

KNOWLEDGE MANAGEMENT SYSTEM AND TAX REVENUE GENERATION IN NIGERIA: THE MEDIATING ROLE OF IMPROVE TAXPAYERS' SERVICES

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Abstract

This study investigated the nexus between knowledge management system (KMS) and tax revenue generation directly and indirectly through improve taxpayers' services. Stratified random sampling technique was employed to collect quantitative data from 267 participants who were tax officers and taxpayers. Structural equation modeling (SEM) was used to analyze the data collected through WarpPLS 7.0 software. This study found that KMS can increase tax revenue generation directly and indirectly via improve taxpayers' services in Nigeria. In addition, KMS can improve taxpayers' services. The study recommends adoption of modern information and communication technology tools as KMS to enhance tax revenue generation. Also, other countries can adapt the model in this study to increase tax revenue generation.

Keywords: Knowledge management system, tax revenue generation, tax administrator, taxpayer, taxpayers' services, tax administration, Nigeria

1. Introduction

Tax revenue generation in Nigeria is low and a concern to government, public institutions, tax administrators and individual researchers (Pantamee, 2018; Gurama, 2019; Ganyam, Ivungu & Anongo, 2019). According to Abiola and Asiweh (2012), Adebisi and Gbegi (2013), Umar, Derashid and Ibrahim (2017), Pantamee (2018) and Gurama (2019), tax revenue generation in Nigeria is low and needs improvement. The quest to improve tax revenue generation in Nigeria resulted to several tax reforms (Oriakhi & Ahuru, 2014; Oti & Odey, 2016). The reforms involved tax system and administration. For example, the promulgation of petroleum profit tax (PPT) ordinance number 15 in 1959, income tax management act 1961, companies income tax act 1979 (Nwokoye & Rolle, 2015; Oti & Odey, 2016). Other reforms include introduction of value added tax (VAT) 1993, tax reform in 2004 which the policy document was launched in 2012. The tax reform in

2004 involved personal income tax (PIT), VAT, PPT, custom and exercise tax, education tax and Federal Inland Revenue Service (FIRS).

Furthermore, there are several researches that aimed at improving tax revenue generation in Nigeria. For example, Oriakhi and Osemwengie (2013) studied incentive and tax revenue productivity in Nigeria. Umar *et al.* (2017) developed a framework to improve income tax revenue generation in Nigeria based on moderating role of public governance quality. Pantamee, Mansor and Othman (2017) who employed governance and performance theory, developed a reform model for tax administration to improve tax revenue generation. Despite the several tax reforms and researches to improve tax revenue generation in Nigeria, low tax revenue generation is still a challenge and concern.

However, studies have shown that knowledge management system (KMS) improved tax revenue generation in other countries. On this note, Sejdija (2012) reported that KMS improved tax revenue generation in Germany. In the same vein, Rosdi, Chew, Samsudin and Hassan (2016) said KMS increased tax revenue generation at Inland Revenue Board of Malaysia. Other studies that affirmed KMS can improve tax revenue generation includes Jones (2014) and Wanjiku (2019) who said KMS improved tax revenue in Kenya. KMS enhance speedy and quality information delivery to tax administrators and taxpayers. Therefore, can improve tax administrators' work and taxpayers' compliance to pay tax. Studies including Bird (2015) and Semenova, Filippova and Efremova (2017) showed improve service delivery to taxpayers increase tax compliance and revenue. KMS and improve taxpayers' services can increase tax revenue generation. However, study that integrate KMS and improve taxpayers' services to enhance tax revenue generation is limited. Also, there is paucity of research on the relationship between KMS and tax revenue in Nigeria. Moreover, study on the relationship between improve taxpayers' services and tax revenue generation in Nigeria is limited. Therefore, this study fills the existing research gap as it: (1) examine the relationship between KMS and tax revenue generation in Nigeria, and (2) investigate the mediating role of improve taxpayers' services in the relationship between KMS and tax revenue generation in Nigeria. This study is structured into six sections which include introduction, literature review, research methodology, results, discussion, contribution and conclusion.

From the above, the following research questions follow:

- i. What is the relationship between knowledge management system and tax revenue generation in Nigeria?

ii. Does improve taxpayers' services mediate the relationship between knowledge management system and tax revenue generation in Nigeria?

Further, the objectives of the research is as follows:

i. To examine the relationship between knowledge management system and tax revenue generation in Nigeria.

ii. To investigate the mediating role of improve taxpayers' services in the relationship between knowledge management system and tax revenue generation in Nigeria.

2. Literature review

This section reviews related literature for the study. The literature review includes KMS and tax revenue generation in Nigeria. Next section presents literature on KMS.

2.1 Knowledge Management System

Knowledge management system (KMS) is information and communication technology (ICT) employed to facilitate knowledge creation, storage, retrieval, sharing, transfer and application (Budiardjo, Pamenan, Hidayanto, Meyliana & Cofriyanti, 2017; Shrafat, 2018; Choi, Ahn, Jung & Kim, 2020). KMS enhance speed of information and knowledge dissemination (Budiardjo *et al.*, 2017; Choi *et al.*, 2020), store information and knowledge (Leung, Shamsub, Tsang & Au, 2015; Choi *et al.*, 2020) and stimulate collaboration (Abdelrahman, Pappmichail & French, 2011; Budiardjo *et al.*, 2017). Studies showed KMS improved performance of other organizations (Matayong & Mahmood, 2013; Ozlen & Handzic, 2014; Iyengar, Sweeney & Montealegre, 2015; Mao, Liu, Zhang & Deng, 2016; Choi *et al.*, 2020; Lei & Wang, 2020). For example, Ozlen and Handzic (2014) said KMS improve productivity and competitiveness in an organization. Lei and Wang (2020) and Choi *et al.* (2020) affirmed that KMS improve competitive advantage of organizations. According to Lin, Tsai, Tarn and Hsu (2015), KMS increase quality of services provided by an organization.

Also, studies have shown KMS increased tax revenue generation in other countries. For instance, Sejdija (2012) said KMS improve tax revenue generation and performance of "North-Rhine Westphalia" (NRW) tax administration in Germany. In the same vein, Rosdi *et al.* (2016) affirmed KMS increase tax revenue generation at Inland Revenue Board of Malaysia. Other studies include Jones (2014) and Wanjiku (2019) who stated that KMS improved tax revenue generation in Kenyan Revenue Authority. Hence, this study believes KMS can improve tax revenue

generation in Nigeria. Tax administration in Nigeria such as FIRS launched electronic services (e-service) for speedy, qualitative and easy administrative process in order to increase tax revenue generation (FIRS, 2018). The e-services introduced by FIRS include both tax administrator and taxpayer e-services (FIRS, 2018). Tax administrator e-services includes e-mail, e-library, intranet portal, e-tax receipt and e-tax clearance (FIRS, 2018). On the other hand, e-taxpayer services include e-tax registration, e-filing and e-payment. This study believes that introduction of KMS in tax administration in Nigeria by FIRS can increase tax revenue generation. Therefore, this study hypothesized that:

H1: Knowledge management system improves tax revenue generation in Nigeria.

2.2 Tax Revenue Generation in Nigeria

Tax revenue generation in Nigeria is low (Umar *et al.*, 2017; Pantamee, 2018; Gurama, 2019; Ganyam *et al.*, 2019). The low tax revenue generation in Nigeria is evidenced by the low tax revenue ratio to Gross Domestic Product (GDP). Tax revenue ratio to GDP in Nigeria is low compared to minimum required ratio recommended by United Nation to achieve millennium development goals (World Bank, 2017; OECD, 2019). According to World Bank (2017) and OECD (2019), tax revenue ratio to GDP in Nigeria between the year 2012 and 2017 are between 5.3 and 9.4%, while the minimum requirement by United Nation is 15%. One of the global standards for measuring tax revenue performance is tax revenue ratio to GDP (IMF, 2011; OECD, 2013; Umar *et al.*, 2017).

Studies have attributed low tax revenue generation in Nigeria to diverse factors. According to previous studies, factors that cause low tax revenue generation in Nigeria include tax administration inefficiency and ineffectiveness (Ocheni, 2015; Pantamee, 2018; Gurama, 2019), non-compliance (Umar *et al.*, 2017), tax evasion and avoidance (Enejo & Gabriel, 2014), lack of accountability and bureaucracy (Aminu & Eluwa, 2014; Afuberoh & Okoye, 2014), inadequate modern facilities, inexperience tax officers and lack of accountability (Abiola & Asiweh, 2012; Umoru & Anyiwe, 2013) and inadequate and inefficient ICT (Ifere & Eko, 2014; Ajala & Adegbe, 2020). For example, Pantamee (2018) emphasized on tax administration inefficiency and ineffectiveness. Aminu and Eluwa (2014), and Afuberoh and Okoye (2014) said government inability to curb problem of accountability on how tax revenue is utilized and bureaucracy are the cause of low tax revenue generation. According to Ifere and Eko (2014), and Ajala and Adegbe (2020), inefficiency and ineffectiveness of ICT is a major causes of low tax revenue generation.

This study focus on ICT as KMS to improve tax revenue generation in Nigeria. In this era of knowledge-based economy, ICT is critical to tax administration and revenue performance. ICT enhance access to tax knowledge and information by both tax administrators and taxpayers (Sejdija, 2012). Thus, ICT improve services provided to taxpayers. ICT increase rapid distribution of information, speed to process case file and data transfer between computer database (Rosdi *et al.*, 2016). Timely and qualitative information are essential services taxpayers required to improve their compliance to pay tax. Thus, KMS can improve services to taxpayers. Lin *et al.* (2015), Downes and Marchant (2016) and Ferguson (2016) said KMS improve services delivery. On the other hand, studies showed improve services delivery to taxpayers can increase compliance to pay tax (Bird, 2015; Semenova *et al.*, 2017). Therefore, this study investigates the mediating role of improve taxpayers' services in the relationship between KMS and tax revenue generation in Nigeria. Hence, this study hypothesized that:

H2: Knowledge management system improves taxpayers' services in Nigeria.

H3: Improve taxpayers' services mediates the relationship between KMS and tax revenue generation in Nigeria.

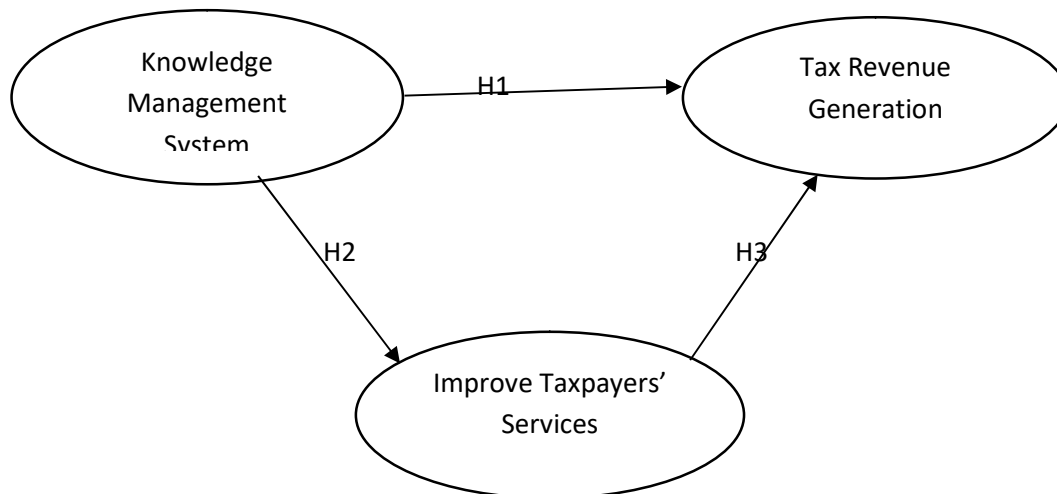


Figure 1: Research conceptual framework

In addition, Penrose (1959) and Barney (1986) said resources own by an organization provide competitive advantage and long-term superior performance. This study believes KMS and improve taxpayers' service can enhance sustainable

tax revenue generation. The RBV theory is one of the theories predominantly used in internal and external resources or capabilities and performance study (Barney & Arian; 2001; Smith & Rupp, 2002). The link between RBV theory and administrative performance has been established in both conceptual and empirical studies (Hinterhuber, 2013; Ritthaisong, Johri & Speece, 2014). For example, Ritthaisong *et al.* (2014) used the RBV to elaborate on the substitution of organization's internal resources to improve administrative performance. An administrative internal resource is a driving factor for administrative performance (Beleska-spasova, Glaister & Stride, 2012).

Besides, previous studies on KM employed the RBV theory for planning, understanding and guide. For example, Chuang (2004) employed RBV theory to study the link between KM capabilities and competitive advantage, and affirmed KM can improve administrative competitiveness. Also, Yousif (2012) who affirmed that a knowledge resource is a driving factor for administrative performance, employed RBV as the underpinning theory. Adeel (2016) utilized RBV as underpinning theory and found strong impact of KM on administrative performance. Moreover, studies showed KMS which is an internal resource can improve tax administration performance (Sejdija, 2012; Rosdi *et al.*, 2016). In continuation, studies have shown improve taxpayers' service as an organizational internal resource can improve tax administration performance (Bird, 2015; Semenova *et al.*, 2017). Hence, RBV as an underpinning theory for this study is justified.

2.3 Empirical Review

Literature review showed limited study on KMS in tax administration in Nigeria. Therefore, this study reviewed empirical studies in tax administration in Nigeria in general. Enahoro and Olabisi (2012) studied tax administration effectiveness in Lagos State to ascertain tax assessment, collection and remittance. The study employed survey method, administered structured questionnaire on 130 civil servants and found inefficient tax administration negatively affect tax revenue generation. Abiola and Asiweh (2012) who used Nigeria as a case to study developing country, examined the effect of tax administration on tax revenue. Data were collected from 93 participants via structured questionnaire online and revealed a positive relationship between enforcement machineries (manpower & IT) and improved tax revenue. Ogbonna and Appah (2016) investigated the impact of tax administration and revenue on economic growth in Nigeria. Primary and secondary data were sourced from structured questionnaire, academic journals, scholarly books and analysed via regression. The results revealed significant

relationship between VAT, PIT revenue and per capital income, PPT, CIT revenue, tax administration and GDP in Nigeria.

Olaoye and Atilola (2018) assessed the relationship between electronic tax (e-tax) payment and tax revenue generation in Nigeria. Secondary data were collected from FIRS, Central Bank of Nigeria bulletin and Quarterly Economic Reports. Graphs, descriptive statistics and paired sampled t-test were used for analysis and revealed e-tax has insignificant positive impact on VAT, CIT and CGT in Nigeria. Ganyam *et al.* (2019) studied the nexus between tax administration and tax revenue in Nigeria. Data were collected from 187 tax officers in Benue State Inland Revenue Service (BIRS) through questionnaire, analysed with descriptive statistics and t-test statistics employed to test the hypotheses. The study found e-tax system improved tax revenue generation and accountability significantly, and concluded a significant relationship between tax administration and tax revenue generation. Ajala and Adegbe (2020) studied the impact of IT on tax assessment effectiveness in Nigeria. Survey research approach was adopted and data collected from 641 participants were analysed through descriptive and inferential statistics. Results of the analysis showed a significant positive relationship between IT and tax assessment effectiveness in Nigeria. This study focus on empirical evidence in respect to KMS, improve taxpayers' service and tax revenue in Nigeria.

This study employed Resource-Based View (RBV) as underpinning theory. RBV has evolved overtime (Wernerfelt, 1984; Rumelt, 1984; Barney, 1986, 2001; Mahoney & Pandian, 1992; Teece & Pisano, 1994; Barney & Arikan, 2001; Jacks, Palvia, Schilhavy & Wang, 2011; Yousif, 2012). RBV emphasized tangible and intangible internal resources of an organization that is valuable, rare, inimitable, non-tradable and non-substitutable (VRIN) can improve performance (Wernerfelt, 1984; Barney, 1986, 1991, 2001; Jacks *et al.*, 2011; Yousif, 2012). These resources include but not limited to knowledge, human resource, information technology, services, organisational culture, training, leadership and organisational structure (Barney, 1986; Ferreira, Azevedo & Ortiz, 2011; Pratono & Mahmood, 2015). The hallmark of competitive advantage and organizational performance is appropriate investment in internal resources of an organization (Yousif, 2012). This study employed KMS and improve taxpayers' service as internal resources to improve tax revenue generation in Nigeria. Therefore, this believes RBV is a suitable underpinning theory.

3. Methods and Techniques

Quantitative research methodology was used for this study. Choice of quantitative methodology was influenced by the nature of research problem and questions of this study. Population of the study comprises of tax administrators in FIRS and

taxpayers under FIRS in Nigeria. In addition, stratified random sampling technique was used to select two hundred and sixty-seven (267) samples out of the population of study which consist of tax administrators and taxpayers that are two different groups. Stratified random sampling technique is suitable because population of the study consist of two different groups. Population of the study was categorized into two strata namely tax administrator and taxpayer and sample selected from each stratum.

Sample size for this study is based on minimum sample size recommended by Kock and Hadaya (2018) for research that employ PLS-SEM. According to Kock and Hadaya (2018), minimum sample size of one hundred and sixty (160) is adequate based on “inverse square root” method. Hence, “inverse square root” method recommended by Kock and Hadaya (2018) was used to determine sample size. Two hundred and twenty-six (226) questionnaires were returned out of two hundred and sixty-seven (267) distributed. Nine (9) questionnaires were rejected out of the two hundred and twenty-six (226) returned. Hence, two hundred and seventeen (217) questionnaires were used. In respect to the minimum sample size of one hundred and sixty (160) by Kock and Hadaya (2018), two hundred and seventeen (217) questionnaires that were used is adequate for this study.

Three variables in this study includes (1) KMS, (2) tax revenue generation, and (3) improve taxpayers’ services. KMS, tax revenue generation and improve taxpayers’ services are dependent, independent and mediating variables respectively. Measures for the three variables were adapted from Lin (2006), Mao *et al.* (2016) and Budiardjo *et al.* (2017). KMS, tax revenue generation and improve taxpayers’ services were measured with fifteen (15), seven (7) and nine (9) items respectively. All the items were tested in a pilot study for validity and reliability before the actual survey. Furthermore, Structured questionnaire was administered on 267 tax officers and taxpayers. The three variables were measured with thirty-one (31) items. A 5-point Likert scale was used to measure KMS (independent variable), tax revenue generation (dependent variable) and improve taxpayers’ services (mediating variable). The scale range from one (1) representing strongly disagree to five (5) strongly agree.

Multiple regression analysis and hypotheses testing were performed through partial least squares structural equation modeling (PLS-SEM) with WarpPLS 7.0 software. Thus, WarpPLS 7.0 software was used to analyze and test hypotheses in this study. Next section presents the results of this study.

4. Results and Discussions

This study used exploratory factor analysis to present structure of variables. Cronbach's alpha was used to test internal validity which showed all measures are reliable. Table 1 presents Cronbach's alpha which are 0.782, 0.766 and 0.840 for KMS, improve taxpayers' services (ITPS) and tax revenue generation (TRG) respectively. According to Hair, Hult, Ringle and Sarstedt (2014), 0.70 Cronbach's alpha coefficient is a show of a high reliable construct. Therefore, the constructs are reliable internally. Additionally, factor loadings, average variance extracted (AVE) and composite reliability (CR) were employed to assess convergent validity. The factor loadings as presented in Table 1 range from 0.707 to 0.998. CR for this research are 0.732, 0.714 and 0.869 for KMS, ITPS and TRG respectively. The factor loadings and CR are above 0.70 which is the threshold recommended by Hair, Black, Babin and Anderson (2010). KMS, ITPS and TRG constructs have AVEs of 0.570, 0.574 and 0.678 respectively and are above the 0.50 threshold suggested by Fornell and Larcker (1981). In this regard, reliability and validity measures were adequate.

Table 1: Model measurement

Construct	Items	Chronbach's α	Loading	AVE	CR
Knowledge management system		0.782		0.570	0.732
	KMS1		0.735		
	KMS2		0.713		
	KMS3		0.775		
	KMS4		0.796		
	KMS5		0.740		
	KMS6		0.707		
	KMS7		0.713		
	KMS8		0.723		
	KMS9		0.790		
	KMS10		0.791		
	KMS11		0.765		
	KMS12		0.713		
	KMS13		0.770		
	KMS14		0.708		
KMS15		0.738			

Construct	Items	Chronbach's α	Loading	AVE	CR
Improve taxpayers' services		0.766		0.574	0.714
	ITPS1		0.713		
	ITPS2		0.714		
	ITPS3		0.748		
	ITPS4		0.744		
	ITPS5		0.720		
	ITPS6		0.705		
	ITPS7		0.821		
	ITPS8		0.720		
ITPS9	0.788				
Tax revenue generation		0.840		0.678	0.869
	TRG1		0.729		
	TRG2		0.766		
	TRG3		0.957		
	TRG4		0.829		
	TRG5		0.992		
	TRG6		0.998		
	TRG7		0.993		

Results of discriminant validity are contained in Table 2. According to Fornell and Larcker (1981), discriminant validity is assessed by comparing square root of AVEs with correlation of pair constructs. Discriminant validity is satisfactory if square of AVEs are higher than correlation with square constructs. As presented in Table 2, square AVEs include 0.520, 0.527, 0.524 which are higher than 0.194, 0.490, 0.129 that are pair constructs. Therefore, discriminant validity for this study is satisfactory.

Table 2: Discriminant validity using Fornel and Larcker criteria

	KMS	TRG	ITPS
KMS	0.520		
TRG	0.194	0.527	
ITPS	0.490	0.129	0.524

Results of hypotheses testing

Hypotheses of this study were tested with P-value, associated path coefficients and effect size (f2) as presented in Table 3, and R² in Figure 2 was used to assess the structural model. Kock (2020) emphasized on the importance of P-value and path coefficients in testing hypothesis as P-values show strength of relationships which are provided by the path coefficient. In the same vein, R² and effect size (f2) are important in assessment of structural model (Kock, 2020). According to Cohen (1988) and Kock (2020), R² values of 0.02, 0.13 and 0.26 represent weak, moderate and substantial respectively. Hence, model for this study has substantial R² because it is 0.34 (see Figure 2).

Results of hypotheses testing in Table 3 showed relationships between KMS and TRG, KMS and ITPS, ITPS and TRG are supported and statistically significant at 0.05 level of significance. Hence, KMS improves tax revenue generation in Nigeria (H1), KMS improves taxpayers’ services in Nigeria (H2) and improve taxpayers’ services mediates the relationship between KMS and tax revenue generation in Nigeria. Relationship between KMS and ITPS is the strongest with path coefficient of 0.990, followed by ITPS and TRG (0.988), lastly, KMS and TRG (0.801). Effect size in Table 3 consists 0.127 (H1), 0.980 (H2) and 0.208 (H3). Effect size of 0.35, 0.15 and 0.02 values indicate large, medium and small effect respectively (Cohen, 1988; Kock, 2020). Accordingly, H2 has large effect size, H3 medium effect size and H1 small effect size. Next section presents discussion, contribution and conclusion.

Table 3: Results of hypotheses testing

Hypothesis	Relationship	Path coefficient	P-value	Effect size	Decision
H1	KMS → TRG	0.801	<0.001	0.127	Supported
H2	KMS → ITPS	0.990	<0.001	0.980	Supported
H3	ITPS → TRG	0.988	<0.001	0.208	Supported

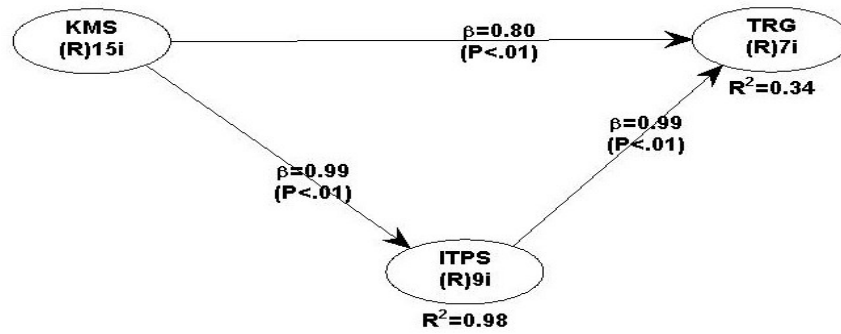


Figure 2: Research model and results of hypothesis testing.

Note: KMS = knowledge management system, TRG = tax revenue generation and ITPS = improve taxpayers' services.

5. Discussion

A positive relationship exists between KMS and tax revenue generation (Rosdi *et al.*, 2016), improve taxpayers' services and tax revenue generation (Bird, 2015; Semenova *et al.*, 2017). However, study on KMS in tax administration in Nigeria is limited. Moreover, there is paucity of study on improve taxpayers' services as a mediator in the relationship between KMS and tax revenue generation. Also, study on the relationship between KMS and improve taxpayers' services is limited in Nigeria. Hence, this study fills the research gaps as it proposed a model that integrate KMS, improve taxpayers' services and tax revenue generation. Thus, the model demonstrate relationship between KMS and tax revenue generation, KMS and improve taxpayers' services and the mediating role of improve taxpayers' services in the relationship between KMS and tax revenue generation.

Hypothesis 1 (H1) on the direct relationship between KMS and tax revenue generation, hypothesis 2 (H2) on the relationship between KMS and improve taxpayers' services and hypothesis 3 (H3) on the mediating role of improve taxpayers' services in the relationship between KMS and tax revenue generation were all supported based on the findings from data collection and analysis. Therefore, findings from empirical investigation showed KMS can increase tax revenue generation directly, and indirectly through improve taxpayers' services in Nigeria. Findings of this study are in line with (Sejdija, 2012; Rosdi *et al.*, 2016) who said KMS improved tax revenue generation in Germany and Malaysia respectively. In the same vein, Bird (2015) and Semenova *et al.* (2017) stated that improve service delivery to taxpayers enhance compliance and tax revenue generation.

6. Contribution and conclusion

This study contributes to literature in KMS, tax administration and RBV theory. It extends literature in KMS and RBV theory in tax administration context. The integrated model in this study can be adapted in other organizations to improve performance. Furthermore, the literature can be employed by researchers in knowledge management, tax administration and RBV theory for further research. Also, students and teachers of knowledge management and tax administration can employ the literature for learning and teaching. In addition, the study contributes practically as the proposed model integrate KMS and improve taxpayers' services to increase tax revenue generation. Thus, the model in this study can increase tax revenue generation in Nigeria if employed by tax administration. Increase tax revenue generation will culminate to economic growth, development of Nigeria and improve standard of living of Nigerian citizens. Both direct and indirect relationships are two strategies that can increase tax revenue generation in Nigeria. Also, the model can be adapted to improve performance of other organizations. This study is limited by its focus on KMS and not the entire knowledge management process (KMP). KMP entails knowledge creation, storage and retrieval, transfer and application while KMS is ICT employed as sub-component of KMP. This study focus on knowledge storage and retrieval which is ICT component in KMP. Hence, future study can focus on mediating role of improve taxpayers' service in the relationship between KMP and tax revenue generation.

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