

# A confirmatory factor analytic study of an ethical climate measure in Zimbabwe



## Authors:

Nelson Gwamanda<sup>1</sup>   
Bright Mahembe<sup>1</sup> 

## Affiliations:

<sup>1</sup>Department of Industrial Psychology, Faculty of Economic and Management Sciences, University of the Western Cape, Cape Town, South Africa

## Corresponding author:

Bright Mahembe,  
bmahembe@uwc.ac.za

## Dates:

Received: 15 Nov. 2022

Accepted: 10 Mar. 2023

Published: 30 May 2023

## How to cite this article:

Gwamanda, N., & Mahembe, B. (2023). A confirmatory factor analytic study of an ethical climate measure in Zimbabwe. *SA Journal of Human Resource Management/SA Tydskrif vir Menslikehulpbronbestuur*, 21(0), a2184.  
<https://doi.org/10.4102/sajhrm.v21i0.2184>

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**Orientation:** A psychometrically sound ethical climate instrument helps in establishing the appropriate ethical values important for positive organisational outcomes.

**Research purpose:** The primary goal of the present study was to test the psychometric properties of the ethical climate questionnaire on a Zimbabwean sample.

**Motivation for the study:** The ethical climate questionnaire (ECQ) is one of the questionnaires used to measure ethical climate. There is a need to assess the reliability and construct validity of the ECQ on a Zimbabwean sample owing to the lack of studies on its psychometric properties in this setting.

**Research design, approach and method:** A quantitative design was adopted in this study. A non-probability sample consisting of 304 participants from selected security organisations was studied. The ECQ was used to measure ethical climate and its reliability was determined by calculating Cronbach alpha coefficients for each of the survey sub-scales. Construct validity was assessed through confirmatory factor analyses (CFA).

**Main findings:** The ECQ demonstrated a reasonable model fit. Moderately high reliability coefficients were recorded on all the subscales of the ECQ with the caring subscale having a Cronbach alpha of 0.79, the law and code subscale, 0.86, rules, 0.85, 0.86 for instrumental and the independence subscale having 0.87.

**Practical implications:** The ECQ has demonstrated acceptable reliability coefficients and the subscales are uni-dimensional. Although most of the psychometric properties of the ECQ are acceptable including the confirmatory factor analysis of the ECQ, the underlying theoretical structure might have to be re-examined for its alignment with the values in the Zimbabwean context.

**Contribution/value-add:** The study promotes the use of reliable and valid instruments in Zimbabwe by confirming the psychometric properties of the ethical climate questionnaire.

**Keywords:** ethical climate; Ethical Climate Questionnaire; reliability; confirmatory factor analysis; discriminant validity; construct validity.

## Introduction

Ethical climate is described as a contextual factor reflecting an employee's level of awareness of their moral obligation (Wang & Hsieh, 2012). It alludes to the beliefs and normative values shared by employees over and above their acceptance of the vision and mission of their employing organisation (Treviño & Weaver, 1998). In other words, the ethical climate stipulates a set of shared formal and informal guidelines that govern the existence of ethical behaviour in an organisation (Teresi et al., 2019). The ethical climate, by implication, arguably provides the written and unwritten expectations that have a considerable influence on the employer-employee relationship. In recent years, researchers and practitioners have focused their attention on ethical climate because of its perceived influence on individual and organisational outcomes (Demirtas et al., 2017; Newman et al., 2017). An ethical climate propagates the development of trustworthiness among employees, which results in the exhibition of positive attitudes towards the organisation (Farouk & Jabeen, 2018).

Several studies detail the benefits of an ethical organisational climate (Farouk & Jabeen, 2018; Teresi et al., 2019). Ethical climate has been found to have a positive influence on proactive customer service performance when employees go the extra mile in assisting customers which, in turn, increases customer satisfaction (Moon & Choi, 2014). It has been linked with work attitudes including job satisfaction and organisational commitment (Abou Hashish, 2017; Numminen et al., 2015),

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organisational citizenship behaviours (Pagliaro et al., 2018), trust in supervisors (Newman et al., 2017), perceived organisational support and positive affect (Hsieh & Wang, 2016), organisational identification (DeConinck, 2011) and intention to participate in training and career commitment (Kang et al., 2011). Hsieh and Wang (2016) report a strong negative relationship between ethical climate and organisational deviance mediated by job satisfaction and perceived organisational support. Wolmarans (2014) submits that ethical climate is negatively linked to counterproductive work behaviours such as lax performance, tardiness, absenteeism and turnover, which may all be linked to organisational performance. Ethical climate has also been reported to have a strong negative relationship with corruption (Gorsira et al., 2018), an important organisational outcome given the rise in cases of unethical workplace conduct. Numminen et al. (2015) document that ethical climate negatively affects turnover intentions by reducing conflict and role ambiguity among employees. In addition, an ethical climate is likely to enhance employee job performance (Shin et al., 2015; Teresi et al., 2019). The positive outcomes associated with ethical climate foster competitive advantage and return on investment for the organisation.

Ethical climate mediates the relationship between leadership style and organisational outcomes, for example, ethical leadership and the financial performance of organisations (Shin et al., 2015), benevolent leadership and employees' organisational citizenship behaviour (Ghosh, 2015), instrumental leadership and employees' work attitudes (Mulki et al., 2009) and authoritarian leadership and team identification (Cheng & Wang, 2015). Derin et al. (2022) put out that ethical climate plays a mediatory role between knowledge sharing and innovative work behaviour. Evidence from Otaye-Ebede et al. (2020) shows that ethical climate also mediates the relationship between workplace spirituality and organisational citizenship behaviours and innovative workplace behaviours. Ethical climate attenuates or accentuates how individual and team level constructs affect employee attitudes and behaviour. Overall, studies demonstrate the importance of ethical climate in influencing employee attitudes and organisational success.

Despite the importance of ethical climate in ensuring organisational success, studies to validate its measurement in the Zimbabwean context are relatively scarce. It is important to note that despite a number of instruments developed to measure ethical climate, none of them has been validated for use in Zimbabwe. These include, but are not limited to, the following: the Ethical Climate Questionnaire (ECQ) (Victor & Cullen, 1987); the global ethical climate six-item scale developed by Mayer et al. (2010); the Ethical Climate Index Arnaud (2010); Schwepker's (2013) scale; the Ethical Work Climate (EWC) scale developed by Babin et al. (2000); a four-item measure developed by Jaramillo et al. (2013), a two-item measure developed by Stewart et al. (2011), a six-item scale developed by Luria and Yagil (2008) and the Hospital

Ethical Climate Scale (Schluter et al., 2008) among others. While several instruments have been developed, the ECQ developed by Victor and Cullen (1988) is one of the most widely used measures.

The ECQ was originally developed in the USA and tested on a sample of MBA university students as well as managers and other employees in the manufacturing sector (Victor & Cullen, 1988). It was further tested for its factor structure and transportability in various settings that include the USA, Japan, Singapore and China (Shafer, 2015) as well as Australia (Shacklock et al., 2011). In the South African context, the measure has been used in several studies to measure ethical climate among other variables (Wolmarans, 2014). These studies did not specifically assess the reliability and construct validity of the measure. There are no studies that have been conducted in the Zimbabwean context using the ECQ.

## Objectives

The main objective of the study was to determine the reliability and construct validity of the 26-item ECQ by Victor and Cullen (1988) on a Zimbabwean sample. The specific objectives of the study were to confirm the:

- reliability of the ECQ by computing the Cronbach alpha reliability coefficients for each of the subscales
- construct validity of the ECQ by testing the first- and second-order model goodness-of-fit using confirmatory factor analysis (CFA)
- discriminant validity of the ECQ.

## Contribution to the field

Ethical climate has a significant influence on employees' work engagement where it acts as an organisational resource to bring about positive change and thereby increase organisational effectiveness (Mitonga-Monga & Cilliers, 2015). The presence of an ethical climate reflects an organisation's processes, procedures, policies and practices, with moral consequences that may help employees in the execution of their daily work (Mitonga-Monga, 2018). An ethical caring climate in particular is believed to be associated with lower organisational deviance (Pagliaro et al., 2018; Tastan, 2019). Of importance to observe is that ethical climates reflect the climate that is adopted by management as it is leaders who define what ethical behaviour is and how ethical issues should be handled within organisations. The importance of ethical climate in influencing positive organisational outcomes highlights the importance of the measurement thereof. The ECQ was identified as a widely used measures of ethical climate. However, this measure was developed in America. It was therefore deemed necessary to ascertain the reliability and validity of the instrument within the Zimbabwean context. This study adds to the body of knowledge on the psychometric properties of the ECQ.

## Ethical climate theory and the Ethical Climate Questionnaire

Ethical climates arise when leaders develop organisational policies and practices that exert significant influence on the ethical decision making of organisational members and their attitudes and behaviours at work (Schminke et al., 2007; Simha & Cullen, 2012). The origins of ethical climate theory are attributed to Victor and Cullen (1988) who defined an ethical climate as the prevailing perceptions of typical organisational practices and procedures that have ethical content. It is characterised by the processes through which organisations implement and enforce ethical rules and policies to stimulate ethical behaviours and punish unethical behaviours (Schwepker, 2013). Olson (1998) suggested that ethical climate creates an environment that enhances ethical decision making and behaviours.

Arnaud (2010) broadens the definition of ethical climate by defining it as a moral concept that reflects the content and strength of the prevalent ethical values, norms, attitudes, feelings and behaviours of the members of a social system. Arnaud (2010) developed the theoretical model of EWC as a critique of Victor and Cullen's (1987, 1988) framework, questioning whether it was 'comprehensive enough to capture the true breadth of the ethical climate construct'. While comprising the moral reasoning dimension that formed the basis of Victor and Cullen's model, Arnaud also incorporated dimensions of Rest's (1984, 1986) four-component cognitive development model, these being the dimensions of moral sensitivity, moral character, and collective moral motivation. However, Arnaud's model lacks sufficient empirical support partly because of the popularity of Victor and Cullen's conceptualisation.

Victor and Cullen (1987) developed a theoretical stratum of ethical climate that is grounded in Kohlberg's (1984) theory of cognitive moral development that proposed that individual moral development is person- and context-specific. Victor and Cullen (1987) adapted this model to an organisational setting (Buchan, 2009) that comprises two dimensions. According to this model, the first dimension is a classification of the ethical climate based on the moral development of the work group, these being egoism, benevolence and principled. Furthermore, there are three loci of analysis that comprise the second dimension, these being the individual, local and cosmopolitan. When these dimensions are cross-classified together they form nine hypothetical approaches to ethical climate (Victor & Cullen, 1987). This nine-cell typology (Victor & Cullen, 1987) of ethical climates determines the condition of an organisation's ethical climate and how ethical issues are dealt with.

The individual locus of analysis identifies the sources of analysis as residing in the individual such as self-interest (Grobler, 2016; Victor & Cullen, 1988). At the individual level of the criterion principle, morals are self-chosen (one's morals), which is the principle loci. The local locus of analysis on the other hand identifies the sources of analysis

as pertaining to the organisational collective (e.g. company profit). The basis of morals is founded in the organisation at the local locus (its rules and regulations). (principle loci). The cosmopolitan locus of analysis considers those outside the organisation as social responsibility (Grobler, 2016; Victor & Cullen, 1988). Moreover, the source of morals is found outside the organisation (laws and professional codes of ethics) at the cosmopolitan locus. In the context of the egoism criterion, an individual locus of analysis shows a climate that upholds self-interest while the local level of analysis considers the organisation's interests (profit). Finally, the cosmopolitan locus of analysis considers society's best interest (efficiency) (Victor & Cullen, 1988; Wyld & Jones, 1997). Benevolence aligns with the friendship at the individual level, team interest at the local level and the social responsibility at the cosmopolitan level as indicated in Table 1.

As a result of insufficient reliable empirical support uniformly across all the nine theoretical ethical climate types, Victor and Cullen (1988) refined the original nine types into five climates for which empirical support was found (Victor & Cullen, 1988). The five types of ethical climates are caring, law and code, rules, instrumental and independence (Martin & Cullen, 2006; Victor & Cullen, 1988).

A *caring* climate is characterised by an environment in which employees are sincerely interested in the well-being of each other (Nafei, 2015). This genuine and sincere attitude is directed towards individuals within and outside the organisation who are likely to be affected by their decisions. The caring dimension is associated with the benevolence ethical criteria at the individual level (Nafei, 2015). A *law and code* climate entails a context where employees are expected to abide by the laws, codes and professional standards of the organisation and government (Nafei, 2015). The law and code dimension is associated with the principle criteria at the cosmopolitan level (Grobler, 2016). A *rules* climate is associated with employees strictly obeying the rules and procedures of the organisation or their subunit (Victor & Cullen, 1988). This dimension is associated with the principled ethical criteria at a local level (Victor & Cullen, 1988). An *instrumental* climate focuses on the fulfilment of individual interests. It pertains to the extent to which employees look out for their self-interest in relation to company interest and that results in it being regarded as a negative type of climate (Nafei, 2015). An *independence* climate allows employees to follow and be guided by their own moral beliefs when making decisions (Nafei, 2015). Attention is given to the individual's convictions and

**TABLE 1:** Ethical climate types.

Ethical criterion	Individual	Local	Cosmopolitan
<b>Level of analysis</b>			
Egoism	Self-interest	Company profit	Efficiency
Benevolence	Friendship	Team interest	Social responsibility
Principle	Personal morality	Company rules and procedures	Laws and professional codes

Source: Adapted from Victor, B., & Cullen, J.B. (1988). The organisational bases of ethical work climates. *Administrative Science Quarterly*, 33(1), 101–125. <https://doi.org/10.2307/2392857>.

personal morality. An independence climate is associated with principal criteria at the individual level (Nafei, 2015).

While the aforementioned suggests distinctions between typologies, organisations generally encompass multiple climate types because of the fact that they comprise diverse facets. Furthermore, Victor and Cullen (1987, 1988) stress that the climate type reflected by an organisation is linked to the ethical dilemmas typically faced in that organisation.

## The Ethical Climate Questionnaire

The ECQ was developed by Victor and Cullen (1987) as a measure of ethical organisational climate and based on the typology presented here as established by theory. Barnett and Vaicys (2000) describe the ECQ 'as a typology based on ethical philosophy as well as the sociological theory of reference groups'. The ECQ assesses the perceptions of organisational members on how they deal with ethical choices (Appelbaum et al., 2005). As indicated, the original ECQ incorporated nine ethical climate types established by theory. This version required respondents to specify how precisely how each of 26 items describes their work climate on a six-point Likert-type response scale (Victor & Cullen, 1987). The ECQ thus regards respondents as observers, reporting on but not evaluating the perceived organisational climate. Ten additional items were added to the scale when Cullen et al. (1993) performed a review, which resulted in very strong reliability and validity. Cullen et al. (1993, p. 673) reported that the 36-item version of the questionnaire yielded seven climate types as the benevolence, climates of friendship and team interest loaded on the same factor thereby prompting the authors to conclude that 'the questionnaire lacks the precision necessary to discriminate between these two climates'. In addition, social responsibility was found to be a discrete climate in the same study. The 26-item version was also chosen because it yielded more ethical climates that are easier to interpret than the 36-item version as argued by Grobler (2016). While limitations have been identified in Victor and Cullen's (1987, 1988) conceptualisation and framework of measurement (Salamon & Mesko, 2016), the ECQ remains a preferred measure of ethical climate because it has been widely validated (Dark & Rix, 2015). This provides a sound basis for the comparison of findings between studies.

The 26-item version of the ECQ evaluating five climate types was used in this study. The scale assesses organisational climate against the five dimensions of caring, law and code, rules, instrumental and independence. Scale items are accompanied by six-point Likert-type response scale ranging from disagree strongly (1) to agree strongly (6). Victor and Cullen (1988) found evidence of acceptable reliability for the 26-item ECQ. The reliability coefficients ranged from 0.73 to 0.81, which are generally acceptable except for the independence dimension whose Cronbach's alpha was 0.65 (Tabachnick & Fidel, 2007). Wimbush et al. (1997) confirmed these findings pertaining to the reliability for the dimensions, which ranged from  $\alpha = 0.69$  to  $\alpha = 0.92$ . The independence

dimension also had a relatively lower reliability ( $\alpha = 0.69$ ) that was, however, sufficient to establish internal consistency. Victor and Cullen (1988) reported evidence of convergence validity in the parameter estimates and *t*-values of the ECQ. The measure was developed in the USA and typically utilised in Japan, Singapore, China and Australia. While the psychometric properties have been established for these countries, evidence of use in African countries such as Zimbabwe is not available.

This study, therefore, assessed the reliability and construct validity of the ECQ on a sample of participants from selected organisations in Zimbabwe.

## Research design

The purpose of this study was to determine the psychometric properties of the ECQ within the Zimbabwean context. In order to realise the objectives of the study, a quantitative research design was employed. Data were gathered by administering the ECQ, which is a self-administered survey, to employees within various Zimbabwean organisations.

## Sample

The population was made up of 5000 private security employees drawn from 10 companies. The overall sample of the study consisted of 304 participants drawn from selected security organisations in Zimbabwe. The response rate was 76%. Females constituted 28.9% while males constituted 69.9%. The majority (42.4%) fell in the 31–40 age category and 28.9% fell within the 41–50 age category. All of the respondents were black Africans. A total of 89.1% of the respondents had an ordinary level certificate (equivalent of grade 11) as their highest level of education. A total of 64.5% of the participants were permanent employees while 24.7% were on contract.

## Measuring instrument

Ethical climate was measured using the 26-item version of the ECQ (Victor & Cullen, 1988). The questionnaire has five subscales for measuring caring; 7 items, law and code; 4 items, rules; 4 items; 7 items for instrumental and independence with 4 items. While evidence could not be found that the ECQ had been utilised in studies within Zimbabwe, the internal reliability of the subscales had been determined within the South African context. These ranged from  $\alpha = 0.79$ – $0.87$  as reported by Wolmarans (2014). Example items are as follows: Caring: 'What is best for everyone in the company is a major consideration here'; Law and code: 'People are expected to comply with the law and professional standards over and above other considerations'; Rules: 'It is very important to follow the company's rules and procedures here'; and on Independence: 'In this company, people are expected to follow their own personal and moral beliefs'. An example item for the instrumental subscale is: 'In this organisation, people protect their own interests above all else'.

## Research procedure and ethical considerations

The questionnaires were distributed face-to-face through the human resources management (HRM) and operations units of the organisations. These two departments (HRM and operations) closely assisted in the study because they had easy access to all the employees in the organisations. Convenience sampling was used and only willing participants took part. The participants were given 2 weeks to complete the questionnaires. The questionnaire was in English, and most of the employees were proficient in English as the minimum recruitment criteria are five ordinary-level subjects, which include English. The researcher personally collected the questionnaires directly from the participants to ensure confidentiality. Participants were assured that their responses would be treated with anonymity and that no names would be revealed in the study. Informed consent was obtained from the respondents before they completed the questionnaires and voluntary participation in the study was emphasised.

## Statistical analysis

The following analyses were conducted in this study: (1) Item analysis, to determine the reliability of the scales using the reliability procedure in the SPSS program (corrected-item statistics, inter-item correlations and scale-if-item is deleted); (2) Exploratory factor analysis (EFA) (using the principal axis factoring method and direct oblimin rotation), to ascertain scale dimensionality; and (3) structural equation modelling (SEM) to determine the construct validity of the ECQ.

## Structural equation modelling

Structural equation modelling is a collection of statistical techniques that allow a set of relationships representing causal hypotheses between one or more independent and dependent variables to be evaluated (Tabachnick & Fidell, 2013). It is a large sample technique that helps in explaining the patterns of covariances found among variables in terms of hypothesised relationships suggested by the measurement thereof and structural models (Diamantopoulos & Siguaw, 2000). Structural equation modelling is conducted to, firstly, determine if the measure reflects the intended constructs through CFA and to evaluate the measurement properties of psychological measures. Secondly, SEM allows for the specification and testing of path models. Lastly, SEM simultaneously assesses the quality of measurement and examines the predictive relationships among constructs by performing confirmatory factor analysis and path analysis at the same time. Structural equation modelling was used to perform a confirmatory factor analysis on the observed inter-item covariance matrix using robust maximum likelihood estimation.

## Confirmatory factor analysis

The CFA is a technique by which hypotheses or theories relating to the structure underlying a set of variables are tested (Pallant, 2016). The CFA serves to confirm whether a set of measures (the observed data) are related to specific latent

variables according to the form described in the measurement model (Blaikie, 2003) by producing a series of fit indices. These indices allow the researcher to establish how well the measurement model with its parameter estimates fits the observed data. The measurement model describes how the indicator variables are meant to reflect the specific underlying latent variables that they were earmarked to represent. The goodness-of-fit of the measurement model was tested with the CFA technique available in LISREL 8.80 (Jöreskog & Sörbom, 2006). In CFA, the number of factors or latent variables and the pattern of indicator-factor loadings are specified in advance. The pre-specified factor solution is evaluated in terms of how well it reproduces the sample covariance matrix of the measured variables (Brown, 2006).

## The evaluation of the Ethical Climate Questionnaire first-order model

The evaluation of the ECQ CFA models was based on the following indices: the root means square error of approximation (RMSEA); root mean squared residual (RMR); the goodness-of-fit index (GFI); normed fit index (NFI); non-normed fit index (NNFI); comparative fit index (CFI); incremental fit index (IFI) and the relative fit index (RFI).

The RMSEA is the most informative fit indices that tests for the closeness of fit in the null hypothesis (Diamantopoulos & Siguaw, 2000; Schumacker & Lomax, 2016). The RMSEA values below 0.05 are suggestive of a good fit; those between 0.05 and under 0.08 suggest reasonable fit; values between 0.08 and 0.10 denote mediocre fit while values > 0.10 indicate poor fit (Diamantopoulos & Siguaw, 2000).

The RMR presents the average value of the difference between the sample covariance (variance) and a fitted (model-implied) covariance (variance). In other words, it is a summary measure of fitted residuals (Diamantopoulos & Siguaw, 2000; Hair et al., 2010).

The GFI depicts how closely the model comes to perfectly reproducing the observed covariance matrix. The GFI is usually recommended as the most reliable measure of the model fit (Diamantopoulos & Siguaw, 2000). The values of the GFI greater than 0.90 are usually considered as indicating an acceptable fit (Diamantopoulos & Siguaw, 2000).

For model comparative purposes, the RFI; IFI; the Bentler-Bonett NNFI; the Bentler-Bonett NFI and the CFI (Diamantopoulos & Siguaw, 2000; Schumacker & Lomax, 2016) are recommended. Values greater than 0.90 are usually regarded as acceptable (Diamantopoulos & Siguaw, 2000).

## Ethical considerations

The researcher received ethical clearance from the Human and Social Sciences Ethics Committee of the University of the Western Cape to conduct the study. The researcher was granted permission from the organisations from which participants were drawn.

## Results

### Missing values

Missing values were addressed through the use of multiple imputations (Jöreskog & Sörbom, 2006). This technique allowed the missing values to be substituted with values derived from averages with the aid of simulation (Jöreskog & Sörbom, 2006; Rubin, 1987). The final sample size was 304; no cases were deleted.

### Item analysis

Using the SPSS version 28 (SPSS Inc., 2021), item and dimensional analyses were performed on the items of the ECQ. All of the internal consistency coefficients of the ECQ were above the acceptable cut-off level ( $\alpha > 0.70$ ) (Nunnally & Bernstein, 1994) (see Table 2). The five ECQ subscales were found to be uni-dimensional and the variance explained by each of the factors was generally above 50% (see Table 2).

### Evaluating the fit of the measurement model

The CFA was carried out on the items of the ECQ through LISREL 8.80 (Du Toit et al., 2008) to evaluate the construct validity of the measurement models. The ECQ measurement model was considered as an exogenous variable and list-wise deletion and the robust maximum likelihood estimation method were utilised to produce the required estimates. The normalised data set was used for subsequent analyses.

### Goodness-of-fit of the first order and second-order measurement models

The two measurement models for ECQ tested in this study show similar levels of fit regarding the CFI, NFI, NNFI, IFI and RFI. Both first order and second-order measurement models indicate reasonable model fit. In terms of the RMSEA, the first order shows a value of 0.0771, while the second-order measurement models show a value of 0.0768. In terms of the SRMR the first-order measurement model shows a value of 0.0707 while the second-order model shows a value of 0.0720. The GFI values for all the models missed the 0.90 cut-off (see Table 3).

**TABLE 2:** Reliability and exploratory factor analysis output for the Ethical Climate Questionnaire dimensions.

Scale	Number of items	Cronbach's alpha	Factor loadings	% Variance explained
1. Caring	7	0.79	0.27–0.77	55.7
2. Law and code	4	0.86	0.69–0.88	61.3
3. Rules	4	0.85	0.74–0.81	59.2
4. Instrumental	7	0.86	0.73–0.89	60.1
5. Independence	4	0.87	0.60–0.90	65.2
<b>Total scale</b>	<b>26</b>	<b>0.90</b>	-	-

**TABLE 3:** Goodness-of-fit indices obtained for the Ethical Climate Questionnaire first-order and second-order measurement models.

Model	RMSEA	SRMR	GFI	NFI	NNFI	CFI	IFI	RFI
First-order CFA	0.0771	0.0707	0.87	0.95	0.96	0.97	0.97	0.94
Second-order CFA	0.0768	0.0720	0.86	0.95	0.96	0.97	0.97	0.94

CFA, confirmatory factor analysis; RMSEA, root mean square error of approximation; SRMR, standardised root mean residual; GFI, goodness-of-fit; NFI, normed fit index; NNFI, non-normed fit index; CFI, comparative fit index; IFI, incremental fit index; RFI, relative fit index.

### Parameter estimates

The unstandardised Gamma matrix shows the strength of the relationship and influence of the exogenous latent variable (ethical climate) on its manifest variables. The parameters are significant ( $p < 0.05$ ) if  $t$ -values are  $\geq |1.96|$  (Diamantopoulos & Siguaw, 2000). The  $t$ -values show that the dimensions are significant indicators of the ethical climate higher-order factor, as the  $t$ -values are greater than 1.96 except *independence* with 1.70. The results are shown in Table 4.

### Inter-correlations between latent Ethical Climate Questionnaire dimensions

The inter-correlations among the five latent ECQ dimensions are presented in Table 3. The intercorrelations were within reasonable limits and not above 0.90 as this could indicate multicollinearity (Pallant, 2016; Tabachnick & Fidell, 2013), except for the *independence* dimension, which correlated below 0.30 with the other dimensions.

### Power assessment

Power assessment was conducted using the Rweb (1.03) translation of the SAS syntax (Preacher & Coffman, 2006). This syntax is used to derive the power estimates for the tests of exact and close fit. In this study, the inputs for the analysis comprised a significance level ( $\alpha$ ) of 0.05, a sample size of 304 and 146 degrees of freedom (see Table 7). A reasonably large power value of 0.9995581 for the test of exact fit was obtained. The power of the test of close fit obtained was 0.99732, which was high implying that, in the conditions that characterised this specific study, one would reject approximately 99.7% of incorrect models thereby instilling some confidence in the model.

**TABLE 4:** Unstandardised gamma matrix.

Variable	$T$
Caring	8.34*
Law and code	15.13*
Rules	14.57*
Instrumental	10.52*
Independence	1.70*

\* $p < 0.05$ ;  $t = t$ -values;  $t$ -values  $\geq |1.96|$  indicate significant parameter estimates.

**TABLE 5:** Inter-correlations between Latent Ethical Climate Questionnaire dimensions, mean and standard deviations ( $N = 304$ ).

Subscales	M	SD	1	2	3	4	5
1. Caring	33.11	6.68	-	-	-	-	-
2. Law and code	19.22	4.11	0.88	-	-	-	-
3. Rules	19.63	4.56	0.85	0.94	-	-	-
4. Instrumental	19.43	4.33	0.88	0.82	0.86	-	-
5. Independence	19.63	4.56	0.04	0.09	0.14	0.16	-

SD, standard deviation.

**TABLE 6:** Completely standardised factor loadings LAMBDA-X (Ethical Climate Questionnaire,  $n = 304$ ).

Item	Caring	Law and code	Rules	Instrumental	Independence
ECQ1	0.54	-	-	-	-
ECQ2	0.53	-	-	-	-
ECQ3	0.51	-	-	-	-
ECQ4	0.32	-	-	-	-
ECQ5	0.78	-	-	-	-
ECQ6	0.78	-	-	-	-
ECQ7	0.71	-	-	-	-
ECQ8	-	0.80	-	-	-
ECQ9	-	0.83	-	-	-
ECQ10	-	0.76	-	-	-
ECQ11	-	0.68	-	-	-
ECQ12	-	-	0.85	-	-
ECQ13	-	-	0.80	-	-
ECQ14	-	-	0.70	-	-
ECQ15	-	-	0.64	-	-
ECQ16	-	-	-	0.88	-
ECQ17	-	-	-	0.64	-
ECQ18	-	-	-	0.83	-
ECQ19	-	-	-	0.83	-
ECQ20	-	-	-	0.78	-
ECQ21	-	-	-	0.85	-
ECQ22	-	-	-	0.73	-
ECQ23	-	-	-	-	0.59
ECQ24	-	-	-	-	0.87
ECQ25	-	-	-	-	0.87
ECQ26	-	-	-	-	0.84

ECQ, Ethical Climate Questionnaire.

**TABLE 7:** Power assessment for the structural model for the tests of exact and close fit.

Alpha	RMSEA (0)	RMSEA (A)	N	Power	Df
0.05	0.00	0.05	304	0.9995581	146
0.05	0.05	0.08	304	0.99732	146

RMSEA, root mean square error of approximation; Df, degrees of freedom.

## Discussion

This study sought to assess the transportability of the 26-item ECQ by Victor and Cullen (1988) by ascertaining its reliability and construct validity on a Zimbabwean sample.

The Cronbach's alpha values obtained indicate that the reliability coefficients for the five dimensions of the ECQ were above the 0.70 threshold (Nunnally & Bernstein, 1994). When treated as a unidimensional scale, Cronbach's alpha coefficient was high ( $\alpha = 0.90$ ). This is completely in tandem with the high reliability coefficients obtained by Wolmarans (2014) on a South African sample. The reliability coefficients are also consistent with those obtained by Victor and Cullen (1988) during the development of the scale in the USA using MBA students as well as managers and other employees in the manufacturing sector. The Cronbach's alpha coefficients ranged from  $\alpha = 0.73$  to 0.81. The inter-correlations between the latent dimensions were above 0.50 except for the independence dimension, which correlated below 0.30 with the other dimensions. This indicates that it may not be a credible manifest variable of the ethical climate latent construct. According to Cohen's (1988) guidelines, correlations that are between 0.10 and 0.29 are small, between 0.30 and 0.49 are medium while

those between 0.50 and 1.0 are large. The problems relating to the psychometric properties of the independence dimension might possibly be the reason why different researchers decided to reconceptualise its dimensions.

Although the reliability and dimensionality psychometric properties of the ECQ are generally accepted, it is noteworthy to report that most studies that attempted to validate the use of the ECQ in the African setting offered competing typologies that subsequently influenced the operationalisation of the instruments that the studies tested (Elm & Nichols, 1993; Grobler, 2016). Hence, there are few studies that tested the original ECQ in the African setting (Wolmarans, 2014). For example, Grobler (2016) reported three overarching typologies that were originally inspired by the Victor and Cullen (1988) conceptualisation of ethical climate. The three types of ethical climate reported in this article are ethical work environment, instrumental and personal morality. These ethical climate typologies still need to be tested for alignment with the values in various international contexts. The present study was a bit limited in the sense that it intended to evaluate the psychometric properties of the Victor and Cullen (1988) 26-item version of the ECQ. A void still exists as to whether the original typology fits best in the African contexts compared with competing models.

The five ECQ subscales were found to be unidimensional and accounted for more than 50% of the variance. In terms of construct validity, the first- and second-order models showed reasonable model fit to the data. The fit indices were surprisingly within the same range. These findings are consistent with the findings by Wolmarans (2014) in the South African context.

## Limitations of the study and suggestions for future research

Although the study was less skewed in terms of gender, the sample may not be representative of the Zimbabwean sample given that the convenience sampling technique was used. This technique affects the generalisability of the findings. Future research must also confirm if the independence dimension is a credible indicator of the ethical climate construct. If it is confirmed that the independence dimension is not a good indicator of the latent construct, this necessitates a reconsideration of the conceptualisation of the ethical climate underlying model that was originally defined by Victor and Cullen (1988).

## Conclusion

Given the reliability coefficients, the item analyses and dimensional analyses output, which point to the fact that the scales are reliable and unidimensional, it can be concluded that the scale at least meets the minimum requirements for use in other settings. However, the preliminary construct validity as assessed by testing the structural and measurement models indicates that the fit indices show reasonable fit and that the independence subscale is not correlating well with

the other dimensions. The gamma indices confirmed that the independence scale is not a significant indicator of the ethical climate latent construct. Therefore, the original scale by Victor and Cullen (1988) can be used in Zimbabwe but with caution in terms of the decisions based on the independence subscale.

## Acknowledgements

This article is partially based on the author's PhD in Logistics at the University of the Western Cape, South Africa, available here: <http://hdl.handle.net/11394/8120>.

The authors acknowledge the time taken by the participants in order to take part in the study as well as the permission granted by the security companies that allowed their employees to participate in the study.

## Competing interests

The author(s) declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.

## Authors' contributions

N.G. was the project leader responsible for the data collection and article write-up, the project is based on his PhD thesis; B.M. was responsible for the article write-up and statistical analyses.

## Funding information

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

## Data availability

The data that support the findings of this study are available on request from the author, B.M.

## Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

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