, namely: norms of empathetic concern and norms of moral sensitivity. Norms of empathetic concern (Factor 4) comprises four items, which reflect PSAs' empathy towards others. These items, which load on as Factor 4, are: *Auditors in my audit team sympathize with someone who is having difficulties in his/her job; When auditors in my audit team see that someone is treated unfairly, they sympathize with that person; Auditors in my audit team feel bad for someone who is being taken advantage of; In my audit team, auditors feel sorry for someone who is having problems.* The four items related to "norms of moral awareness" also load well together as Factor 6 of Table I. These items, which indicate prompt awareness to ethical dilemma are: *Auditors in my audit team are aware of ethical issues; Auditors in my*

	Rotated component matrix[a] Components					
	1	2	3	4	5	6
Factor	CM_ motivation	CM_ character	CM_judg_focus on others	CM_Sen_norms of empathetic	CM_judg_focus on one self	CM_sen_norms of m_awareness
ewc26	*0.849*	0.102	0.104	0.084	0.179	0.074
ewc28	*0.793*	0.115	0.205	0.118	0.080	−0.043
ewc27	*0.779*	0.139	0.192	0.123	0.079	−0.023
ewc22	*0.768*	0.099	0.022	0.045	0.214	0.111
ewc23	*0.762*	0.093	0.054	0.041	0.269	0.117
ewc25	*0.748*	0.071	0.084	0.099	0.258	0.111
ewc21	*0.712*	0.118	0.088	0.060	0.074	0.035
ewc24	*0.593*	−0.065	0.036	0.084	0.296	0.114
ewc31	0.206	*0.717*	0.273	0.281	0.049	0.143
ewc32	0.213	*0.700*	0.331	0.303	0.094	0.148
ewc33	0.148	*0.693*	0.277	0.291	0.096	0.159
ewc30	0.148	*0.672*	0.120	0.139	0.082	0.211
ewc34	0.143	*0.641*	0.210	0.277	−0.018	0.101
ewc29	−0.073	*0.610*	0.033	−0.077	0.052	0.259
ewc18	0.136	0.230	*0.826*	0.106	−0.005	0.151
ewc19	0.084	0.107	*0.818*	0.170	−0.018	0.051
ewc17	0.195	0.219	*0.765*	0.182	0.024	0.184
ewc20	0.127	0.317	*0.577*	0.257	0.113	0.284
ewc16	0.196	0.275	*0.504*	0.207	−0.080	0.234
ewc2	0.095	0.197	0.158	*0.852*	0.057	0.207
ewc1	0.154	0.193	0.168	*0.819*	−0.003	0.182
ewc3	0.163	0.255	0.230	*0.775*	0.095	0.185
ewc4	0.117	0.222	0.288	*0.647*	0.123	0.315
ewc14	0.275	0.059	0.041	0.096	*0.820*	0.005
ewc13	0.290	0.058	−0.001	0.043	*0.817*	0.058
ewc12	0.122	−0.012	−0.081	−0.070	*0.751*	−0.073
ewc11	0.376	0.097	0.028	0.112	*0.711*	0.042
ewc15	0.506	0.202	0.123	0.140	*0.585*	0.068
ewc7	0.093	0.187	0.168	0.137	0.033	*0.798*
ewc6	0.072	0.193	0.135	0.224	0.034	*0.771*
ewc10	0.076	0.247	0.136	0.153	−0.064	*0.739*
ewc8	0.112	0.246	0.223	0.327	0.046	*0.618*

Notes: Extraction method: PCA; rotation method: Varimax with Kaiser normalization; [a]rotation converged in seven iterations; CM_ = collective moral, m_= moral

Table I. Rotated component matrix (removed EWC's Items 5 and 9)

audit team recognize a moral dilemma right away; If a rule or law is broken, auditors in my audit team are quick to notice; Auditors in my audit team are very sensitive to ethical problems.

The second component of EWC is collective moral judgment. This component also has two sub-components, namely: focus on oneself and focus on others, which load onto Factors 5 and 3, respectively. The five items for Factor 5 (focus on oneself) are: *Auditors in my audit team protect their own interest above other considerations; Auditors in my audit team are very concerned about what is best for them personally; Auditors in my audit team are mostly out for themselves; Auditors in my audit team think of their own welfare first when facing a difficult decision; In my audit team, auditors are primarily concerned about personal benefits above other considerations.* This factor indicates the

extent to which an individual prioritizes self-serving purposes when making ethical decisions. While, the five items for Factor 3 (focus on others) are: *Auditors in my audit team are expected to do what is right for society; Auditors in the NAD have a strong sense of responsibility to society and humanity; The main consideration of each auditor is what is best for everyone in the NAD; The good for all auditors is the most important concern in the NAD; Auditors in my audit team are very concerned about their colleagues' interests.* This factor indicates the degree to which an individual exercises moral judgment that encapsulates concern for others.

The third component of EWC, collective moral motivation comprises of eight items. These items, which load on as Factor 1, collectively reflect the motivation of respondents. Specifically, whether PSAs prioritize other motives rather than ethical values. If they do, their moral motivation would be low. These items for moral motivation are *Auditors in my audit team are willing to break the rules in order to advance in the NAD; In my audit team, power is more important compared to other positive values; Auditors in my audit team consider authority as more important than fairness; In my audit team, achievement is valued more than commitment and loyalty; In my audit team personal success is more important than helping others; Auditors in my audit team strive to obtain power and control even if it compromises ethical values; Auditors in my audit team are willing to tell a lie to advance in the NAD; In order to control scarce resources, auditors in my audit team are willing to compromise their ethical values.*

The last component of EWC is a collective moral character, which consists of six items. These items load onto Factor 2 and measure the extent to which an individual undertakes a pre-determined course of action, which is ethical. The six items of Factor 2 are *Auditors in my audit team are confident that they can do the right thing when facing moral dilemmas; Auditors in my audit team generally would help a peer even if that person is not a very helpful person; Auditors in my audit team feel it is better to assume responsibility for a mistake; No matter how much auditors in my audit team are being provoked, they are always responsible for whatever they do; Auditors in my audit team feel in control over the outcomes when making decisions that concern ethical issues*; *When necessary, auditors in my audit team take charge and do what is morally right.*

Summarizing the above, subsequent to removing Items 5 and 9, the PCA results display a clean pattern and strong factor values that load well onto six factors, which represent the four main components (and their sub-components) in line with the postulated EWC model. This suggests that the ECI developed by Arnaud (2010) is appropriate to measure EWC in the context of Malaysian public sector audit profession.

4.2.1 Correlation matrix, mean and reliability. Having completed the PCA, further confirmations were performed to support the findings. Hence, the strength of the relationship between ECI items were assessed and presented in Table II. As Pallant (2010) recommends, the correlation matrix shows at least some correlations of $r = 0.3$ or greater. Furthermore, no item has a correlation (r) value of greater than 0.90 (Bagozzi *et al.*, 1991). Thus, there is no issue of singularity; hence, none of the cases in the current data set need to be deleted. In the same table, communality values, mean values and standard deviation values for each item of EWC is presented. From the table, it is clearly demonstrated that there is no issue of communality, as there is only one item with 0.465 communality value. Moreover, the average mean values are indicative of responses at the higher end of the scale. These responses suggest that, according to the PSAs, the EWC in the NAD tend to be ethical rather than unethical. For the standard deviation result, items are interrelated with each. This should be the case as the items are measuring the same construct, i.e. EWC.

Table II.
Correlation matrixa

	Correlations											
	ewc1	ewc2	ewc3	ewc4	ewc6	ewc7	ewc8	ewc10	ewc11	ewc12	ewc13	ewc14
ewc1	1	0.792**	0.727**	0.608**	0.393**	0.360**	0.420**	0.345**	0.189**	−0.048	0.114**	0.116**
ewc2	0.792**	1	0.758**	0.661**	0.406**	0.367**	0.467**	0.356**	0.200**	−0.027	0.127**	0.172**
ewc3	0.727**	0.758**	1	0.648**	0.413**	0.357**	0.507**	0.362**	0.256**	0.035	0.175**	0.211**
ewc4	0.608**	0.661**	0.648**	1	0.458**	0.402**	0.539**	0.430**	0.211**	0.007	0.174**	0.225**
ewc6	0.393**	0.406**	0.413**	0.458**	1	0.639**	0.554**	0.576**	0.139**	−0.001	0.086*	0.081*
ewc7	0.360**	0.367**	0.357**	0.402**	0.639**	1	0.568**	0.569**	0.150**	−0.050	0.132**	0.084*
ewc8	0.420**	0.467**	0.507**	0.539**	0.554**	0.568**	1	0.512**	0.155**	−0.022	0.122**	0.132**
ewc10	0.345**	0.356**	0.362**	0.430**	0.576**	0.569**	0.512**	1	0.052	−0.124**	0.061	0.038
ewc11	0.189**	0.200**	0.256**	0.211**	0.139**	0.150**	0.155**	0.052	1	0.490**	0.631**	0.618**
ewc12	−0.048	−0.027	0.035	0.007	−0.001	−0.050	−0.022	−0.124**	0.490**	1	0.530**	0.521**
ewc13	0.114**	0.127**	0.175**	0.174**	0.086*	0.132**	0.122**	0.061	0.631**	0.530**	1	0.744**
ewc14	0.116**	0.172**	0.211**	0.225**	0.081*	0.084*	0.132**	0.038	0.618**	0.521**	0.744**	1
ewc15	0.275**	0.270**	0.310**	0.330**	0.196**	0.182**	0.248**	0.158**	0.622**	0.363**	0.615**	0.628**
ewc16	0.397**	0.384**	0.408**	0.404**	0.338**	0.354**	0.408**	0.304**	0.114**	−0.100**	0.076*	0.062
ewc17	0.390**	0.390**	0.444**	0.477**	0.341**	0.363**	0.408**	0.317**	0.160**	−0.015	0.089*	0.119**
ewc18	0.342**	0.322**	0.413**	0.402**	0.299**	0.325**	0.374**	0.329**	0.117**	−0.075*	0.054	0.095**
ewc19	0.342**	0.326**	0.366**	0.386**	0.235**	0.227**	0.299**	0.219**	0.065	−0.074*	0.019	0.045
ewc20	0.438**	0.460**	0.463**	0.503**	0.410**	0.410**	0.448**	0.421**	0.203**	−0.042	0.163**	0.196**
ewc21	0.239**	0.181**	0.227**	0.204**	0.126**	0.142**	0.183**	0.110**	0.352**	0.163**	0.298**	0.285**
ewc22	0.216**	0.188**	0.225**	0.242**	0.152**	0.181**	0.183**	0.132**	0.424**	0.230**	0.416**	0.384**
ewc23	0.224**	0.203**	0.238**	0.237**	0.152**	0.199**	0.202**	0.131**	0.480**	0.271**	0.424**	0.432**
ewc24	0.141**	0.160**	0.208**	0.199**	0.129**	0.111**	0.166**	0.084*	0.408**	0.262**	0.391**	0.369**
ewc25	0.226**	0.214**	0.283**	0.255**	0.176**	0.200**	0.236**	0.161**	0.466**	0.246**	0.419**	0.439**
ewc26	0.249**	0.210**	0.289**	0.240**	0.177**	0.185**	0.239**	0.184**	0.473**	0.234**	0.401**	0.405**
ewc27	0.245**	0.220**	0.333**	0.259**	0.187**	0.133**	0.207**	0.149**	0.396**	0.175**	0.317**	0.323**
ewc28	0.263**	0.223**	0.293**	0.239**	0.145**	0.160**	0.183**	0.121**	0.393**	0.189**	0.326**	0.323**
ewc29	0.185**	0.177**	0.221**	0.190**	0.273**	0.246**	0.256**	0.282**	0.079*	0.027	0.046	0.025
ewc30	0.359**	0.370**	0.357**	0.370**	0.335**	0.352**	0.333**	0.348**	0.189**	0.051	0.135**	0.160**
ewc31	0.456**	0.450**	0.515**	0.497**	0.373**	0.389**	0.456**	0.371**	0.230**	0.013	0.159**	0.191**
ewc32	0.469**	0.469**	0.549**	0.536**	0.383**	0.400**	0.471**	0.393**	0.267**	0.026	0.207**	0.201**
ewc33	0.433**	0.467**	0.505**	0.496**	0.407**	0.376**	0.457**	0.368**	0.240**	0.006	0.188**	0.187**
ewc34	0.379**	0.401**	0.449**	0.415**	0.321**	0.287**	0.420**	0.341**	0.122**	−0.055	0.117**	0.143**

Notes: **Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed)

(*continued*)

Table II.

	Correlations											
	ewc15	ewc16	ewc17	ewc18	ewc19	ewc20	ewc21	ewc22	ewc23	ewc24	ewc25	ewc26
ewc1	0.275**	0.397**	0.390**	0.342**	0.342**	0.438**	0.239**	0.216**	0.224**	0.141**	0.226**	0.249**
ewc2	0.270**	0.384**	0.390**	0.322**	0.326**	0.460**	0.181**	0.188**	0.203**	0.160**	0.214**	0.210**
ewc3	0.310**	0.408**	0.444**	0.413**	0.366**	0.463**	0.227**	0.225**	0.238**	0.208**	0.283**	0.289**
ewc4	0.330**	0.404**	0.477**	0.402**	0.386**	0.503**	0.204**	0.242**	0.237**	0.199**	0.255**	0.240**
ewc6	0.196**	0.338**	0.341**	0.299**	0.235**	0.410**	0.126**	0.152**	0.152**	0.129**	0.176**	0.177**
ewc7	0.182**	0.354**	0.363**	0.325**	0.227**	0.410**	0.142**	0.181**	0.199**	0.111**	0.200**	0.185**
ewc8	0.248**	0.408**	0.408**	0.374**	0.299**	0.448**	0.183**	0.183**	0.202**	0.166**	0.236**	0.239**
ewc10	0.158**	0.304**	0.317**	0.329**	0.219**	0.421**	0.110**	0.132**	0.131**	0.084*	0.161**	0.184**
ewc11	0.622**	0.114**	0.160**	0.117**	0.065	0.203**	0.352**	0.424**	0.480**	0.408**	0.466**	0.473**
ewc12	0.363**	−0.100**	−0.015	−0.075*	−0.074*	−0.042	0.163**	0.230**	0.271**	0.262**	0.246**	0.234**
ewc13	0.615**	0.076*	0.089*	0.054	0.019	0.163**	0.298**	0.416**	0.424**	0.391**	0.419**	0.401**
ewc14	0.628**	0.062	0.119**	0.095**	0.045	0.196**	0.285**	0.384**	0.432**	0.369**	0.439**	0.405**
ewc15	1	0.202**	0.300**	0.229**	0.161**	0.338**	0.451**	0.535**	0.562**	0.409**	0.553**	0.580**
ewc16	0.202**	1	0.583**	0.491**	0.386**	0.409**	0.264**	0.210**	0.200**	0.137**	0.227**	0.247**
ewc17	0.300**	0.583**	1	0.699**	0.585**	0.555**	0.253**	0.254**	0.256**	0.147**	0.266**	0.286**
ewc18	0.229**	0.491**	0.699**	1	0.671**	0.574**	0.214**	0.164**	0.207**	0.131**	0.226**	0.251**
ewc19	0.161**	0.386**	0.585**	0.671**	1	0.545**	0.171**	0.141**	0.169**	0.122**	0.152**	0.176**
ewc20	0.338**	0.409**	0.555**	0.574**	0.545**	1	0.214**	0.220**	0.249**	0.171**	0.249**	0.269**
ewc21	0.451**	0.264**	0.253**	0.214**	0.171**	0.214**	1	0.598**	0.592**	0.332**	0.459**	0.560**
ewc22	0.535**	0.210**	0.254**	0.164**	0.141**	0.220**	0.598**	1	0.825**	0.497**	0.567**	0.608**
ewc23	0.562**	0.200**	0.256**	0.207**	0.169**	0.249**	0.592**	0.825**	1	0.510**	0.592**	0.632**
ewc24	0.409**	0.137**	0.147**	0.131**	0.122**	0.171**	0.332**	0.497**	0.510**	1	0.587**	0.534**
ewc25	0.553**	0.227**	0.266**	0.226**	0.152**	0.249**	0.459**	0.567**	0.592**	0.587**	1	0.756**
ewc26	0.580**	0.247**	0.286**	0.251**	0.176**	0.269**	0.560**	0.608**	0.632**	0.534**	0.756**	1
ewc27	0.501**	0.261**	0.336**	0.303**	0.223**	0.281**	0.510**	0.491**	0.496**	0.421**	0.597**	0.756**
ewc28	0.498**	0.275**	0.333**	0.285**	0.256**	0.271**	0.544**	0.537**	0.552**	0.405**	0.572**	0.721**
ewc29	0.141**	0.274**	0.204**	0.214**	0.140**	0.216**	0.109**	0.051	0.067	−0.032	0.009	0.029
ewc30	0.269**	0.301**	0.329**	0.326**	0.280**	0.459**	0.169**	0.253**	0.274**	0.198**	0.237**	0.237**
ewc31	0.336**	0.442**	0.492**	0.459**	0.355**	0.519**	0.274**	0.228**	0.251**	0.146**	0.312**	0.338**
ewc32	0.385**	0.470**	0.527**	0.492**	0.407**	0.551**	0.234**	0.293**	0.293**	0.163**	0.342**	0.345**
ewc33	0.349**	0.415**	0.455**	0.464**	0.369**	0.494**	0.201**	0.249**	0.238**	0.175**	0.255**	0.271**
ewc34	0.252**	0.371**	0.385**	0.393**	0.300**	0.442**	0.224**	0.203**	0.191**	0.099**	0.201**	0.226**

(*continued*)

Table II.

	Correlations							
	ewc27	ewc28	ewc29	ewc30	awc31	ewc32	ewc33	ewc34
ewc1	0.245**	0.263**	0.185**	0.359**	0.456**	0.469**	0.433**	0.379**
ewc2	0.220**	0.223**	0.177**	0.370**	0.450**	0.469**	0.467**	0.401**
ewc3	0.333**	0.293**	0.221**	0.357**	0.515**	0.549**	0.505**	0.449**
ewc4	0.259**	0.239**	0.190**	0.370**	0.497**	0.536**	0.496**	0.415**
ewc6	0.187**	0.145**	0.273**	0.335**	0.373**	0.383**	0.407**	0.321**
ewc7	0.133**	0.160**	0.246**	0.352**	0.389**	0.400**	0.376**	0.287**
ewc8	0.207**	0.183**	0.256**	0.333**	0.456**	0.471**	0.457**	0.420**
ewc10	0.149**	0.121**	0.282**	0.348**	0.371**	0.393**	0.368**	0.341**
ewc11	0.396**	0.393**	0.079*	0.189**	0.230**	0.267**	0.240**	0.122**
ewc12	0.175**	0.189**	0.027	0.051	0.013	0.026	0.006	−0.055
ewc13	0.317**	0.326**	0.046	0.135**	0.159**	0.207**	0.188**	0.117**
ewc14	0.323**	0.323**	0.025	0.160**	0.191**	0.201**	0.187**	0.143**
ewc15	0.501**	0.498**	0.141**	0.269**	0.336**	0.385**	0.349**	0.252**
ewc16	0.261**	0.275**	0.274**	0.301**	0.442**	0.470**	0.415**	0.371**
ewc17	0.336**	0.333**	0.204**	0.329**	0.492**	0.527**	0.455**	0.385**
ewc18	0.303**	0.285**	0.214**	0.326**	0.459**	0.492**	0.464**	0.393**
ewc19	0.223**	0.256**	0.140**	0.280**	0.355**	0.407**	0.369**	0.300**
ewc20	0.281**	0.271**	0.216**	0.459**	0.519**	0.551**	0.494**	0.442**
ewc21	0.510**	0.544**	0.109**	0.169**	0.274**	0.234**	0.201**	0.224**
ewc22	0.491**	0.537**	0.051	0.253**	0.228**	0.293**	0.249**	0.203**
ewc23	0.496**	0.552**	0.067	0.274**	0.251**	0.293**	0.238**	0.191**
ewc24	0.421**	0.405**	−0.032	0.198**	0.146**	0.163**	0.175**	0.099**
ewc25	0.597**	0.572**	0.009	0.237**	0.312**	0.342**	0.255**	0.201**
ewc26	0.756**	0.721**	0.029	0.237**	0.338**	0.345**	0.271**	0.226**
ewc27	1	0.798**	0.046	0.220**	0.355**	0.358**	0.298**	0.250**
ewc28	0.798**	1	0.009	0.206**	0.325**	0.354**	0.301**	0.246**
ewc29	0.046	0.009	1	0.370**	0.337**	0.314**	0.336**	0.256**
ewc30	0.220**	0.206**	0.370**	1	0.580**	0.549**	0.492**	0.429**
ewc31	0.355**	0.325**	0.337**	0.580**	1	0.742**	0.662**	0.580**
ewc32	0.358**	0.354**	0.314**	0.549**	0.742**	1	0.782**	0.586**
ewc33	0.298**	0.301**	0.336**	0.492**	0.662**	0.782**	1	0.575**
ewc34	0.250**	0.246**	0.256**	0.429**	0.580**	0.586**	0.575**	1

Table III presents the Cronbach's alpha results. The reliability of the construct, EWC is 0.93 and its four components, namely: collective moral sensitivity, collective moral judgment, collective moral motivation and collective moral character have reliability values of 0.89, 0.81, 0.91 and 0.84, respectively. EWC and its components were found to possess high internal reliability.

5. Discussion and conclusion

This research uses PCA to test whether the ECI developed by Arnaud (2010) to measure EWC in the private sector can be applied to a public sector setting in a developing country. Thus, this study uses the sample of PSAs in the NAD of Malaysia. After following all the necessary procedures and tests of PCA, the results show that the reliability of the EWC construct and its components was high. This finding gives support to Arnaud's (2010) model. Furthermore, the PCA results only found two items out of the 34 items of ECI to be problematic. By removing these two items, six factors were generated that corresponded to the four main components (along with their sub-components) of Arnaud's (2010) PPM. Therefore, this study provides empirical evidence that Arnaud's (2010) ECI is, indeed, applicable and can be used to measure EWC in the public sector of a developing country.

As there are limited studies that tests Arnaud's (2010) ECI in varying contexts, this study validates that the ECI can be applied, not only to a developing country's sample but also to a completely different sector, i.e. the public sector. These findings would be useful to researchers, who are interested to study EWC, regardless of whether they are in developed or developing countries. As the original ECI was developed for the context of the private sector in a developing country; the findings of this study extend its application to the public sector in a developing country. Consequently, the ECI by Arnaud (2010), which is used to measure EWC, can be applied to both the public and private sectors in developed and in developing countries.

Generally, this study has an extremely focused objective, which is to determine whether the components of EWC as proposed by Arnaud (2010) can be derived by using PCA on a different sample. This study neither analyze the level of EWC of the PSA in Malaysia nor does it test causal relationships in association with EWC. The actual EWC in the NAD and associations between EWC and other factors are left for future studies. By finding, EWC can be measured in the public sector of a developing country opens many avenues of research, far more than those suggested above.

Table III.
Reliability statistics

Variables	Cronbach's alpha		No. of items
EWC		0.93	32
EWC-component			
Collective moral sensitivity	0.89		8
Collective moral judgment	0.81		10
Collective moral motivation	0.91		8
Collective moral character	0.84		6

Notes

1. H.E. Tan Sri Dato' Setia Haji Ambrin Bin Buang was still the AG at the time of questionnaire distribution.
2. "Singularity occurs when one independent variable is actually a combination of other independent variables e.g. when both subscale scores and the total score of a scale are included" (Pallant, 2010, p. 151). "A matrix is said to be singular when off-diagonal variables are perfectly correlated." (Ferguson and Cox, 1993, p. 87).
3. Item 5 is "Auditors in my audit team do not pay attention to ethical issues."
4. Item 9 is "Others' misfortunes do not usually affect auditors in my audit team."

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