



INTELLECTUAL CAPITAL AND PERFORMANCE OF UNIVERSITIES IN SOUTH-SOUTH, NIGERIA

AJIENKA, MERCY FINELADY, EDWINAH AMAH (Ph.D.), WILLIAMS OLORI (Ph.D.), UKOHA, OJIABO (Ph.D.) AND NEEDORN, RICHARD

Doctoral Candidate, Department of Management, University of Port Harcourt, Choba, Port Harcourt

Department of Management, University of Port Harcourt, Port Harcourt

Department of Management, University of Port Harcourt, Choba, Port Harcourt

Department of Management, University of Port Harcourt, Choba, Port Harcourt

Department of Management, University of Port Harcourt, Choba, Port Harcourt

Abstract: The study investigated the relationship between intellectual capital and performance of universities in South-South, Nigeria. The study employed a purposive sample of three top ranking Universities in Nigeria; University of Port Harcourt, Rivers State University, and University of Benin. A sample of three-hundred and sixty-one was drawn from the selected population of universities in Nigeria. The study utilized the cross-sectional research design. Data for the study were gotten through structured questionnaire and the data analytical technique employed was the structural equation modelling using the partial-least square estimation. The study affirms that the dimensions of intellectual capital such as; human capital, structural capital, relational capital and client capital all play significant role in stimulating the performance of universities, especially in terms of discipline referral and teachers satisfaction. The weakest dimension of intellectual capital observed in the University is the human capital dimensions. The study also observed that knowledge management culture helps catalyze the effect of intellectual capital on university performance. The study concludes that intellectual capital is a key ingredient in the promotion of university performance in the South South. In view of these observation, the study recommended amongst others that the university and government authority should encourage and invest in the development of its human capital through frequent orientation and reorientation and investment in research programmes for academic staff. It will help in the creation of new knowledge, improve the already existing knowledge and will help the lecturers to understand the recent trends in teaching and learning.

Keywords: Intellectual Capital, Performance, University, Knowledge Management.

1. INTRODUCTION

Nigerian Universities have come under serious scrutiny by various stakeholders largely owing to the protracted low ranking of the Nigerian universities in various ranking platforms. For instance, the Academic Ranking of World Universities (ARWU) conducted ranking for African universities in 2021, which reveals that only fifteen Nigerian universities made the top 100, with University of Ibadan having the 5th position and Ladoke Akintola

University of Technology having 99th position. Also, African University Ranking (<https://www.4icu.org/top-universities-africa>, 2021), shows that only eight Nigerian universities made the top 100, with University of Lagos having the 42nd position and Ahmadu Bello University having the 95th position.

Moreover, there appears to be loss of faith in the academic effectiveness of the universities in promoting economic growth and development. The high incidences of

Management and Human Resource Research Journal

An official Publication of Center for International Research Development

Double Blind Peer and Editorial Review International Referred Journal; Globally index

Available www.cirdjournal.com/index.php/mhrrj/index; E-mail: journals@cird.online



graduates' unemployment and the syndrome of unemployable university graduates pose great challenge to university leadership and the government (Ofoegbu & Alonge, 2017).

Moreover, there seem to be dissatisfaction regarding the quality of academic programs or service, which makes several families to send their children to foreign universities, including Ghana and Republic of Benin. Nigerian universities are known to run academic programs that have not been reviewed for decades. There is prevalence of publication of articles in predatory journals. Furthermore, there is a mass movement of lecturers to other countries, while students manifest high level of dissatisfaction with the ineffective academic system.

In addition, there is growing evidence that the nation's universities do not come up with novel research ideas than that of key competitors, research grants are not consistently obtained, national and international patents registered by universities are relatively few, while the socio-economic impact of university research on the community of stakeholders has not been encouraging.

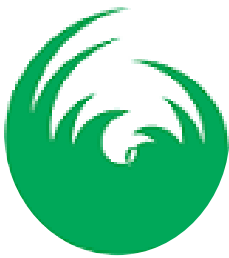
Specifically, the reported patent applications by all universities in Nigeria is grossly low compared to the number of PhDs graduated in the country every year; while an alarming 88% of Nigerian universities are yet to submit their first intellectual properties (Umukoro, 2019). Furthermore, from 2007-2018, only 120 patents were acquired by Nigerian universities, while in 2012 alone, North Carolina University received 806 patents with 248 pending and 3450 invention disclosures. Moreover, most universities in the country are not investing much on R&D (Akpochofo, 2009) and investment in research by government is irregular (Igwe, 1990; Donwa, 2006; Olayiwola, 2010). Other manifestations of problems concerning academic effectiveness of Nigerian universities are low income generated from research projects, poor

teaching performance, and low level of graduate employers' satisfaction.

Oyebade and Dike (n.d) posited that tertiary institutions in Nigeria so far have not met the expectations of relevant high-level manpower, development of intellectual capability of individuals and acquisition of physical and intellectual skills, promote and encourage scholarship as well as community service. This is due to a number of factors such as limited infrastructure, poor funding, poor staffing, poor record keeping and socio-political interferences. These problems have resulted in low quality outputs, lack of international competitiveness and comparability of outputs. Also, Asiyai (2013) and Mahabub (2014) posited that several factors pose as challenges of quality in higher education in Nigeria in the 21st century. These factors are highlighted as: inadequate funding, inadequate teaching staff/ poor quality of teaching staff, poor policy implementation, lack of resources, lack of information communication technology facilities, frequent labour disputes and closures of universities, lack of vibrant staff development programmes, cultism and other vices, brain drain and poor leadership.

Despite the plethora of causes of the low performance of Nigerian universities as espoused by scholars, this study tows the logic of prior research that intellectual capital will push the performance limits of organisations (Hsu & Sabherwal, 2011; Hsu & Wangng, 2012; Sydlar, Haefliger, & Pruksasa, 2014).

The aim of this work is to ascertain the relationship between intellectual capital and performance of Universities in South-South, Nigeria. The theoretical scope of this study includes the intellectual capital theory (Stewart, 1997), the Resource Based View theory (Barney, 1991) and the Resource orchestration theory (Sirmon & Hitt, 2007; Sirmon, Hitt & Gilbert, 2011). The content scope of this study covers the dimensions of intellectual



capital (human, relationship and structural capital management) its theories and philosophies, as well as the measures of university performance (student achievement, discipline referrals, teacher satisfaction, and research outcomes). Informed by Availability, the study employs a sample of 3 university; University of Port Harcourt (5th on the University Ranking), Rivers State University (10th on the University Ranking), University of Benin (15th on the University Ranking). The study was limited to Universities in South South Nigeria as informed by accessibility.

2. LITERATURE REVIEW

2.1. Theoretical Review

2.1.1 Intellectual Capital Theory

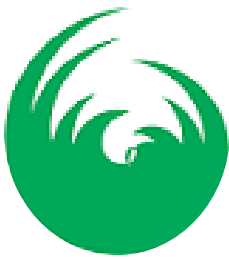
The intellectual capital theory has its root form the writings of Stewart (1997). According to Stewart (1997) intellectual capital is a resource of knowledge available on the company that produces high-value assets and economic benefits in the future for the company. Martı (2007), and Khalique, Shaari and Isa (2013) argued that the development of intellectual capital theory is based on the guidance, ideas and thoughts of influential practitioners. They established that intellectual capital theory explains how intangible factors determine the success of companies. Khalique, Shaari, Abdul and Isa (2011) proposed an integrated intellectual capital model (IICM), which was based on intellectual capital theory. This was considered as the exponential growth and development in the intellectual capital theory. In the intellectual capital field, Khalique (2012) applied this model in the first time to examine the impact of intellectual capital on the organizational performance of selected SMEs in Malaysia and Pakistan Operating in electrical and electronics sector.

The successful application of this model was the ground-breaking development in the intellectual capital theory. This theory claimed that intellectual capital is a prime

source for SMEs to get competitive edge in a knowledge-based economy. This model has secured an overwhelming response from the academicians, researchers, and practitioners around the world. Many researchers (Hashim et al., 2015; Khalique et al., 2015, 2018; Khalique and Mansor, 2016; Ullah et al., 2016) have applied this model in their research. The integrated intellectual capital model based on six components of intellectual capital namely, human capital, customer capital, structural capital, social capital, technological capital and spiritual capital. In this study, these components are used as independent variables while business performance is employed as a dependent variable. This theory claimed that intellectual capital has a positive and significant impact to enhance the organizational performance of SMEs.

2.1.2 The Resource Based View theory

The resource-based view (RBV) (Penrose, 1959; Wernerfelt, 1984; Barney, 1991) arguably constitutes one of the most popular theoretical frameworks in the management literature. The RBV takes an ‘inside-out’ view or firm-specific perspective on why organizations succeed or fail in the market place (Dicksen, 1996). Resources that are valuable, rare, inimitable and non-substitutable (Barney, 1991) make it possible for businesses to develop and maintain competitive advantages, to utilize these resources and competitive advantages for superior performance (Collis and Montgomery, 1995; Grant, 1991; Wernerfelt, 1984). According to RBV, an organization can be considered as a collection of physical resources, human resources and organizational resources (Barney, 1991; Amit and Shoemaker, 1993). Resources of organizations that are valuable, rare, imperfectly imitable and imperfectly substitutable are main source of sustainable competitive advantage for sustained superior performance (Barney, 1991). The resource-based theory has been applied in



various research relevant to the understanding of the relationships between intellectual capital and firm performance (Reed, 2000; Bounfor, 2003; Tseng & Goo, 2005; Juma, 2005). The theory attributes value creation potential and high firms performance to organisational resources and capabilities (Bharadwaj, 2000), and not by its industry structure (Bounfor, 2003; Tseng and Goo, 2005). In other words, resource-based theory emphasises on the usage of internal resources, both tangible physical assets and intangible assets which have been internalised and used effectively by firms to achieve competitive and profitable activities (Riahi-Belkaoui, 2003; Wernerfelt,

1984). These internal resources or strategic assets include brand names, patent, in-house knowledge of technology, employees skills, trade contact, capital equipment and efficient procedures (Wernerfelt, 1984; Grant, 1991).

2.2 Conceptual Review

Figure 2.1 is the conceptual framework of the study which maps out the presumed relationships between the explanatory variable (including its dimensions) and the target variable (including its measures): The conceptual model showing the interrelationship between the variables of the study and their proxies.

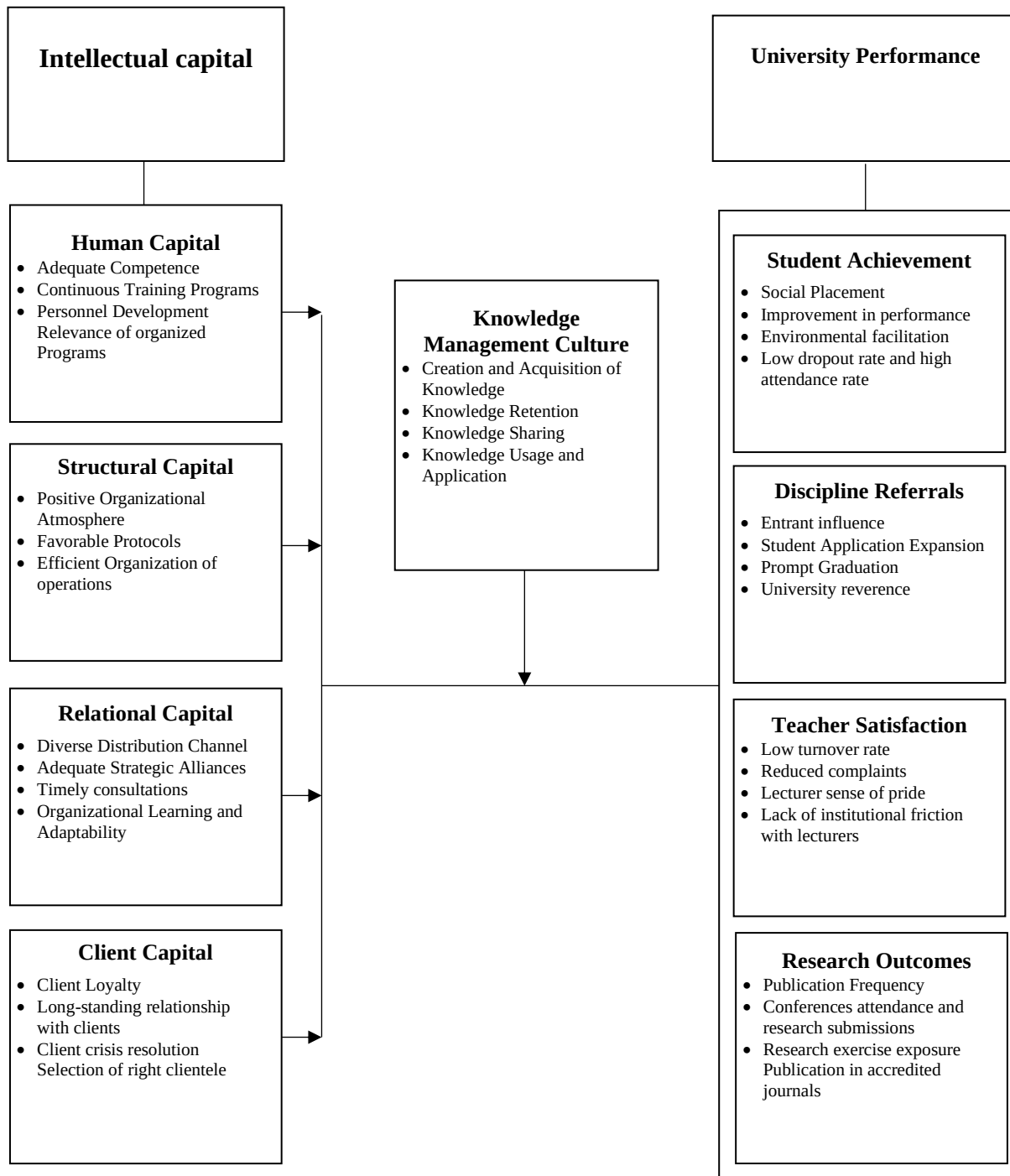
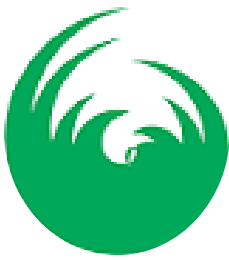




Figure 2.1: Conceptual framework

Source: Dimensions of Intellectual Capital were adapted from the works of Cricelli, Greco, Grimaldi and Dueñas (2018), and Wang, Cai, Liang, Wang and Xiang (2018); while the Measures of University Performance were adapted from the study of Yaakub and Mohamed (2020) and Cricelli, Greco, Grimaldi and Dueñas (2018).

Intellectual capital was measured in this study with dimensions such as human capital, structural capital, relational capital and client capital while university performance was measured with student achievement, discipline referrals, teacher satisfaction, and research outcomes.

Figure 2.1 shows the conceptualized relationship between Intellectual capital and university performance. The independent variable is Intellectual capital and is decomposed into human capital, structural capital, relational capital and client capital. These dimensions were adopted from the work of Wang, Cai, Liang, Wang and Xiang (2018). Furthermore, university performance is the dependent variable and is measured using student achievement, discipline referrals, teacher satisfaction, and research outcomes. These components were adopted from Yaakub and Mohamed (2020) and Cricelli, Greco, Grimaldi and Dueñas (2018).

2.3 Empirical Review

A lot of previous literature shows that intellectual capital has a significant role in the efficient performance of organizations (Muhammad & Ismail, 2009; Mention & Bontis, 2013) and also for an organization's competitive advantage (Mondal & Ghosh, 2012). Whereas the focus of this study is on education sector because education sector specially universities play critical and very important role in the development of the knowledge-oriented society.

Some of the studies on intellectual capital and performance are discussed below:

Nicolo, Raimo, Polcini and Vitolla (2021) investigated the link between performance and intellectual capital disclosure in the context of Italian Public universities. This study applies a content analysis to investigate the extent of voluntary Intellectual Capital disclosure (ICD) provided through performance reports by a sample of 59 Italian public universities. Four multivariate regression models are estimated to examine the associations between academic performance and the level of ICD and its sub-components, namely Human capital, structural capital, relational capital and client capital. The content analysis findings show that Italian public universities place a high value on disclosing human capital information. The results based on the multivariate analysis confirm the view that, in the case of higher performance, Italian Public Universities tend to convey a greater extent of information on both IC and its sub-components (ICDI; HCDI; SCDI and RCDI and university performance, $p < 0.01$); SCDI and RCDI ($p < 0.05$). This study broadens the scope of mainstream ICD literature's actions by bringing new expertise about the interconnections between university performance and voluntary ICD provided via performance reports. Connecting university performance to ICD can enhance the practical and theoretical understanding of the role that ICD may exert for universities to signaling their excellence and explain to stakeholders how they create value and achieve superior performance, focusing on their strategic - IC-based resources.

Rehman, Aslam and Iqbal (2021) studied intellectual capital efficiency and bank performance: Evidence from Islamic banks. The study employs a two-step system generalized method of moments (2SYS-GMM) estimator to analyze the data collected from 129 Islamic banks in 29 Muslim countries over the period from 2008 to 2017. The



study provides evidence that the performance of Islamic banks (IBs) is driven primarily by investment in ICE. The results indicate that structural capital efficiency (SCE) and relational capital efficiency (RCE) are the essential drivers of value in achieving high performance at Islamic banks. The results reveal that human capital efficiency (HCE) negatively affects the performance of IBs. Bank size and foreign ownership are also identified as significant drivers of IBs performance. This study helps IBs to maintain their ICE assets because they are the main drivers for sustaining competitive advantage as well as raising bank productivity. Our findings can help stakeholders and policymakers to recognize the significant components of ICE and a reasonable allocation among them for improving bank performance. To the best of our knowledge, this is the first empirical study to evaluate ICE and its relationship with Islamic banking performance in 29 Muslim countries across the Middle East, South Asia, and Southeast Asia.

Wen-Min (2021) examined intellectual capital and university performance in Taiwan. This study utilizes a two-stage data envelopment analysis to evaluate the cost and teaching and research efficiencies of public universities in Taiwan. Additionally, this paper also employs a truncated-regression to discuss whether intellectual capital affects the Operating efficiency of universities. The results demonstrate that the universities are much better at handling cost efficiencies than teaching and research efficiencies (average scores of cost efficiency and teaching and research efficiency are 0.913 and 0.823, which indicates that the universities in Taiwan already TCSrate at respectable levels in cost management). The regression analysis indicates that intellectual capital does play an important role in influencing teaching and research efficiency. Finally, the conceptual roadmap to performance improvement strategies, which helps the manager and/or

authorities to improve their Operating efficiencies, also is presented.

Castro, Ramirez and Escobar (2021) studied the relationship between intellectual capital and financial performance in Colombian listed banking entities. This study aims to investigate the relationship between intellectual capital and the financial performance of 7 Colombian banks for the period 2010-2016. The information on the variables analysed was taken from each bank's financial statement and the information on the market variables was obtained from the Colombian Stock Exchange. The value-added intellectual coefficient VAICTM method is used to identify whether there is a positive relationship with the following financial performance indicators: Return on assets (ROA), Market value (Market to book e MTB) and Tobin's q (share value indicator). Intellectual capital efficiencies (human and structural capital) and capital employed have been analysed and their impact on financial performance has been measured through and econometric model. The statistical significance of the correlation between the variables of the different models is represented by the p-value, which assumes as significant those variables with a value below 0.05, and as very significant those with a value below 0.01, allowing to assert that the variables are highly significant in all the models. The analysis indicates that associations between VAICTM, financial performance and corporate value are varied, so a homogeneous trend cannot be identified.

Bakhtiar, Haider, and Adnan (2021) studied the link between intellectual capital and performance in higher education sector in the cities of Rawalpindi and Islamabad, Pakistan. The study adopted a deductive approach. The survey questionnaire method was used to collect the primary data from the employees working in 20 public and private universities, using self-administered questionnaire.



The structural equation modelling was used to analyze the results. The results of the study indicate that intellectual capital has a positive impact on universities performance ($r = .792$, $r^2 = .612$, and $r^2 - \text{adjusted} = 0.51$). The result portrays that intellectual capital plays an important role in the universities and contributes to their performance positively.

Pedro, Alves and Leitão (2020) examined intellectual capital, performance and quality of life in higher education institutions. The study applied a Structural Equation Model and the Partial Least Squares method. Data were collected from 738 students and 587 lecturers/researchers from seven Portuguese public higher education institutions. The IC positively influence the institution's performance, through relational capital and structural capital (p value < 0.2). The study concluded that higher educational institutions should deploy strategies to improve and develop their intellectual capital in order to remain relevant in the current knowledge-driven economy.

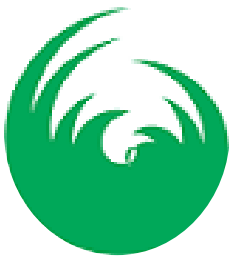
Mohammad (2020) studied outsourcing and public universities' performance in Nigeria. The purpose of the study was to examine the effect of outsourcing on public universities' performance in Nigeria. The study followed cross sectional survey design, while data were collected from 12 public universities in the country. The hypotheses were tested using partial least squares structural equation modelling. The study found significant relationships between outsourcing and quality of teaching and research (core activities) and outsourcing and the quality of other activities (non-core) ($r = 0.3570$, $t = 7.6305 > 1.96$; and $r = 0.369$, $t = 7.8425 > 1.96$). Hence, it was concluded that outsourcing of teaching and research to part-time and visiting lecturers enhance the quality of teaching and research in public universities. Thus, outsourcing increases the quality of other activities such as construction, transportation and food, cleaning services, security and

many more. In addition, outsourcing helps universities to TCSrate at low-cost.

Cricelli, Greco, Grimaldi, and Dueñas (2018) examined intellectual capital and university performance in emerging countries with particular interest in public universities in Colombia. The objective of the study was to explore the relationship between intellectual capital (IC) and performance of public universities in emerging countries in order to identify patterns and provide recommendations that may turn the universities' IC into development opportunities, in terms of research, innovation, and education. The study adopted a k-means clustering, a method of vector quantization. The Spearman's rank order correlation coefficient was used to test the relationships between the proxies of the variables. The results of this study show how different aspects of IC are associated with University performance (with all p-value less than 0.05). The study concluded that intellectual capital plays strategic role in the performance of the university in terms of research, innovation and education.

3. METHODOLOGY

Using the cross-sectional survey design, the population of the study are the entire twenty-nine (29) universities in South-South, Nigeria. This figure was ascertained from the Nigerian Universities Commission (2018). The accessible population were three selected Universities which are; University of Port Harcourt (5th on the University Ranking), Rivers State University (10th on the University Ranking), University of Benin (15th on the University Ranking). The ranking of the University was based on the Nigerian Unirank; uniRank tries to answer this question by publishing the 2021 Nigerian University Ranking of 160 Nigerian higher-education institutions meeting the following uniRank selection criteria: being chartered, licensed or accredited by the appropriate Nigerian higher



education-related organization, offering at least four-year undergraduate degrees (bachelor degrees) or postgraduate degrees (master or doctoral degrees), and delivering courses predominantly in a traditional, face-to-face, non-distance education format. This study adopted the judgmental sampling. A questionnaire named Intellectual capital and University performance Questionnaire (INTCQ) was developed and used for the study with the aid of Google forms online survey software. The questionnaire contains multiple-choice statements items across various sections. The instrument consists of four sections. Section A comprised 7 statement items about demographic variables of the respondents, Section B contains 24 statement items that capture University employees' perception of human capital, structural capital, relational capital, and client capital depicting intellectual capital. Section C contains 24 statement items that capture University employees' perception of student achievement, discipline referrals, teacher satisfaction and research outcomes depicting University performance. Section D contains 6 statement items that capture University employees' perception of knowledge management culture in the university.

Validity/Reliability of Instruments

Validity/Reliability of the Questionnaire Instrument

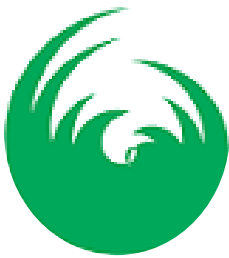
The face and content validity of the research instrument was achieved through expert opinions of supervisors in wording, construct, clarity and content while the convergent and discriminant validity was achieved through confirmatory factor analysis using the pilot study results. The Cronbach Alpha method was used to determine the internal reliability based on the pilot study.

Reliability of the Instrument

Reliability means that different applications of the same instrument produce congruent results with minimum variance. In this study, two internal consistency reliability methods were used; namely Cronbach's (1951) Alpha and composite methods. These methods are also consistent with Likert measurement scale, with each having a threshold value of 0.7. Thus, a reliability coefficient of 0.7 above is an indication that the instrument is reliable. Based on the pilot study results, the scale reliability coefficients are reported in Table 3.3 as follows:

Table 3.3: Reliability of the Variable Scales

S/N	Scale	Alpha Coefficient	Composite Reliability
1	Human capital (HMC)	0.765	0.815
2	Structural capital (STC)	0.816	0.829
3	Relational capital (RLC)	0.842	0.850
4	Client capital (CLC)	0.834	0.844
5	Student Achievement (STA)	0.831	0.948
6	Discipline referrals (DSR)	0.801	0.839
7	Teacher satisfaction (TCS)	0.771	0.861



8	Research outcomes (RSO)	0.815	0.849
9	Knowledge management culture (KMC)	0.894	0.840

Source: SPSS output

Regression/Structural Model

The functional models for the relationship between intellectual capital and University Performance are given as follows

$$UPF = f(INTC) \quad (3.1)$$

$$STA = f(HMC, STC, RLC, CLC) \quad (3.2)$$

$$DSR = f(HMC, STC, RLC, CLC) \quad (3.3)$$

$$TCS = f(HMC, STC, RLC, CLC) \quad (3.4)$$

$$RSO = f(HMC, STC, RLC, CLC) \quad (3.5)$$

$$UPFC = f(INTC, KMC, INTC) \quad (3.6)$$

Where;

INTB = Intellectual capital

UPF = University Performance

STA = Student Achievement

DSR = Discipline referrals

TCS = Teacher satisfaction

RSO = Research outcomes

HMC = Human capital

STC = Structural capital

RLC = Relational capital

CLC = Client capital

KMC = Knowledge management culture

UPFC = University Performance Composite (Mean composite of Student Achievement, discipline referrals, teacher satisfaction, and research outcomes)

INTC = Intellectual capital Composite (Mean composite of human capital, structural capital, relational capital, and client capital)

INTC*KMC = The interaction between intellectual capital and knowledge management culture.

The statistical (empirical) models for these relationships are given as follows:

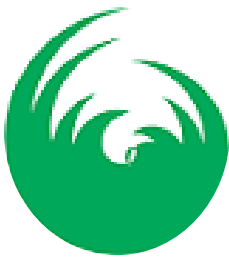
$$STA_i = \beta_0 + \beta_1 HMC_i + \beta_2 STC_i + \beta_3 RLC_i + \beta_4 CLC_i + \epsilon_i \quad (3.7)$$

$$DSR_i = \lambda_0 + \lambda_1 HMC_i + \lambda_2 STC_i + \lambda_3 RLC_i + \lambda_4 CLC_i + u_i \quad (3.8)$$

$$TCS_i = \phi_0 + \phi_1 HMC_i + \phi_2 STC_i + \phi_3 RLC_i + \phi_4 CLC_i + e_i \quad (3.9)$$

$$RSO_i = \phi_0 + \phi_1 HMC_i + \phi_2 STC_i + \phi_3 RLC_i + \phi_4 CLC_i + e_i \quad (3.10)$$

Where β_0, λ_0 and ϕ_0 in models are regression intercepts; $\beta's, \lambda's$ and $\phi's$ are the slope parameters capturing the effects of *HMC, STC, RLC AND clc*; and ϵ_{it}, u_{it} and e_{it} are the error terms representing all unmodelled factors. The results of models 3.7, 3.8, 3.9 and 3.10 would be used to test hypotheses 1 – 16.



The statistical model for the moderating role of knowledge management culture is given by:

$$UPF_i = \gamma_0 + \gamma_1 INTC_i + \gamma_2 KMC_i + \gamma_3 INTC * KMC_i + e_i \quad (3.11)$$

Where γ_0 is the model intercept, γ_1 is the slope parameter that captures the effect of intellectual capital composite, γ_2 is the slope parameter that captures the direct effect of knowledge management culture and γ_3 is the slope parameter that captures the interaction between intellectual capital and knowledge management culture. The moderating role of knowledge management culture is captured through the interaction term, hence, the sign, size and significance of γ_3 determine the effect of knowledge management culture on the relationship between intellectual capital and university performance.

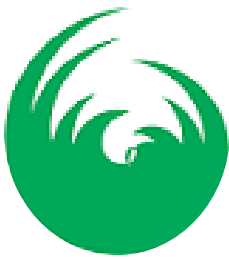
Two SEM streams are known in modern research practice. The first one is the “classical” SEM approach, also known by different names including covariance structure analysis, covariance based structural Equation Modelling (CB-SEM) or latent variable analysis – which utilizes software such as LISREL or AMOS (Henseler, Ringle & Sinkovics, 2009; Hair et al., 2010). Another stream is known in the literature as Partial Least Square (PLS), also called Variance Based Structural Equation Modelling (VB-SEM) or component-based SEM (Henseler et al., 2009; McDonald, 1996; Tenenchaus, 2008; Hwang, Mathotra, Klin, Tomiuk & Hong, 2010). This stream is based on application of Least Square using the PLS algorithm with regression-based methods or Generalized Structured Component Analysis (GSCA), what is a fully informational method that optimizes a global criterion (Tenenchaus, 2008; Hwang et al.(2010). PLS-SEM is mostly used in order to explain the relationships and prediction of target constructs (Hair, Hult, Ringle & Sarstedt, 2014).

Partial Least Square – Structural Equation Modelling has been employed in a variety of disciplines such as marketing (Henseler, Ringle & Smkovies, 2009), management information system (Chin, Macolin & Newstch, 2003; Penga & Lai, 2012), and business strategy (Hulland, 1999). Although, covariance based structural equation modelling (CB-SEM) is also used in several studies. This study employed variance based (PLS – SEM) approach for the following reasons:

- PLS-SEM accounts for unreliability in the measurement of latent variables, while estimating complex models comprising systems of equations, just the way CB-SEM does.
- PLS-SEM maximizes predictive accuracy (World, 1982), whereas SEM approached only models the covariance among variables.
- PLS-SEM imposes minimal demand on measurement scales, sample size, and distributional assumptions, thereby avoiding serious problems SEM such as inadmissible solutions and factor indeterminacy (Fornell & Bookstein, 1982).
- Finally, PLS-SEM provides great flexibility in estimating multiple interaction effects (Sackar, Echambadi, & Harrison, 2001). In the same vein, NVIVO 12.0 as a computer Aided Qualitative Data Analysis Software(CAQDAS) was deployed to organise and analyse the interview data.

Data Software Packages

The data was analyzed using four different statistical software packages; namely, Microsoft Excel version 2019, SPSS version 26, SMARTPLS version 3. Specifically, EXCEL was used to arrange, code and organize the primary raw data, and to plot all the descriptive graphs. SPSS was used to transform the coded primary data from



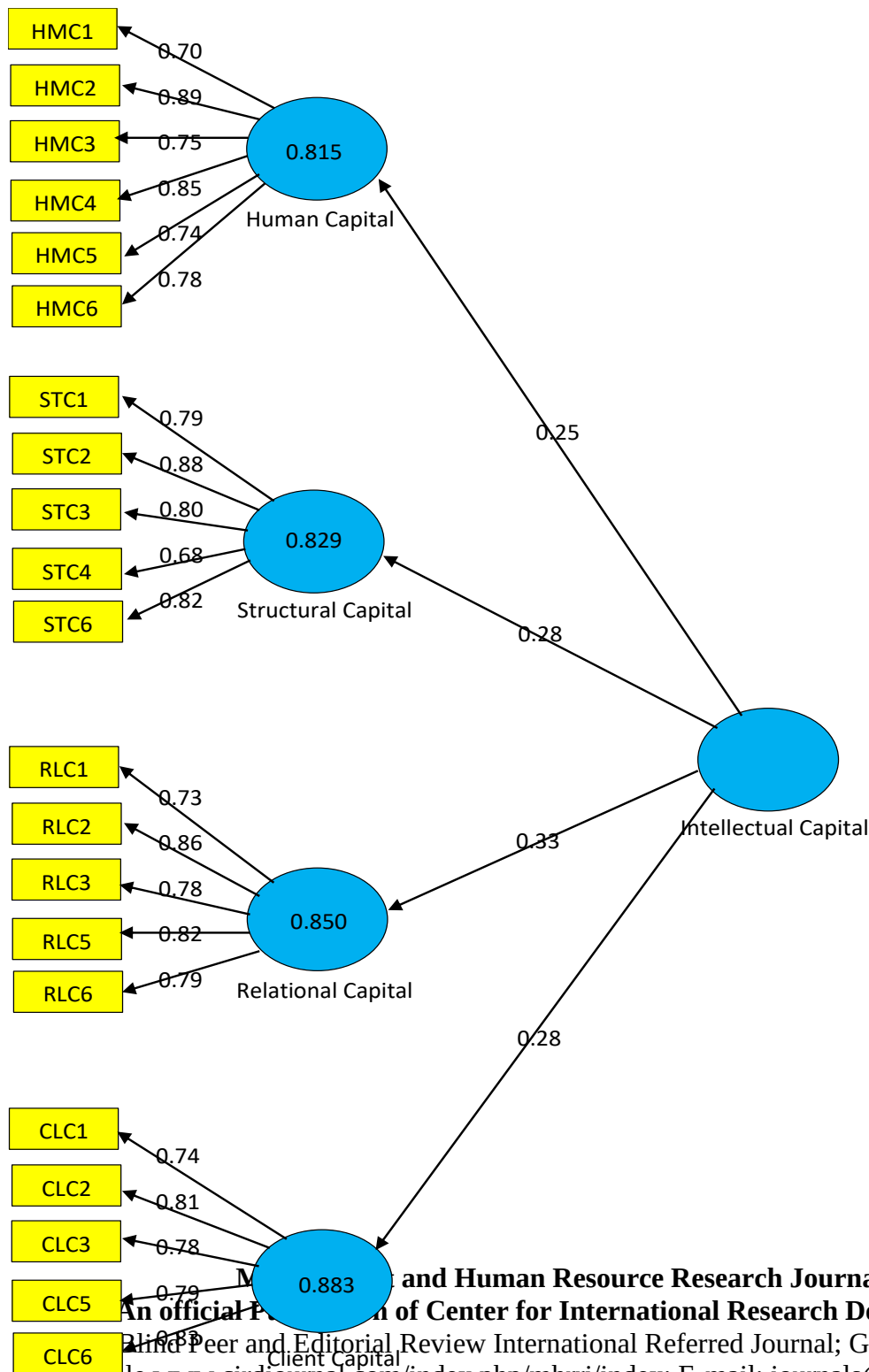
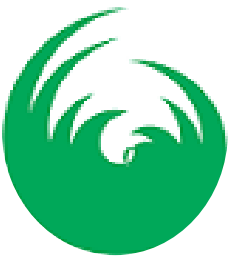
ordinal responses to interval scale data and compute the reliability of the data. SMARTPLS 3 was used to conduct the confirmatory factor analysis and the structural analysis.

4. RESULTS AND DISCUSSION

Confirmatory Factor Analysis for Intellectual capital Scale

Figure 4.1 presents the unstandardized and standardized solutions for the 16-item scale for four-factor intellectual capital CFA model. The Four Factors are human capital, structural capital, relational capital, and client capital. For each factor, the first path $HMC \rightarrow HMC1, STC \rightarrow STC1$

$RLC \rightarrow RLC1$ and $CLC \rightarrow CLC1$) was fixed at 1 for model identification. The four-factor model was estimated based on maximum likelihood estimation of the sample covariance matrix. The model fit was established using the Chi-Square (χ^2) and the root mean square error approximation (RMSEA). Composite reliability, convergent validity and discriminant validity were calculated based on the CFA results. The details for the CFA results are presented in Tables 4.1 while the inter-factor correlation matrix is presented in Table 4.2.



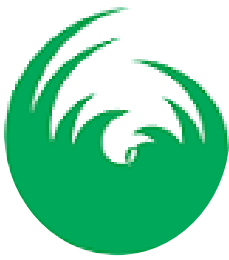


Figure 4.1: Standardized CFA Solution for Intellectual capital Model

Source: SMARTPLS 3 output

Table 4.1: Standardized CFA results for Intellectual Capital Model

Item	Factor	Beta	R^2	Error	AVE	RAVE	Composite Reliability	Alpha
HMC1	Human capital	0.70	0.49	0.45	0.717	0.847	0.887	0.723
HMC2	Human capital	0.89	0.79	0.28				
HMC3	Human capital	0.75	0.56	0.51				
HMC4	Human capital	0.85	0.72	0.45				
HMC5	Human capital	0.74	0.55	0.65				
HMC6	Human capital	0.78	0.61	0.22				
STC1	Structural capital	0.79	0.62	0.54	0.675	0.822	0.731	0.710
STC2	Structural capital	0.88	0.77	0.36				
STC3	Structural capital	0.80	0.64	0.59				
STC4	Structural capital	0.68	0.46	0.54				
STC6	Structural capital	0.82	0.67	0.38				
RLC1	Relational capital	0.73	0.53	0.33	0.818	0.904	0.911	0.722
RLC2	Relational capital	0.86	0.74	0.17				
RLC3	Relational capital	0.78	0.61	0.36				
RLC5	Relational capital	0.82	0.67	0.34				
RLC6	Relational capital	0.79	0.62	0.19				
CLC1	Client capital	0.74	0.55	0.52	0.737	0.858	0.894	0.718
CLC2	Client capital	0.81	0.66	0.29				
CLC3	Client capital	0.78	0.61	0.47				
CLC5	Client capital	0.79	0.62	0.46				
CLC6	Client capital	0.83	0.69	0.26				



$\chi^2 = 97.60$, p-value = 0.115109

RMSEA = 0.052

Source: SMARTPLS 3 output based on research data



Table 4.2: Inter-Factor Correlation Matrix for HMC, STC, RLC, and CLC

FACTOR	HMC	STC	RLC	CLC
HMC	1.000	0.95	0.48	0.47
STC	0.95	1.000	0.47	0.45
RLC	0.48	0.47	1.000	0.52
CLC	0.47	0.45	0.52	1.000

Source: SMARTPLS 3 output based on survey data

From Figure 4.1, it can be seen that all items load equally high on their respective factors, with factor loadings ranging 0.58 and 0.91. The squared multiple correlation in Table 4.16 shows that the proportion of the item variance explained by the underlying factor ranges between 34% and 83%, with STC5 ($R^2 = 0.34$) and HMC2 ($R^2 = 0.83$) having the lowest and highest explained variance respectively. Further, the correlation matrix in Table 4.2 shows that inter-factor correlations ranged from moderate to very high, with the correlation between human capital and structural capital being the strongest.

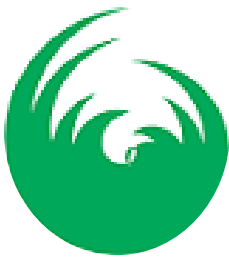
Further, Table 4.1 shows that the estimated four-factor CFA model is adequate for the data, with the Chi-square ($\chi^2 = 97.60$, p-value = 0.1151) and the RMSEA (= 0.052) both failing to reject the model. For a good CFA model, the Chi-square statistic should be nonsignificant (i.e. p-value > 0.05) while the RMSEA should be less than or equal to 0.08 (Matsunaga, 2010; Marsh *et al.*, 2004). Thus, the model fits the data adequately and can be used to calculate composite reliability, convergent and discriminant validity.

From Table 4.1, it can be seen that for all factors, the average variance extracted (AVE), which is 0.717, 0.675, 0.818, and 0.737 for human capital, structural capital, relational capital, and client capital respectively, is well

above the 0.50 cut-off point. The corresponding composite reliability coefficients of 0.887, 0.731, 0.911, and 0.894 are also well above 0.70 threshold value. Therefore, there is evidence that the CFA results satisfy the convergent reliability requirement. The square root of average variance extracted (RAVE) is 0.847, 0.822, 0.904, and 0.858 for human capital, structural capital, relational capital, and client capital respectively. These values are also substantially above all off-diagonal elements of the inter-factor correlation matrix in Table 4.2. Thus, the results have also satisfied the condition for discriminant validity. Overall, the four-factor CFA model for intellectual capital has acceptable validity and a clearly interpretable structure.

Confirmatory Factor Analysis for University Performance Scale

Figure 4.2 presents the unstandardized and standardized solutions for the 14-item scale for four-factor University Performance CFA model. The Four Factors are Student Achievement, discipline referrals, teacher satisfaction, and research outcomes. For each factor, the first path ($DFA \rightarrow DFA1, SVQ \rightarrow SVQ1$ TCS $\rightarrow OPE1$) and $ORR \rightarrow ORR1$) was fixed at 1 for model identification. The four-factor model was estimated based on maximum likelihood estimation of the sample covariance matrix. The model fit was established using the Chi-Square (χ^2) and the root



mean square error approximation (RMSEA). Composite reliability, convergent validity and discriminant validity were calculated based on the CFA results. The details for

the CFA results are presented in Tables 4.3 while the inter-factor correlation matrix is presented in Table 4.4.

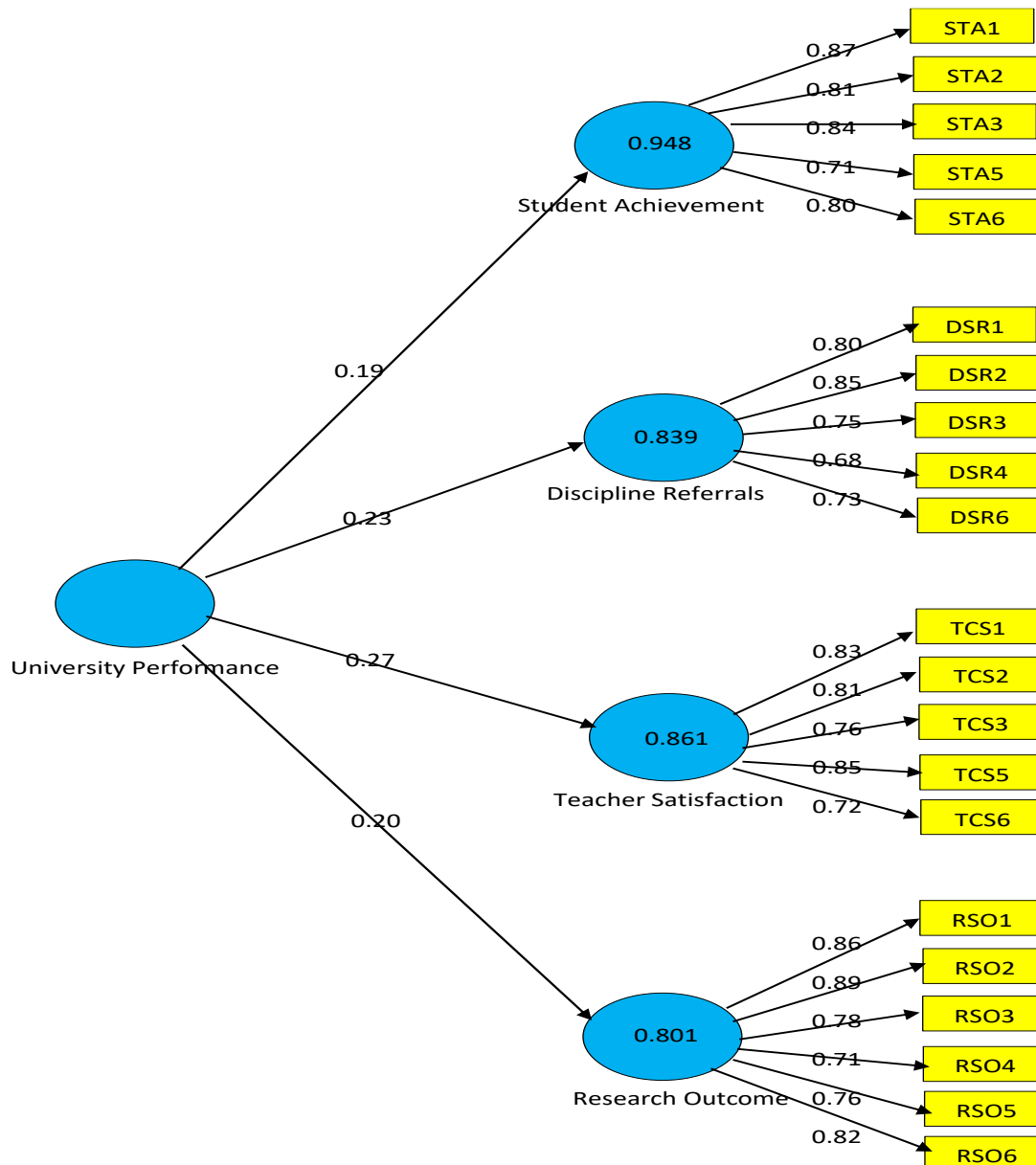


Figure 4.2: Standardized CFA Solution for University Performance Model

Source: SMARTPLS 3 output

Management and Human Resource Research Journal

An official Publication of Center for International Research Development

Double Blind Peer and Editorial Review International Referred Journal; Globally index

Available www.cirdjournal.com/index.php/mhrrj/index; E-mail: journals@cird.online



Table 4.3: Standardized CFA results for University Performance Model

Item	Factor	Beta	R^2	Error	AVE	RAVE	Composite Reliability	Alpha
OTD1	Student Achievement	0.87	0.76	0.283	0.670	0.818	0.907	0.898
OTD2	Student Achievement	0.81	0.66	0.291				
OTD3	Student Achievement	0.84	0.71	0.341				
OTD5	Student Achievement	0.71	0.50	0.455				
OTD6	Student Achievement	0.80	0.64	0.201				
DSR1	Discipline referrals	0.80	0.64	0.411	0.653	0.808	0.850	0.877
DSR2	Discipline referrals	0.85	0.72	0.229				
DSR3	Discipline referrals	0.75	0.56	0.483				
DSR4	Discipline referrals	0.68	0.46	0.599				
DSR6	Discipline referrals	0.73	0.53	0.381				
TCS1	Teacher satisfaction	0.83	0.69	0.213	0.627	0.792	0.870	0.817
TCS2	Teacher satisfaction	0.81	0.66	0.169				
TCS3	Teacher satisfaction	0.76	0.58	0.467				
TCS5	Teacher satisfaction	0.85	0.72	0.554				
TCS6	Teacher satisfaction	0.72	0.52	0.449				
RSO1	Research outcomes	0.86	0.74	0.831				
RSO2	Research outcomes	0.89	0.79	0.860				
RSO3	Research outcomes	0.78	0.61	0.753	0.650	0.806	0.841	0.864
RSO4	Research outcomes	0.72	0.52	0.678				
RSO5	Research outcomes	0.76	0.58	0.732				
RSO5	Research outcomes	0.82	0.67	0.571				
$\chi^2 = 397.41$, p-value = 0.0000				RMSEA = 0.161				

Source: SMARTPLS 3 output based on research data.

Table 4.4: Inter-Factor Correlation Matrix for STA, DSR, TCS, and RSO

Management and Human Resource Research Journal

An official Publication of Center for International Research Development

Double Blind Peer and Editorial Review International Referred Journal; Globally index

Available www.cirdjournal.com/index.php/mhrrj/index; E-mail: journals@cird.online



FACTOR	STA	DSR	TCS	RSO
STA	1.000	0.19	0.34	0.21
DSR	0.19	1.000	0.54	0.19
TCS	0.34	0.54	1.000	0.21
RSO	0.21	0.19	0.21	1.000

Source: SMARTPLS 3 output based on survey data.

From Figure 4.2, we can see that all items load quite high on their respective factors, with factor loadings ranging 0.51 and 0.95. The squared multiple correlation in Table 4.3 shows that the proportion of the item variance explained by the underlying factor ranges between 26% and 90%. Further, the correlation matrix in Table 4.4 shows that inter-factor correlations ranged from low to moderate, with the correlation between discipline referrals and teacher satisfaction being the strongest.

Further, Table 4.3, it can be seen that for all factors, the average variance extracted (AVE), which is 0.670, 0.673 and 0.627 for Student Achievement, Discipline referrals, Teacher satisfaction, and research outcomes respectively, is well above the 0.50 cut-off point. The corresponding composite reliability coefficients of 0.907, 0.850, 0.870 and 0.841 are also well above 0.70 threshold value. Therefore, the CFA results satisfy the convergent reliability requirement. The square root of average variance extracted (RAVE) is 0.818, 0.808, 0.792 and 0.806 for Student Achievement, discipline referrals, teacher satisfaction, and research outcomes respectively. These values are also substantially above all off-diagonal elements of the inter-factor correlation matrix in Table 4.4. Thus, the results have also satisfied the condition for discriminant validity.

However, Table 4.3 also shows that the estimated four-factor CFA model is adequate for the data, with the Chi-

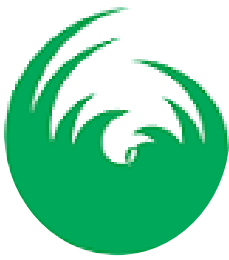
square ($\chi^2 = 397.41$, p-value = 0.0000) and the RMSEA (= 0.161) both clearly rejecting the model. For a good CFA model, the Chi-square statistic should be insignificant (i.e. p-value > 0.05) while the RMSEA should be less than or equal to 0.08 (Matsunaga, 2010; Marsh *et al.*, 2004). Thus, although, our model satisfies both convergent and discriminant validity, it does not fit our data adequately, hence, would require modification for improvement.

From Figure 4.2, it can be seen that adding some error covariances, as suggested by modification indices, substantially improves the model fit. The error covariances added are between: OTD1 and TCS1; OTD2 and TCS1; OTD3 and TCS1; OTD4 and TCS2; OTD4 and TCS5; DSR2 and OTD6; DSR2 and DSR1; and DSR4 and DSR1. The Chi-square ($\chi^2 = 71.16$, p-value = 0.1754) is now statistically nonsignificant while the RMSEA (= 0.024) is well below its threshold value. Therefore, the modified CFA model is a good to the data. Overall, although, the four-factor CFA model for University Performance has acceptable validity it is accepted with some modifications in terms of error covariances.

Discussion of Findings

Human capital and Student Achievement

The first hypothesis states that human capital has no significant effect on Student Achievement. On apirori, there is a positive relationship between human capital and Student Achievement. Therefore, expected, *apriori*, that



β_1 , which captures the effect of human capital in the Student Achievement model, would be positive and significant so that the above hypothesis would be rejected. The result shows that human capital has a positive but non statistically significant effect on Student Achievement.

Structural capital and Student Achievement

The second hypothesis states that structural capital has no significant effect on Student Achievement. On *apriori*, structural capital has a positive impact on Student Achievement. Therefore, our *apriori* expectation was that β_2 , which captures the effect of structural capital in the Student Achievement model, would be positive and significant so that the above hypothesis would be rejected. Consistent with the expectation, *apriori*, the results show that structural capital has a positive and highly significant effect on Student Achievement.

Relational capital and Student Achievement

The third hypothesis states that Relational capital has no significant effect on Student Achievement. On *apriori*, Relational capital can lead to improved Student Achievement. Therefore, it was expected *apriori* that, β_3 , which captures the effect of Relational capital in the Student Achievement model, would be positive and significant. Consistent with the expectation, *apriori*, the results show that Relational capital has a positive and highly significant effect on Student Achievement.

Client Capital and Student Achievement

The fourth hypothesis states that Client capital has no significant effect on Student Achievement. On *apriori*, Client capital can lead to improved Student Achievement. Therefore, it was expected *apriori* that, β_3 , which captures the effect of Client capital in the Student Achievement model, would be positive and significant. Consistent with the expectation, *apriori*, the results show that Client capital has a positive and highly significant effect on Student Achievement.

Human Capital and Discipline Referrals

The fifth hypothesis states that human capital has no significant effect on discipline referrals. On *apriori*, human capital has an enhancing effect on University Performance. Thus, it was expected, *apriori*, that λ_1 capturing the effect of human capital in the discipline referrals model, would be positive and significant so that the above hypothesis would be rejected. The results show that human capital has a positive and highly statistically significant effect on discipline referrals.

Structural Capital and Discipline Referrals

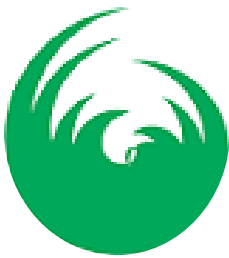
The sixth hypothesis states that structural capital has no significant effect on discipline referrals. It was expected, *apriori*, that λ_2 capturing the effect of structural capital in the discipline referrals model, would be positive and significant so that the above hypothesis would be rejected. The results show that human capital has a positive and highly statistically significant effect on discipline referrals.

Relational Capital and Discipline Referrals

The seventh hypothesis states that relational capital has no significant effect on discipline referrals. It was expected *apriori* that, λ_3 , which captures the effect of relational capital in the discipline referrals model, would be positive and significant. Consistent with the expectation, *apriori*, the results show that relational capital has a positive and significant effect on discipline referrals.

Client capital and Discipline referrals

The eighth hypothesis states that client capital has no significant effect on discipline referrals. It was expected *apriori* that, λ_4 , which captures the effect of client capital in the discipline referrals model, would be positive and significant. Consistent with the expectation, *apriori*, the results show that client capital has a positive and significant effect on discipline referrals.



Human capital and Teacher satisfaction

The ninth hypothesis states that human capital has no significant effect on teacher satisfaction. Our expectation, *apriori*, is that ϕ_1 , which captures the effect of human capital on teacher satisfaction, would be positive and significant, so that the above hypothesis would be rejected. The result shows that human capital has a positive but statistically nonsignificant effect on teacher satisfaction.

Structural capital and Teacher satisfaction

The tenth hypothesis states that structural capital has no significant effect on teacher satisfaction. On *apriori*, structural capital has a positive impact on teacher satisfaction. Therefore, our *apriori* expectation was that ϕ_2 , which captures the effect of structural capital in the teacher satisfaction model, would be positive and significant so that the above hypothesis would be rejected. Consistent with the expectation, *apriori*, the results show that structural capital has a positive and significant effect on Student Achievement.

Relational capital and Teacher satisfaction

The eleventh hypothesis states that relational capital has no significant effect on teacher satisfaction. On *apriori*, Relational capital can lead to University Performance. Therefore, we expected *apriori* that, ϕ_3 , which captures the effect of Relational capital in the teacher satisfaction model, would be positive and significant so that the above hypothesis would be rejected. Consistent with the expectation, *apriori*, the results show that relational capital has a positive and highly significant effect on teacher satisfaction.

Client capital and Teacher satisfaction

The twelfth hypothesis states that client capital has no significant effect on teacher satisfaction. On *apriori*, Client capital can lead to University Performance. Therefore, we expected *apriori* that, ϕ_4 , which captures the effect of Client capital in the teacher satisfaction model, would be

positive and significant so that the above hypothesis would be rejected. Consistent with the expectation, *apriori*, the results show that client capital has a positive and highly significant effect on teacher satisfaction.

Human capital and Research outcomes

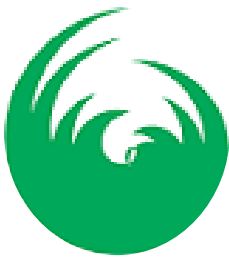
The thirteenth hypothesis states that human capital has no significant effect on research outcomes. On *apriori*, there is a positive relationship between human capital and research outcomes. Therefore, expected, *apriori*, that β_1 , which captures the effect of human capital in the research outcomes model, would be positive and significant so that the above hypothesis would be rejected.

The result shows that human capital has a positive but nonstatistically significant effect on research outcomes.

The fourteenth hypothesis states that structural capital has no significant effect on research outcomes. On *apriori*, structural capital has a positive impact on research outcomes. Therefore, our *apriori* expectation was that β_2 , which captures the effect of structural capital in the research outcomes model, would be positive and significant so that the above hypothesis would be rejected. Consistent with the expectation, *apriori*, the results show that structural capital has a positive and highly significant effect on research outcomes.

Relational capital and Research outcomes

The fifteenth hypothesis states that Relational capital has no significant effect on research outcomes. On *apriori*, Relational capital can lead to improved research outcomes. Therefore, it was expected *apriori* that, β_3 , which captures the effect of Relational capital in the research outcomes model, would be positive and significant. Consistent with the expectation, *apriori*, the results show that Relational capital has a positive and highly significant effect on research outcomes.



Client capital and Research outcomes

The sixteenth hypothesis states that Client capital has no significant effect on research outcomes. On *apriori*, Client capital can lead to improved research outcomes. Therefore, it was expected *apriori* that, β_3 , which captures the effect of Client capital in the research outcomes model, would be positive and significant. Consistent with the expectation, *apriori*, the results show that Client capital has a positive and highly significant effect on research outcomes.

The Moderating Role of Knowledge management culture

The seventeenth hypothesis states that knowledge management culture has no significant influence on the relationship between intellectual capital and University Performance. On *apriori*, knowledge management culture enhances the effectiveness of intellectual capital. Therefore, the expected *apriori* that, γ_3 , which captures the moderating effect of knowledge management culture in the University Performance model, would be positive and significant so that the above hypothesis would be rejected. Consistent with the expectation, *apriori*, the results show that knowledge management culture has a positive and highly significant effect on the relationship between intellectual capital and University Performance.

5. CONCLUSION AND RECOMMENDATION

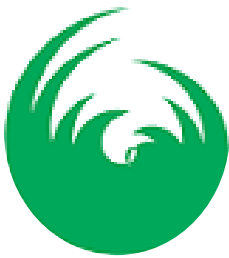
Based on the observations and empirical evidence, this research observed that all employed of intellectual capital are linked directly with the performance of universities. The research concludes that all employed components of intellectual capital have positive influence on the performance of universities but relational capital is more prominent among all of them in terms of correlation (r) value. This study aligns with the theoretical assertions and predictions of the Intellectual Capital Theory (Stewart, 1997)- and their perceptions of knowledge available on the company that produces high-value assets and economic

benefits in the future for the company; the Resource Based View Theory (Penrose, 1959; Wernerfelt, 1984; Barney, 1991)- bothering on resources that are valuable, rare, inimitable and non-substitutable (Barney, 1991) make it possible for businesses to develop and maintain competitive advantages, to utilize these resources and competitive advantages for superior performance and the Resource Orchestration Theory (Sirmon & Hitt, 2007; Sirmon, Hitt & Gilbert, 2011)- suggesting that the roles of managerial actions in the process of structuring a firm's resource portfolio, bundling the resources to build relevant capabilities and leveraging these capabilities to eventually realize a competitive advantage.

Recommendations

In view of the findings and the position of this study with regards the relationship between intellectual capital and performance of universities in South-South, Nigeria, this study recommends as follows:

- 1) The university and government authority should encourage and invest on research programmes for academic staff. It will help in the creation of new knowledge, improve the already existing knowledge and will help the lecturers to understand the recent trends in teaching and learning.
- 2) The management of universities should encourage cooperation and establish more strategic alliances in order to contribute and promote relational capital at the university.
- 3) The research recommends the establishment of a unit called the "Relations, Creative and Innovative Business Unit" that is directly linked to the Deputy Vice Chancellor, Research and Development, and

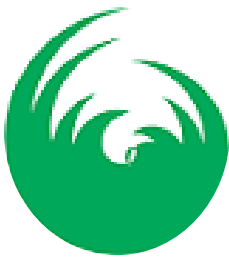


is responsible for all relations, patents rights and inventions.

- 4) The university management to emphasis on attracting competencies from the labour market as a means to achieve a competitive advantage in human capital at the university.
- 5) The university management to motivate and encourage employees to create and innovate to ensure the success of university services and improve them according to a specific and clear system.
- 6) The necessity for the university to support and encourage creativity, inventions through innovative solutions and ideas presented by employees, students and to put them into practice.

References

- Bakhtiar, M. J., Haider, M., & Adnan, S. (2021). The nexus of intellectual capital with performance in higher education sector through mediation of sense making. *Journal of Managerial Sciences*, 11(3), 262-384.
- Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management Science*, 17(1), 99-120.
- Bontis, N. (1998). Intellectual capital: an exploratory study that develops measures and models. *Manag. Decis.*, 36(2), 63-76.
- Bozeman, B. (2000). Technology transfer and public policy: A review of research and theory. *Research Policy*, 29, 627–655.
- Castro, J. P. G., Ramirez, D. F. D., Escobar, J. M. (2021). The relationship between intellectual capital and financial performance in Colombian listed banking entities. *Asia Pacific Management Review*, Article in Press.
- Cricelli, L., Greco, M., Grimaldi, M., & Dueñas, L.P.L. (2018). Intellectual capital and university performance in emerging countries: Evidence from Colombian public universities. *Journal of Intellectual Capital*, 19(1), 71-95.
- Grant, C., & Osanloo, A. (2015). Understanding, selecting, and integrating a theoretical framework in dissertation research: Creating the blueprint for ‘house’. *Administrative Issues Journal: Connecting Education, Practice and Research*, 4(2), 12-24.
- Hashim, M. J., Osman, I., & Alhabshi, S. M. (2015). Effect of intellectual capital on organizational performance. *Procedia – Social and Behavioural Sciences*, 211, 207-214.
- Hashim, N. A., Haron, H., & bin Ibrahim, D. M. N. (2019). Leadership and innovation on performance of private higher education institutions in Malaysia. *KnE Social Sciences*, 511–526.
- Khalique, M., Bontis, N., Abdul Nassir bin Shaari, J., & Hassan Md. Isa, A. (2015). Intellectual capital in small and medium enterprises in Pakistan. *J. Intellect. Cap.*, 16 (1) (2015), pp. 224-238.
- Mohammad, H. I. (2020). Outsourcing and public universities performance in Nigeria, the mediating effect of trust. *Journal of Global Operations and Strategic Sourcing*, ahead-of-print.
- Mondal, A., & Ghosh, S. K. (2012). Intellectual capital and financial performance of Indian banks. *Journal of Intellectual Capital*, 13(4), 515-530.
- Muhammad, N. M. N., & Ismail, M. K. A. (2009). Intellectual capital efficiency and firm’s performance: Study on Malaysian financial sectors. *International journal of economics and finance*, 1(2), 12-23.
- Nicolò, G. (2020). *The rise of intellectual capital disclosure from private to public sector: The case of Italian Public Universities*. Collana Accounting & Business Studies, FrancoAngeli.
- Nicolo, G., Raimo, N., Polcini, P. T., & Vitolla, F. (2021) investigated the link between performance and intellectual



capital disclosure in the context of Italian Public universities. *Evaluation and Program Planning*, 88, 1-12.

OECD (2013). *Supporting investment in knowledge capital, growth and innovation*. OECD Publishing.

Pedro, E., Alves, H., & Leitão, J. (2020). In search of intangible connections: intellectual capital, performance and quality of life in higher education institutions. *Higher education*, 12, 1–18.

Penrose, E.T. (1959). *The theory of growth of the firm*. New York: Wiley.

Rehman, A. U., Aslam, E., & Iqbal, A. (2021). Intellectual capital efficiency and bank performance: Evidence from Islamic banks. *Borsa Istanbul Review*, Article in Press.

Wen-Min, L. (2021). Intellectual capital and university performance in Taiwan. *Economic Modelling*, 29, 1081-1089.

Wu, W. Y., Chang, M. L., & Chen, C. W. (2008). Promoting innovation through the accumulation of intellectual capital, social capital, and entrepreneurial orientation. *R&D Management*, 38(3), 265-277.

Zhining, W., Shaohan, C., Huigang, L., Nianxin, W., & Erwei, X. (2018). Intellectual capital and firm performance: the mediating role of innovation speed and quality. *The International Journal of Human Resource Management*, 13(2), 23-35.