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RESEARCH ARTICLE

Investigating the Impact of Tax Awareness on Tax Compliance and Non-economic Determinants

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ABSTRACT

This study examines the mediating effect of awareness of tax between four non-economic determinants, Tax Morale (TM), National Pride (NP), Tax Compliance (TS), Quality of Tax Service (QTS), and Tax Knowledge (TK), among the population (n=1080) of individual taxpayers in Shenzhen, China. Partial Least Squares - Structural Equation Modelling (PLS-SEM) software (version 4) from SmartPLS was used to analyse the proposed relationships. The model obtained had high reliability and good convergent validity, and the overall model had a satisfactory fit. The results show that all four antecedents were significant and explained about 29% of the variance in the dependent variable, Tax Awareness. National pride has the lowest impact, followed by quality of tax service and tax knowledge, while tax morale has the highest impact. Among the factors affecting Tax Compliance, only Quality of Tax Service and Tax Morale had significant influence, while the influence of Tax Knowledge, National Pride, and Tax Awareness was not statistically significant. The direct effect of Tax Awareness on Tax Compliance was very little, and the indirect effect was not found. The results indicate that quality of service and taxpayers' internal moral commitment account for significant direct factors affecting voluntary tax compliance, while Tax Awareness seems to be more of a result of knowledge, institutional experience and civic values than a factor connecting these values with the tax compliance behaviour.

Contribution/Originality: This study contributes to the existing literature by extending Social Cognitive Theory to tax compliance in China. It examines tax awareness as a mediator and is one of very few studies investigating non-economic determinants of tax compliance. Its primary contribution is finding that tax awareness does not mediate these relationships.

1. Introduction

Compliance of tax is an essential part of China's fiscal sustainability and effort to achieve balanced growth in the economy. Along with the implementation of the modernisation of the national tax administration system, China government is pushing forward with the reform of the tax administration system. Subsequently, the promotion of the voluntary payment of taxes is as important as that of law administration. This is especially true in cities that are getting urbanised rapidly, where government revenues rely significantly on the tax payments of their citizens. Substantial effort has been made in digital tax administration; however, the increasingly strict regulatory measures have led Shenzhen to still face problems caused by taxpayers' non-compliance. The traditional economic models of tax behaviour, in particular the deterrence models, suggest that the tax evader weighs the expected tax penalties against the chance of being caught and the severity of the penalties (Allingham & Sandmo, 1972). However, empirical research by Torgler et al. (2007) has shown that tax compliance is not completely determined by the probability of being audited or concerned with the enforcement intensity. These observations emphasise the need to investigate non-punitive behavioural, psychological, and social factors.

Within this context, civic identity, tax knowledge, quality of service, and tax morale, account for factors that are now increasingly acknowledged as contributing to taxpayers' behavioural intentions. Existing research, such as Luo et al. (2012) and Luo et al. (2023), has demonstrated that improving the awareness of taxpayers about their tax duties can help alleviate uncertainty and boost compliance behaviour among taxpayers. However, having information alone is not enough to ensure compliance with the law unless there is an understanding of the wider social implications of complying with the tax obligations. Similarly, studies like Barare (2018), Gangl et al. (2015) and Appiah et al. (2024) highlight that the positive effects of responsive tax administration, institutional trust and fairness have been established through the provision of tax services of higher quality on voluntary compliance. Despite this, the positive effects of service quality could be reduced if taxpayers do not make a mental connection between positive experiences of the service and their civic duties in general. Similarly, Alm and Togler (2011) and Bartha and Boda (2024) highlighted that tax morals and national pride are intrinsic motivational factors that may motivate taxpayers to pay taxes voluntarily. On the other hand, ethical values and perceptions of fairness can sustain cooperation even under relatively weak tax enforcement. However, such motivational factors can be translated into actual compliance through tax awareness. Thus, tax awareness can serve as relationship between tax knowledge, institutional service quality, civic values, and voluntary tax compliance through cognition. Based on this background, the present study aims to examine the mediating role of tax awareness between tax knowledge, tax morality, and tax compliance of individual taxpayers in Shenzhen, China.

2. Literature Review

2.1. Conceptual Framework

Tax knowledge is the individual's knowledge of tax procedures, tax law, and tax obligations. Many studies have found that the more knowledgeable taxpayers are, the more likely to abide by the tax laws. An early study showed that sufficient tax knowledge is crucial in mitigating filing errors and promoting tax voluntary compliance under the self-assessment system in Malaysia (Loo et al., 2010). Similarly, a seminal study also found a positive effect of tax education on compliant behaviour (Eriksen & Fallan, 1996). Thus, these findings suggest that the knowledge of taxes is the information that is required for compliance. However, simple knowledge does not ensure compliance. Another study claimed it is necessary for people to internalise what they know in their cognitive system for it to influence their behaviour effectively (Kirchler, 2007). Furthermore, Hofmann et al. (2015) highlighted that apart from external factors like tax rates, incomes, audit probability and severity of penalties, psychological factors also play a significant role in the decision of taxpayers. Thus, studies like Batool et al. (2022) and De Clercq (2023) argued that tax awareness is seen as the cognitive process where people believe that they must pay taxes, and that tax is a civic and social responsibility. However, in countries where tax laws are comparatively complex, like Shenzhen, tax awareness is the key element that transforms technical understanding to lasting tax compliance.

The quality of tax services is the extent to which tax authorities respond, are transparent, impartial and reliable in their interactions with taxpayers. By providing good education to taxpayers and quality tax services, the public will have trust and confidence in the tax system, which will consequently boost tax compliance (Barare, 2018). In line with this, another study proposed that the introduction of a more "service-oriented" and “client-oriented” attitude on the part of tax authorities will lead to a more cooperative climate in which taxpayers feel less distant from the institutions of the tax administration (Kirchler, 2007). High levels of service quality leads to higher customer perceptions of fairness, but sustained compliance over time is not guaranteed. A study by Rita et al. (2019) also noted that the quality of e-services has a significant impact on customer behaviour. In the case of behavioural change, Mohammed and Tangl (2024) and Suryanto et al. (2025) stated, that any improvements to service delivery may be short-lived unless taxpayers understand the civic reason for the taxes they pay. Thus, tax awareness is the mediator between positive institutional experience and long-term voluntary tax compliance.

The concept of tax morale has always been recognised as one of the most important factors influencing tax compliance. Tax morality and tax evasion are negatively related (Castañeda, 2024; Deglaire et al., 2021; Owusu et al., 2022; Torgler, 2007). In addition, Alm and Torgler (2011) and Dörrenberg et al. (2022), also highlighted that ethical standards or notions of fairness contribute to the maintenance of agreement in relatively low-enforcement settings. Similarly, Macintyre et al. (2023) and Gobena (2025) highlighted that national pride fosters voluntary tax compliance with tax officials. Similarly, another study determined that people with a higher sense of national attachment are more likely to comply with taxes (Torgler, 2011). The results indicate that intrinsic motivations have a significant contribution to fostering cooperative behaviour. However, these motives need to be thought through to influence real behaviour. Bandura (2001) proposed that values like ethical responsibility and nationalism influence behaviours by a cognitive process, and awareness serves as a mediating agent between the two. Tax awareness helps individuals to align their attitudes to actual tax-compliant action. In China, the importance of identity in terms of civil context and of national development as a social value can be particularly relevant in the context of the cognitive process, since giving in to the tax can be a voluntary act rather than a compulsory one.

2.2. Existing Research on Tax Behaviour as a Mediator

Tax awareness has consistently been identified as a mediator in terms of compliance of tax in the previous research. Wahl et al. (2010) described that taxpayers' sense of fairness led to compliance via improved tax awareness. In the same way, in developing countries, tax awareness serves as a crucial intermediate variable between tax knowledge and tax compliance, and the study by Saad (2014) found similar results in emerging economies; therefore, education on tax mainly influences tax compliance through an increase in awareness. Another study conducted within the African context revealed that tax awareness had a significant mediating effect between the different determinants that are non-economic in nature and are associated with tax compliance. Similarly, these factors include tax morale, awareness and identity, which have been proved to have a more effective effect on enhancing tax compliance compared to measures that focus on deterrence alone (Ntiamoah & Asare, 2022). Overall, the above studies give solid empirical evidence to include tax awareness as a mediating variable in tax compliance studies. However, most of the previous mediation research has been based in Western countries or African countries, and very little empirical research has been done in Asian countries. This raises the importance of carrying out mediation-based investigations in the context of China, where differences in institutional arrangements and values might affect how tax awareness is related to taxpayers' compliance.

2.3. Theoretical Foundation

For understanding tax compliance, it is important explore theoretical frameworks beyond the classic economic deterrence models. Social Cognitive Theory (SCT), developed by Bandura (2001) mentions that people are active decision makers who are able to engage in self-reflection, intentionality, and foresight that plays a role in shaping their behaviour. The theory is based on the idea that people can use their cognitive processes to turn their acquired knowledge and social values into observable action. Specifically in the context of taxation, SCT is relevant due to its conceptualisation of tax awareness that connects the internal factors, including tax morale and national pride, to the external factors, such as tax knowledge and the quality of tax services. The economic deterrence model assumes taxpayers will rationally consider the potential benefits from tax evasion against the probability of evasion being discovered and the associated penalties (Allingham & Sandmo, 1972). Contrary to the implication of the deterrence theory, however, empirical studies have found that compliance is often overlooked even when it is relatively low, meaning that real behaviour is more likely to be measured by taxes than be predicted by tax theory (Mebratu, 2024; Torgler et al., 2007). The results overall indicate that social factors and psychological factors are crucial in explaining tax compliance, supporting the key assumption of SCT integrating tax compliance motives with tax compliance behaviour and tax compliance decision-making.

2.4. Gap in Research and Hypothesis

Research on the influence of non-economic factors on tax compliance has been conducted in previous studies, but empirical research in China that uses mediation analysis based on PLS-SEM is still limited (Chu et al., 2025). The role of moral values and perceptions of fairness in fostering tax compliance is established in the literature, however, relatively few studies in the Chinese context have attempted to employ quantitative mediation models to analyse the relationships among these variables (Kirchler, 2007; Torgler, 2007). Furthermore, existing evidence highlights that community governance is significantly impacted by the belief system in China.

Shenzhen, therefore serves as an interesting research environment as there is a continuous lack of compliance among taxpayers despite the highly developed tax administration system and advanced enforcement mechanisms. This inconsistency implies that reliance is solely on implementation, which is not likely to be an effective means for encouraging compliance and calls for more attention to awareness-based work. This study aimed to test the mediating mechanism of awareness about tax and further extend the application of the Framework of Slippery Slope and SCT in the Chinese context using equational modelling to provide insight into the mechanisms underlying tax compliance. Thus, it offered theoretical and practical support to the design of more effective tax compliance strategies for authorities on tax in China.

Previous research by Torgler (2007), followed by Torgler and Schneider (2009) and Loo et al. (2010) indicated that tax knowledge, quality tax services, national pride and tax morale are all important factors to increase taxpayer responsibilities and duty awareness. Thus, tax awareness is assumed to be the process of cognition that impacts tax behaviour. Additionally, the previous researches also have shown that tax quality service, national pride, knowledge, and tax morale boost the knowledge of tax obligations and promote tax compliant behaviour. The determinants are therefore assumed to affect behaviour through tax awareness, which is viewed as a cognitive mechanism. Finally, Tax awareness has been found in the past to be a significant mediator in tax compliance models (Ntiamoah & Asare, 2022). The study of these suggested relationships between the taxpayers in Shenzhen should bring further insights into the relationship between sociopsychological determinants and tax compliance in the institutional and cultural context of China. Thus, the hypothesis of this study was the following:

H1: The more tax knowledge, the more tax awareness;
H2: The more quality of tax service, the more taxpayer awareness;
H3: The more tax morality, the more tax awareness;
H4: The more national pride, the more tax awareness.
H5: There is a positive association between Tax Compliance and Knowledge;
H6: There is a positive association between Tax Compliance and Quality of Tax Service;
H7: There is a positive association between Tax Compliance and Morale.
H8: There is a positive association between Tax Compliance and National Pride.
H10: Tax knowledge and compliance are mediated by tax awareness.
H11: The association between tax compliance and quality of tax service is mediated by tax awareness.
H12: The association between tax compliance and tax morale is mediated by tax awareness;
H13: The association between tax compliance and national pride is mediated by tax awareness.

3. Methodology

3.1. Design of the Research

The research design used in this study is a cross-sectional quantitative survey. It aimed to investigate the determinants of non-economic namely, tax compliance, Tax Knowledge (TK), Quality of Tax Service (QTS), Tax Morale (TM) and National Pride (NP) of individual taxpayers in Shenzhen, China, with Tax Awareness (TA) as a mediator. In this study, the researcher used the Partial Least Squares Structural Equation Modelling

(PLS-SEM) method because the study aimed to predict the relationships between many latent constructs. According to Schuberth et al. (2023), the technique involves an iterative estimation procedure using ordinary least squares regressions to produce weights for calculating scores on latent constructs. Furthermore, PLS-SEM works well even if indicators are not normally distributed. Existing measurement scales were used to collect data to test the strength of measurement items in the context of the present research.

3.2. Characteristics of the Sample and Settings of the Study

Primary data were gathered from taxpayers in the nine administrative districts of Shenzhen – Yantian, Guangming, Futian, Longgang, Luohu, Baoan, Nanshan, Longhua, and Pingshan. Stratified cluster sampling was done in two stages. During the first stage, from each administrative area, two streets were selected at random. Street selection was done on an alphabetical basis and the probability of selection was in direct proportion to the size of the population of each district; in other words, more densely populated districts have an increased probability of being included. For the next stage, from each of the chosen streets, resident committees (n=4) were chosen randomly and again the neighbourhood committees were selected alphabetically. An official list of members of the individual neighbourhood committees was not provided, so respondents were obtained by random intercept surveying within the selected neighbourhood committees. A total of 15 pre-designed questionnaires were used to gather responses from individual taxpayers in each of the committees that was selected. In addition, fixed on-site quotas were used to account for district population to ensure equal representation of respondents from each district. A total of 1080 valid questionnaires were obtained in the field survey carried out in 2024, which was 120 questionnaires from each administrative district.

3.3. Measurements and Instrumentation

The data were collected using an online questionnaire designed on the Tencent survey platform. The respondents were given a short explanation of the study and their answers were collected anonymously during a limited period of time. Each latent construct was assessed based on a range from "strongly disagree" (1) to "strongly agree" (5), which is based on the Likert Scale. Table 1 shows the variables that were used and their operational descriptions.

Table 1: Description of the Variables included in the study

Variable	Description
Tax Knowledge (TK)	factual/procedural knowledge of tax functions, provisions, procedures, and Chinese tax system
Quality of Tax Service (QT)	perceived responsiveness, reliability, empathy/assurance, clarity, and digital usability of the tax authority
Tax Morale (TM)	internalized civic duty and fairness norms
National Pride (NP)	affective identification with the nation/patriotism
Tax Awareness (TA)	conscious recognition of obligations/updates
Tax Compliance (TS/TC)	voluntary compliance intentions/behaviors

3.4. Collection and Screening of Data, Ethical Considerations

In order to study the situation of tax compliance among taxpayers. It was focused on the population in Shenzhen, China, and a questionnaire survey was carried out. Respondents were briefed on the study purpose before the data gathering, and the study was conducted in an ethical manner in which personal information is collected and used. Participants were free to participate; the study was purely academic and confidentiality of all the information on the respondents was guaranteed during the research process. The data were screened in SPSS prior to conducting the analysis of structural equation modelling (SEM). Missing data, straight-lining responses, descriptive statistics and the presence of potential outlying responses were all checked in the screening process. Additionally, the data was analysed to see if it was normally distributed. Significant missing values and obvious irregularities in the responses were detected in the indicators and later discussed in the model of measurement for assessment.

3.5. Approach of Modelling

3.5.1. Strategy for Two-model Estimation

Two model estimation procedures were used to achieve a balance between content validity and psychometric robustness. The first model (initial model) had all the indicators included for each construct, to avoid the loss of a conceptual coverage that was originally intended. The second model (final model) removed the indicators which were weak or cross-loaded to enhance the reliability and validity of the measurement, while maintaining the theoretical meaning of the indicators. The values of Cronbach's α, Composite Reliability (CR), and Average Variance Extracted (AVE) for the refined model are presented in Table 2 and found to be better. The internal consistency and convergent validity were assessed using the recommended levels of Cronbach's $\alpha \geq 0.70$, AVE ≥ 0.50 and Composite Reliability ≥ 0.70. Indicators that had loadings between 0.40 and 0.70 were provisionally kept in the initial model, if the indicators were theoretically meaningful and did not have a negative impact on the overall validity or reliability of the construct.

Table 2: Constructs in the Study

Construct	Cronbach's α	Composite Reliability (CR)	Average Variance Extracted (AVE)
National Pride (NP)	0.905	0.913	0.601
Quality of Tax Service (QTS)	0.943	0.944	0.660
Tax Awareness (TA)	0.891	0.894	0.698
Tax Knowledge (TK)	0.930	0.931	0.671
Tax Morale (TM)	0.895	0.899	0.578
Tax Compliance (TS)	0.908	0.935	0.725

3.5.2. Rules for Indicator retention

The indicator selection was done following a two-stage threshold approach, consistent with the analytical procedure. In the first screening step, the items that have a standardised loading of 0.40 or higher were provisionally retained, while those that have a loading smaller than 0.40 were excluded in the next analysis. During the next stage of refinement, indicators having loadings between 0.40 and 0.70 were kept given that they were able to meaningfully enhance validity of constructs and if they failed to enhance composite reliability (CR), Cronbach's alpha (α), or average variance extracted (AVE). Most of the final measurement model included indicators having loadings ≥ 0.70. This sequential approach maintained the theoretical width of each construct in their first stages and improved psychometric properties in the last stages.

3.5.3. Evaluation of Measurement Model

The assessment criteria of the PLS-SEM measurement model are used. Standardized factor loadings were used to assess indicator reliability, with the values 0.70 or higher being desirable for the model in the second stage. Composite Reliability and Cronbach's alpha were used to determine internal consistency reliability with a score of at least 0.70 expected. Convergent validity was at 0.50, measured through Average Variance Extracted (AVE). The Heterotrait-Monotrait (HTMT) ratio was used to evaluate the discriminant validity that has a threshold value of less than 0.85–0.90, along with the assessment of indicator cross-loadings.

3.5.4. Test for Mediation and Structural Modelling

The relationships in the structure were examined after the measurement model was confirmed as adequate. The direct impact of Tax Knowledge (TK), Quality of Tax Service (QTS), Tax Morale (TM) and National Pride (NP) on Tax Awareness (TA) was analysed first. The direct impact of TK, QTS, TM, NP and TA on Tax Compliance (TS) was then estimated. Lastly, the indirect relationships between NP, QTS, TK, and TM and TS mediated by TA were examined to explore the hypothesized mediation effects. t-values, standard errors, 95% confidence intervals, and p-values for both indirect paths and direct paths were estimated using bias-corrected bootstrapping. Furthermore, the coefficient of determination (R^2) and the fit indices of the SmartPLS model (d_G, NFI, SRMR, and d_ULS) were used to evaluate the model's explanatory power and overall fit. The model in the second stage showed good model fit with an NFI value of about 0.875, and the SRMR value was about 0.05 (Table 3).

Table 3: Fitness of the Model in the Study

Category	Saturated model	Estimated model
SRMR	0.05	0.05
d_ULS	2.516	2.516
d_G	0.666	0.666
Chi-square	2935	2935
NFI	0.875	0.875

3.5.5. Investigation of Shared-method and Collinearity.

All predictors of Tax Awareness (TA) and Tax Compliance (TS) were checked for the Inner Variance Inflation Factor (VIF). As shown in Table 4, the VIF values obtained were up to 1.85 from 1.06, meaning that there was no multicollinearity issue in the structural model. Several procedural safeguards were adopted to reduce the possible impact of biases in method, such as anonymous participation, wording of the questionnaire items, and alternative sequences of the questionnaire items.

Table 4: Inner Variance Inflation Factor

Category	VIF
NP -> TA	1.057
NP -> TS	1.072
QTS -> TA	1.808
QTS -> TS	1.836
TA -> TS	1.417
TK -> TA	1.759
TK -> TS	1.845
TM -> TA	1.172
TM -> TS	1.269

3.6. Data Analysis

The data collected were subjected to preliminary data screening and data preparation using SPSS. Structural models and measurement models were then estimated using the software SmartPLS version 4, which was also used for the bootstrapping results, the validity test, and the path coefficients of the structural model in the findings.

4. Findings

4.1. Results of Descriptive Statistics

A total of 1080 valid questionnaires were obtained from citizens in the nine administrative districts of Shenzhen to form the final sample. The first data screening revealed no issues that might affect the model's estimate. Then the data were assessed for the measurement model and the structural model. The next analyses were used to examine the proposed hypotheses.

4.2. Results of the Initial Modelling

Aligning with the modelling approach, the full set of indicators pertaining to each construct was included in the first measurement model. Indicators that had standardised loadings of 0.40 and above were provisionally included before refinement. In general, the loadings for the indicators were satisfactory, with two indicators (TK3 and TK10) having a loading in the upper 0.60 range. Table 5 shows the complete factor loadings of the initial model.

NP: The loadings for all 8 indicators were satisfactory (Table 5). The squared loadings for the items ranged from about 0.50 to 0.66, which are all above the recommended indicator reliability threshold. As such, there was no need to remove any of the NP indicators in the first stage.

The ten indicators of QTS had high loadings ranging from 0.787 to 0.841, which represent 62%–71% of the variance. The narrow loading range shows that the measurement of service quality is very consistent and well-defined, with no indicators at all coming close to problematic levels.

TA: Indicators of awareness loaded strongly, ranging from 0.781 to 0.875 (Table 5). The values of these indicators show that the construct was measured consistently and that none of them was found to be weak in the first model (around 0.61 to 0.77).

TK: Most loadings of the tax knowledge indicators were satisfactory ranging from 0.778 to 0.826. Two of them, however, were below the desired value of 0.70: TK3 and TK10, with about 45% and 47% of the explained variance, respectively. These indicators had a relatively small contribution to the construct and thus were considered as appropriate candidates for exclusion in the refinement phase.

TM: The eight tax morale indicators recorded loadings ranging from 0.703 to 0.829. The lowest loading was about 0.49, which is acceptable since it met the loading requirement of the indicator. Overall, a good measurement quality for the construct was achieved, and further improvement will be based on the improvement of AVE, Composite Reliability, and discriminant validity.

TS: Indicators for tax compliance had high standardised loadings, ranging from 0.810 to 0.869, accounting for 66%–76% of the variance in the indicators. The loadings are consistently high, suggesting that this is a stable and reliable measurement block, and there is no indication that it is necessary to remove indicators during model refinement.

Table 5: Initial Model Factor Loadings

Category	NP	QTS	TA	TK	TM	TS
NP1	0.801					
NP2	0.790					
NP3	0.773					
NP4	0.784					
NP5	0.790					
NP6	0.813					
NP7	0.738					
NP8	0.708					
QTS1		0.821				
QTS10		0.813				
QTS2		0.814				
QTS3		0.815				
QTS4		0.820				
QTS5		0.802				
QTS6		0.811				
QTS7		0.798				
QTS8		0.787				
QTS9		0.841				
TA1			0.875			
TA2			0.808			
TA3			0.844			
TA4			0.781			
TA5			0.865			
TK1				0.789		

TK10	0.688		
TK2	0.826		
TK3	0.674		
TK4	0.818		
TK5	0.800		
TK6	0.790		
TK7	0.791		
TK8	0.800		
TK9	0.778		
TM1		0.737	
TM2		0.800	
TM3		0.703	
TM4		0.737	
TM5		0.790	
TM6		0.740	
TM7		0.739	
TM8		0.829	
TS1			0.863
TS2			0.848
TS3			0.858
TS4			0.869
TS5			0.810

All but two of the indicators (TK10 and TK3) obtained standardised loadings of .70 or above, thus representing each construct well in the initial measurement model. Identification of indicators for refinement. The only indicators that made it clear that they should be removed, based on the loading criteria, were TK3 and TK10. With several other strong indicators of the Tax Knowledge construct, eliminating these items was expected to enhance the AVE and CR of the construct as well as reduce the potential for crossloading without reducing the conceptual coverage of the construct. Expected psychometric performance. Since the loading levels for the indicators of TS, TA, TM, QTS and NP were already met with ≥ 0.70, their AVE and CR values were likely to be acceptable before refinement. By contrast, the Tax Knowledge construct was expected to be most positively impacted by indicator removal, and this was indeed the case in the final measurement model.

4.3. Results of the Second Model

Following the removal of weaker indicators, mainly TK10 and TK3, the revised measurement model included indicators with high standardised loadings (most are > 0.70). The final model also showed good consistency internally and acceptable convergent validity for each construct. The detailed factor loadings are shown in Table 6 with the reliability statistics.

For the eight indicators remaining (NP6 and NP8 with 0.813 and 0.708, respectively), standardised loadings were between 0.708 and 0.813. They had squared loadings that ranged from 0.66—0.50, suggesting that between half and two-thirds of the variance in each indicator was accounted for by the underlying construct. Reliability statistics also showed that the measurement quality is satisfactory, achieving a high level of convergent validity and internal consistency.

QTS: The ten indicators of service quality had loadings ranging from 0.787 to 0.841. This has stayed at a high level, thus demonstrating a reliable and stable construct. Here, the lowest loading indicator showed variance in the measure (0.62). The reliability of the construct was sustained with the value of α = 0.943, CR = 0.944, and AVE = 0.660, which were still in the excellent level.

TA: The five indicators retained ranged from 0.779 to 0.875 with indicator reliabilities of around 0.61–0.77. The construct showed a good convergent validity with α = 0.891, CR = 0.894, and AVE = 0.698.

The initial eight items showed strong loadings which were uniformly high between 0.800 and 0.853. All retained indicators were higher than the preferred loading index, and reliability statistics further validating that the improvement significantly enhanced the convergent validity without compromising the theoretical coverage of the construct.
TM: All the indicators of tax morale were found to have loadings ranging from 0.703 to 0.829. One indicator came close to the recommended threshold, but all remaining items met the recommended loading criterion. The construct also showed good internal consistency (α = 0.895), convergent validity (CR = 0.899), and a good AVE (AVE = 0.578), suggesting acceptable convergent validity.

TS: The five compliance indicators had standardised loadings ranging from 0.803 to 0.871 with a very consistent measurement block. The result of the reliability statistics also confirmed the quality of the construct (α = 0.908, CR = 0.935, AVE = 0.725) with excellent convergent validity and strong overall measurement performance.

Table 6: Final Model Factor Loadings

Category	NP	QTS	TA	TK	TM	TS	Cronbach alpha	CR	AVE
NP1	0.801						0.905	0.913	0.601
NP2	0.790								
NP3	0.773								
NP4	0.784								
NP5	0.790								
NP6	0.813								
NP7	0.738								
NP8	0.708								
QTS1		0.821					0.943	0.944	0.66
QTS10		0.813							
QTS2		0.814							
QTS3		0.815							
QTS4		0.820							
QTS5		0.803							
QTS6		0.811							
QTS7		0.798							
QTS8		0.787							
QTS9		0.841							
TA1			0.875				0.891	0.894	0.698
TA2			0.810						
TA3			0.844						
TA4			0.779						

TA5			0.865						
TK1				0.812			0.93	0.931	0.671
TK2				0.853					
TK4				0.838					
TK5				0.814					
TK6				0.808					
TK7				0.813					
TK8				0.813					
TK9				0.800					
TM1					0.737		0.895	0.899	0.578
TM2					0.800				
TM3					0.703				
TM4					0.737				
TM5					0.790				
TM6					0.740				
TM7					0.739				
TM8					0.829				
TS1						0.868	0.908	0.935	0.725
TS2						0.855			
TS3						0.859			
TS4						0.871			
TS5						0.803			

The results implied that all indicators retained met the preferred loading value. Furthermore, all constructs met the standard scores. The biggest improvement after the refinement of indicators was for the TK construct, in which both indicators with loadings below 0.70 were dropped, and the remaining indicators had loadings of 0.80 or greater and an AVE of 0.671. Thus, the refined measurement model exhibited good internal consistency and reliability, as well as good convergent validity across the factors, thus providing a strong groundwork for interpreting the structural relationships.

4.4. Discriminant Validity

Discriminant validity was assessed by the Heterotrait-Monotrait Ratio (HTMT), which is a technique for determining how well the constructs that are latent are empirically distinct from each other. Values below 0.85 are considered to have good discriminant validity, while values below 0.90 are considered to be a conservative criterion and a more liberal criterion, respectively. The HTMT matrix is displayed as a lower-triangular matrix, since it is symmetric. As shown in Table 7, HTMT values range from 0.139 to 0.694. The highest ratio is found between TK and QTS (0.694), which is the closest ratio to the recommended ratio, but still below the threshold of 0.85. Other comparatively higher HTMT values include QTS–TM, TA–TK, TS–QTS and TA–TM. The other constructs, on the other hand, have consistently low HTMT values with NP (such as NP–TS: 0.139; NP–TA: 0.238; NP–TK: 0.177; NP–QTS: 0.209; NP–TM: 0.199), which means that the constructs are empirically well differentiated from each other. Similarly, the Tax Compliance (TS) has relatively low HTMT values with its predictor constructs, TS–NP, TS–QTS, TS–TA, TS–TK and TS–TM. While there is a strong correlation to Quality of Tax Service, the value is still below the recommended level, thus reinforcing the notion that Tax Compliance is a separate construct.

Thereby, the HTMT results do support the discriminant validity. For all inter-construct HTMT ratios, they are lower than the conservative ratio of 0.85, thus the latent variables can be considered as empirically different. The relatively high value of the HTMT between Tax Knowledge and Quality of Tax Service (0.694) is theoretically reasonable as the former is also expected to have greater tax knowledge. However, this association is far from the recommended cut-off. Thus, it is not impacted by the discriminant validity. In general, the results of the assessment according to the criteria of HTMT show that there is adequate discriminant validity for each construct, with results ranging from 0.139 to 0.694. There was the highest HTMT value between Tax Knowledge and Quality of Tax Service (0.694).

Table 7: Results of HTMT

Category	NP	QTS	TA	TK	TM	TS
NP						
QTS	0.209					
TA	0.238	0.444				
TK	0.177	0.694	0.478			
TM	0.199	0.373	0.453	0.348		
TS	0.139	0.351	0.187	0.203	0.273	

4.5. Relationship between Latent Constructs

The correlation analysis reveals that all latent constructs have positive and significant correlations with each other. The original sample correlation coefficients vary from 0.139 to 0.648 (Table 8) and all of these relationships are statistically significant at $p < .001$. The TK and QTS showed the highest association, indicating that those who perceive high-quality tax service also have high tax knowledge ($r = .648$, $t = 28.75$). TA shows substantial positive correlations with both QTS and TK, so that one can assume that good service and better knowledge together contribute to high levels of awareness. TM is also positively related to TA, QTS and TK, suggesting that the higher the taxpayer's moral commitment. The more informed an individual is, the more positive their attitude toward tax services. TS shows the highest correlations with QTS and TM, while comparatively lower correlations with TK, TA and NP ($r = .139$). This is similar to the following structural model, where compliance has a stronger relationship with moral orientation and service quality than with patriotism, awareness and knowledge. Overall, National Pride has the lowest correlations with all constructs, with only modest correlations with QTS, TA, TK, TM, and TS.

Table 8: Results of Correlations

Category	r (O)	r (M)	SD	T-stat	P values
QTS <-> NP	0.199	0.201	0.035	5.665	0.000
TA <-> NP	0.218	0.221	0.036	6.056	0.000
TA <-> QTS	0.411	0.413	0.032	12.67	0.000
TK <-> NP	0.166	0.168	0.036	4.549	0.000
TK <-> QTS	0.648	0.649	0.023	28.75	0.000
TK <-> TA	0.438	0.439	0.032	13.66	0.000
TM <-> NP	0.178	0.180	0.04	4.503	0.000
TM <-> QTS	0.346	0.347	0.037	9.435	0.000
TM <-> TA	0.407	0.409	0.037	11.15	0.000

TM <-> TK	0.321	0.322	0.039	8.305	0.000
TS <-> NP	0.139	0.142	0.035	3.984	0.000
TS <-> QTS	0.355	0.354	0.031	11.38	0.000
TS <-> TA	0.169	0.167	0.034	4.933	0.000
TS <-> TK	0.218	0.216	0.036	6.115	0.000
TS <-> TM	0.262	0.263	0.031	8.508	0.000

O: Original Sample, M: Bootstrapped Sample mean

4.6. Results of Structural Modelling

The standardised structural modelling showing path coefficients study as shown in Table 9.

Table 9: Results of path coefficients

Category	Coeff (O)	Coeff (M)	SD	T-stat	P values
NP -> TA	0.102	0.104	0.027	3.735	0.000
NP -> TS	0.058	0.06	0.035	1.647	0.100
QTS -> TA	0.142	0.142	0.049	2.885	0.004
QTS -> TS	0.326	0.327	0.047	6.919	0.000
TA -> TS	-0.025	-0.028	0.041	0.607	0.544
TK -> TA	0.245	0.244	0.048	5.093	0.000
TK -> TS	-0.045	-0.048	0.050	0.901	0.367
TM -> TA	0.261	0.262	0.035	7.400	0.000
TM -> TS	0.163	0.166	0.038	4.254	0.000

O: Original Sample, M: Bootstrapped Sample mean

4.7. Results for H1-H4

Results show that both proposed antecedents have a significant positive effect on Tax Awareness. Tax Morale demonstrates the strongest influence on awareness, followed by Tax Knowledge, Quality of Tax Service, and National Pride. The results justify the empirical support of the following hypotheses: H1, H2, H3 and H4, which state that Tax Knowledge, Quality of Tax Service, Tax Morale, and National Pride have positive effects on tax awareness.

4.8. Results for H5-H9

Among the predictors, two of the proposed predictors are directly statistically significant to Tax Compliance: Education and Taxable Income. QTS has the strongest direct influence on compliance, while Tax Morale also shows a significant positive effect. In contrast, the direct effects of National Pride, Tax Knowledge, and Tax Awareness are not statistically significant. These findings indicate that while all non-economic factors are found to positively influence higher tax awareness, only high-quality tax services and high tax morals can directly lead to higher compliance behaviours of taxpayers. The insignificant relationship between Tax Awareness and Tax Compliance also shows that the proposed mediation mechanism is not likely to be supported.

4.9. Results for H10-H13

As the direct link between Tax Awareness and Tax Compliance is not statistically significant, the indirect effects of the four antecedent variables on Tax Compliance through TA is anticipated to be insignificant. It is supported by the bootstrapping results (Table 10), which show that none of the non-direct ones is significantly different from zero. Moreover, the two corresponding parameters for the confidence intervalswere still around zero and the Variance Accounted For (VAF) values were still quite small. Thus, the mediation hypotheses of H10 to H13 are not possible.

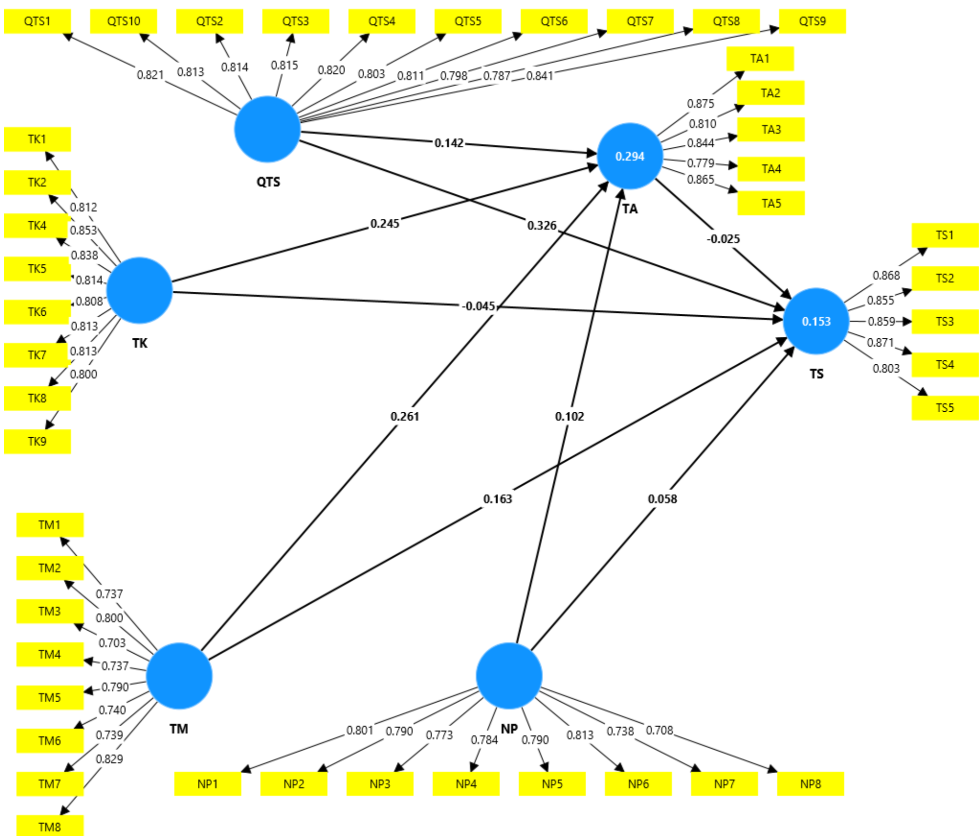
Table 10: Indirect Effects observed through SEM-PLS

Category	Coeff (O)	Coeff (M)	SD	T-stat	P values
NP -> TA -> TS	-0.003	-0.003	0.005	0.558	0.577
QTS -> TA -> TS	-0.004	-0.004	0.006	0.568	0.570
TK -> TA -> TS	-0.006	-0.006	0.01	0.611	0.542
TM -> TA -> TS	-0.006	-0.008	0.011	0.577	0.564

O: Original Sample, M: Bootstrapped Sample mean

The final analysis of the SmartPLS model shows both the structural (inner) model and the measurement (outer) model as well as their standardised coefficients (Figure 1).

Figure 1: Obtained the model from the constructs



The circles in blue colour represent latent constructs: Quality of Tax Service (QTS), Tax Knowledge (TK), Tax Morale (TM), National Pride (NP), Tax Awareness (TA) and Tax Compliance (TS), while the yellow rectangles represent retained measurement indicators. The outer loadings of all constructs have been consistently high with the QTS indicators ranging from approximately 0.787 to 0.841, the TA indicators ranging from 0.779 to 0.875, the TK indicators ranging from 0.800 to 0.853, the TM indicators ranging from 0.703 to 0.829, the NP indicators ranging from 0.708 to 0.813, and the TS indicators ranging from 0.803 to 0.871. The loading values for the latent constructs are appropriate to the high level of indicator reliability. Tax Morale (β = 0.261), Tax Knowledge (β = 0.245), Quality of Tax Service (β = 0.142) and National Pride all have a significant positive effect on Tax Awareness. Tax Compliance is, however, influenced directly only by Quality of Tax Service (β = 0.326) and Tax Morale (β = 0.163); the effects of National Pride (β = 0.058), Tax Knowledge (β = –0.045) and Tax Awareness (β = –0.025) are not statistically significant. The model also accounts for 29.4% of the variance in Tax Awareness (R^2 = 0.294) and 15.3% of the variation in Tax Compliance (R^2 = 0.153). The overall model shows that Tax Awareness is mainly an effect of Tax Knowledge, Quality of Tax Service, Tax Morale and National Pride but it does not mediate the effect of these on Tax Compliance. However, instead, there is a direct effect between service quality and tax morale on taxpayers' compliance behaviour.

4.10. Key Interpretations of Results

Results of the bootstrapped PLS-SEM suggest that all antecedent variables are significantly and positively linked with Tax Awareness (TA), which are the TM, TK, QTS, and NP. Of these predictors, Tax Morale (βTM→TA = 0.261) has the highest effect, followed by Tax Knowledge (βTK→TA = 0.245), National Pride (βNP→TA = 0.102) and Quality of Tax Service (βQTS→TA = 0.142). On the other side, Tax Compliance (TC) is only directly affected by QTS and TM; the relationship of Tax Awareness (TA) with TC is statistically insignificant. Because of this, there is no empirical support for any of the proposed indirect effects through Tax Awareness. The satisfactory psychometric quality of the measurement model further confirms these conclusions.

These results led to two major implications. First, positive service experiences and taxpayers' internal moral values seem to be close enough to the actual decisions that they directly influence compliance without mediation, that is, through tax awareness. Second, the operationalisation of Tax Awareness in this study is mainly informational understanding. Despite being potentially important, it might not be sufficiently needed to measure Tax Awareness in terms of behaviour change, given that the clarity of procedure and internalised civic responsibility are already measured in the Quality of Tax Service and Tax Morale. Hence, the lack of a significant TA → TS relationship helps to explain why mediation is not found, given that all of the antecedent variables were significant to Tax Awareness.

The hypotheses H1 to H4 is supported. Tax Morale, Tax Knowledge, Quality of Tax Service and National Pride show significant positive correlations with TA, with Tax Morale showing the strongest correlation. The results are similar to previous studies, which indicated that an increase in positive experiences and tax knowledge in the tax administration increased the level of awareness of taxpayers (Kirchler, 2007; Loo et al., 2010; Torgler & Schneider, 2009). On the other hand, civic values and national identity fostered greater awareness of tax

The hypothesis from H5–H9 were slightly supported. The two constructs, Quality of Tax Service and Tax Morale show a high direct impact on Tax Compliance, while Tax Knowledge, National Pride, and Tax Awareness show no direct effects. This result confirms Kirchler's (2007) service-oriented approach, where he suggests that a responsive and supportive tax administration creates a cooperative compliance climate. The results are also consistent with the work of Alm and Torgler (2011), who showed that ethical values and moral commitment are still relevant to compliance, even in the face of moderate deterrence.

However, H9 was not supported. All four antecedent variables are found to have significant impact on Tax Awareness; however, the influence of Tax Awareness on Tax Compliance is not significant. Awareness has been a common finding in earlier studies as a direct predictor of compliance, as discussed by Wahl et al. (2010). In the context of the city of Shenzhen, however, the present results indicate that tax awareness is linked more to knowledge, service quality, and moral values than to the behavior by which these values are supposed to have an impact on the phenomenon of tax compliance.

Finally, H10-H13 were not supported. This study found no statistical significance for the indirect relationships between tax knowledge and tax fairness with tax compliance, as well as tax awareness and tax fairness with tax compliance, contrary to findings of previous studies that reported significant indirect relationships (Saad, 2014; Wahl et al., 2010; Ntiamoah & Asare, 2022). The present results suggest that, for residents of Shenzhen, the relation between service quality, tax morality, and tax compliance is independent of tax awareness.

Tax Awareness may not be a factor to mediate compliance behaviour in the present model. However, its consistent relationship with Tax Knowledge, Quality of Tax Service, Tax Morale and National Pride indicates its role in terms of cognition, which includes normative and informational factors. That is, the relationship between tax awareness and tax behavioural compliance seems to be a result of value and learning internalisation; and it is not necessarily the immediate antecedent of tax behavioural compliance when service quality and moral commitment are taken into account together. This finding supports some of the theoretical perspectives whereby the process of cognition relates knowledge and personal values with behaviour. The current results support this process in its early stage, but do not support its involvement in the second behavioural stage. Tax Awareness can thus be expanded in future studies by adding the concept of "procedural self-efficacy" or perceived behavioural control, which Social Cognitive Theory has dealt with more closely in the area of behavioural enactment. Conditional or sequential relationships, such as interactions between Tax Awareness and Quality of Tax Service, or between QTS and TK and then to TS can also be investigated. The psychometric properties of the present measurement model are strong, which offers a good foundation for studying these alternative theoretical relationships.

Social cognitive theory sees the production of behaviour as being dependent on the interaction between environment, cognitive factors and personal factors, which occur all the time. The current results corroborate this view, because both the Quality of Tax Service and TM have a direct impact on Tax Compliance, whereas Tax Awareness rises due to these influences. Thus, it is possible that the lack of mediation is not a contradiction to SCT. Rather, it proposes that the cognitive processes may exist alongside or conditionally upon other factors, instead of being merely a mediating process. The theoretical link between awareness, knowledge and personal values with behaviour is therefore conceptually applicable, but the findings from Shenzhen suggest that QTS and TM have a more direct relationship with tax compliance.

The findings also have some practical implications. First, advancing the quality of the services provided is a key priority in the improvement services related to tax, and more specifically this can be achieved by improving services' reliability, transparency, responsiveness and making services easier to use, both for face-to-face as well as digital services. The relationship between QTS and TS is strong suggesting that investment in service quality is likely to be most fruitful in terms of taxpayer compliance. As suggested by Kirchler (2007) and Barare (2018), taxpayer support measures should focus on the ease of the procedures, the promptness of the help provided, and the transparency of the administration. Second, the outreach programmes must include messages of ethics and civic duty, which would emphasize the principles of justice, reciprocity, and social responsibility. If tax revenues are linked to visible public services, this could help to reinforce taxpayers' internal moral commitment, following the arguments of Torgler (2007). Third, awareness programs should not just inform but provide guidance on how to act by filing tutorials, correction procedures, interactive demonstrations, and procedural checklists, all of which guide taxpayers to adopt compliant behaviour in response to awareness. Fourth, communication strategies can be customized for taxpayers who show high levels of national pride, and patriotism can be sold with clear and simple instructions on how to comply. Fourth, communication strategies can be adjusted for taxpayers with high levels of national pride, and patriotism can be sold along with clear and simple instructions on how to comply. Lastly, future policy implementation should include ongoing monitoring and evaluation via the use of predictive evaluations, such as PLSpredict, as well as field-based experiments, which evaluate various service designs and communication strategies. In summary, the results show that tax awareness is closely related to tax knowledge, QTS, tax morality and national pride but service quality and internal moral commitment have the highest influence on the voluntary tax compliance. Thus, tax policy should focus on effective service provision, civic duty, and should foster education programs that are more effective at getting the word out and encouraging compliant behaviour.

5. Conclusion

This study used the method of Partial Least Squares Structural Equation Modelling (PLS-SEM) to examine the mediating effect of TA between four non-economic determinants TK, QTS, TM, NP and TA of taxpayers in Shenzhen, China. The results showed that all the items in the instrument had a high reliability and validity score, and the results of the structural model showed that the model had a satisfactory fit level. The empirical results found that all four antecedent variables showed positive associations, with Tax Morale (TM→TA) having the highest positive relationship (≈0.26), followed by Tax Knowledge (TK→TA) (≈0.25), Quality of Tax Service (QTS→TA) (≈0.14), and National Pride (NP→TA) (≈0.10). These predictors accounted for a moderate amount of variance for Tax Awareness. Tax Compliance, on the other hand, was significantly predicted only by Quality of Tax Service and Tax Morale, while the effects of Tax Knowledge, National Pride and Tax Awareness were not statistically significant. The direct effect of Tax Awareness on Tax Compliance was also present, though negligible, and did not explain enough data variance for Tax Compliance and the role of Tax Awareness as a mediator between the four antecedent variables was not supported. Taken together, these findings point towards two immediate factors that affect compliance: high-quality tax services and taxpayers' own moral disposition, while Tax Awareness entails knowledge, institutional experience, civic values and the influences of these factors than the process by which they become compliant. However, the significant relationships between the antecedents and Tax Awareness consistently reaffirm the importance of awareness as a cognitive construct, though not necessarily the last in the model to affect behavior.

There are several limitations that need to be considered when interpreting these results. The research design and use of self-reported measurements limit the interpretation of causal relationships, and some bias associated with the residual method may remain due to procedures used in the data collection. Furthermore, the operationalisation of TA is primarily concerned with recognising and knowing one's tax obligations and thus, may not have measured perceived behavioural control or procedural self-efficacy, which could have reduced its power in predicting tax compliance behaviour. However, the results are only applicable to the and cultural and administration environment of Shenzhen and the sampling method used in this study, so it is not easy to generalise. Additionally, modelling developed for only a relatively small share of the variance in tax compliance, indicating that other factors such as confidence in tax authorities, procedural justice, perceptions of fairness and deterrence factors may also affect tax compliance behaviour. Future studies should thus extend the Tax Awareness concept by adding procedural competence, self-efficacy and behavioural control aspects and include sequential and conditional relationships, such as interaction between Tax Awareness and Quality of Tax Service or causal pathway between Quality of Tax Service, TK, Tax Awareness and Tax Service. Causal inference would be strengthened, and external validity would improve, by methodological improvements such as longitudinal or experimental research designs, field-based interventions, and the incorporation of compliance archives. Further research should also include other indicators of prediction, such as f^2, Q^2, and PLSpredict, as well as sub and multi-group of the effect of various characteristics on service quality and moral interventions to determine who would benefit most from which services at what times. Finally, the direct effect of Quality of Tax Service and Tax Morale on Tax Compliance would be tested for its context-specific or generalizable nature across institutional settings, by incorporating an additional replication across different Chinese cities.

Ethics Approval and Consent to Participate

The researchers used the research ethics provided by the Research Ethics Committee of Universiti Putra Malaysia. All procedures performed in this study involving human participants were conducted in accordance with the ethical standards of the institutional research committee. Informed consent was obtained from all participants according to the Declaration of Helsinki.

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Conflict of Interest

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

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