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MULTIDIMENSIONAL AND COMPARATIVE STUDY ON INTELLECTUAL CAPITAL AND ORGANISATIONAL PERFORMANCE

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Abstract. Intellectual capital (IC) as the knowledge-based equity of organizations is increasingly recognised as an important value contributor to performance. By building on previous research, the study examines the IC components of human capital, structural capital and relational capital as they relate to organisational performance. Following past international studies, a model is developed and statistically tested. A survey is administered to firms across several industries and data is analysed employing structural equation modelling. Recognising that replications and extensions of IC studies are vital to knowledge development, comparisons with international studies are made. The results provide support for the hypotheses where relationships between the IC components and performance are evident. These findings suggest that it is crucial for an organisation to optimise the utilisation of its human capital for the sake of optimising its structural capital, which leads to higher performance. By positioning the study in terms of IC literature, the study offers the ability to compare the present study findings with similar findings across countries.

Keywords: intellectual capital, human capital, structural capital, relational capital, performance, comparative study.

JEL Classification: D8, J24, L26, M13.

Introduction

Intellectual capital (IC), conceptualised as the knowledge-based equity of organizations has attracted a significant amount of scholarly and practitioner interest during the last decade (Döring 2014). Since its origin the notion of IC has been conceptualised broadly (Bontis 1998) with several studies relying on the key dimensions of human capital, structural capital and relational capital to describe IC (Cabrita, Bontis 2008; Hormiga *et al.* 2011). Scholars engaged with IC research have proposed different definitions, conceptualisations and categorisations (Djamil *et al.* 2013). Several authors suggest that the different dimensions of IC need to complement each other in order for organisations to achieve their organisational goals (Johannessen *et al.* 2005; Shree, Urban 2012; Tsakalerou 2015).

Moreover, from a practitioner perspective, Celenza and Rossi (2014) confirm that IC is an important source of value for an organisation and that the organisation can no longer viewed from a purely financial perspective but rather framed as the sum of interdependent IC assets. The quest for understanding the roots of an organisation's value is dependent on interpreting the components and sum of IC (Celenza, Rossi 2014; Gogan 2014). Research shows that there is a growing awareness that IC adds significantly to the value of a business (Cronje, Moolman 2013; Donatea *et al.* 2016) where more and more organisations seem to be identifying their core assets as the invisible and intangible elements constituting IC (Kamukama *et al.* 2010; Walter *et al.* 2016).

Although the importance of IC is proliferating, many organizations face problems with its management, mostly due to measurement difficulties (Kim, Mauborgne 2009). Additionally, it is increasingly accepted that the true source of economic value is the creation of IC, which is no longer simply the production of material goods (Chen *et al.* 2005). In this regard, Hormiga *et al.* (2011) point out that many organisations do not recognise their intangible assets and do not manage them correctly to improve their performance. Consequently, measuring IC is complex and difficult, with researchers suggesting that understanding the blend or mix of IC components responsible for enhanced value creation and performance is important for any organisation (Kamukama *et al.* 2010), as well as for emerging economies (Tripathy *et al.* 2015).

Although the results of a meta-study indicate that IC as a whole has a uniformly strong positive effect on firm performance, the effect that its constituents display are significantly lagging in this respect (Tsakalerou 2015). Recognising the shortcomings and literature gap in understanding the influence of individual components of IC, instead of undertaking conceptual investigations and adding new terminology to the already seemingly fuzzy conceptual field of IC (Gogan 2014), the purpose of this study is to unpack the different components of IC by highlighting their individual relevance to organisational performance. By building on previous research, the research question of this study stands as: to what extent do the IC components of human capital (HC), structural capital (SC) and relational capital (RC) influence organisational performance?

The study makes an important contribution as it focuses on components of IC, which are seen as strategic resources that should be properly managed in order to derive maximum benefits from them (Cronje, Moolman 2013). A three-dimensional standard categorisation of IC – human, organisational and relationship-centred, is used to represent the IC measures (Inkinen 2015). Human capital regards the firm's employees and their knowledge, education, skills, capabilities and characteristics (Bontis 1998). Organisation-centred (e.g. organisational and structural) capital includes the knowledge embedded in information technology (IT) systems and the outcomes and products of knowledge conversion, such as documents, databases, process descriptions, plans, the intellectual properties of the firm and all the non-human storehouses of knowledge within a firm (Bontis 1998). Finally, relationship-centred (e.g. relational and customer) capital consists of the value and knowledge embedded in the firm's external relationships, such as its connections with its customers, suppliers, distributors, partners, the local community and all the related parties (Inkinen 2015).

Additionally, and in line with calls for researchers to undertake replications and extensions of IC studies, which are vital to knowledge development (Dahlqvist *et al.* 2000), this study utilizes past frameworks used in Canada, Malaysia, Portugal and Belgium (Bontis 1998; Bontis *et al.* 2000; Cabrita, Vaz 2005; Cabrita, Bontis 2008) to compare research findings across countries. Researchers of these prior studies (Bontis 1998; Bontis *et al.* 2000; Firer, Williams 2003) have recommended generalization of their results to other countries and across industries to enhance understanding of IC. This is important considering that regional contexts influence both knowledge creation and knowledge assimilation separately (Cabrita, Vaz 2005; Puffer *et al.* 2016). By positioning the study in terms of established IC literature and existing studies, the study adds value by allowing for comparisons of the present study findings with similar findings across countries. Moreover, the study takes place in an under-researched emerging market context, South Africa (SA), which allows additional insights to be developed and to expand the theory on IC (Urban, Greyling 2015; Zoogah *et al.* 2015).

The study adds to the knowledge base by providing causal links as per the proposed conceptual model. Rather than merely test the relationship between IC and performance a more nuanced approach was adopted to show that the different variables – HC, SC and RC operate through different pathways or vary in the strength of the paths when they operate through the same pathways. Understanding the role that the different IC factors play in shaping organisational performance is valuable as it fills a gap in the literature where researchers have suggested that understanding the blend or mix of IC components responsible for enhanced value creation and performance is important for any organisation (Kamukama *et al.* 2010).

A further contribution of this study is the methodological and data analytical techniques that are used to advance IC research by employing Partial Least Squares Path modelling (PLS-SEM) as well as Covariance Based Structural Equation modelling (CB-SEM) (Barclay *et al.* 1995). While PLS-SEM (variance based) aims to optimise explanatory significance, CB-SEM aims to optimise fit. Subsequently, the study will rely on a theoretically deduced model based on the PLS-SEM derived constructs, which will then be modelled using CB-SEM.

1. Literature review

1.1. Intellectual capital (IC)

The theory of IC is rooted in the field of macroeconomic development theory, where Becker (1964) emphasised the social and economic importance of human capital theory and noted that the most valuable of all capitals is the investment in human beings. The construct of IC as initially conceptualised in 1969 by John Kenneth has been extensively researched since the 1990's (Cheng *et al.* 2010; Dahlqvist *et al.* 2000). One of the many developments in measuring IC has been the value added intellectual capital (VAIC) model (Gan, Saleh 2008). The VAIC model consists of three inputs of value creation efficiency that sum up the organisation's IC. The three inputs are capital employed efficiency, human capital efficiency and structural capital efficiency (Djamil *et al.* 2013).

For the purpose of this study, IC is conceptualised broadly as an intangible resource, which organisations use to improve performance, as constituted in terms of HC, SC and RC (Gogan 2014). Several studies confirm a positive relationship between the different components of IC in terms of HC, SC and RC and organisational performance (Bontis 1998; Bontis *et al.* 2000). These IC components are briefly described below in terms of how they relate to organisational performance and their underpinning in the study hypotheses.

1.2. Human capital (HC)

HC represents the individual knowledge stock of an organisation as represented by its employees and which is inseparable from its bearer (Becker 1964; Bontis *et al.* 2000; Mention, Bontis 2013). HC exemplifies the investment and costs in education and skills (Shree, Urban 2012) as held by employees through tangible and intangible resources. Employees generate IC through competence (skills and education), attitude (behavioural component) and intellectual agility (enabling one to change practise and consider innovative solutions) (Bontis *et al.* 2000). This suggests HC is the outcome of an organisation's calculated investment through the hiring of employees with high general skills (formal education) added to an investment in training of more specific skills (Roca-Puig *et al.* 2012). In addition, there is a great deal of evidence on the significant relationship between HC and firm's performance (Bontis *et al.* 2000; Cabrita, Bontis 2008). For instance, Rauch *et al.* (2005) argue that HC in terms of previous experience directly affects performance, as it leads to the development of experientially acquired skills or expertise, which will lead in turn to actions that are more knowledgeable and better decision-making. Moreover, research findings indicate that structuring HC with information systems may turn knowledge from being individual property to organisation property, such as SC (Bontis 1998). This transformation of HC into SC is important as without SC, IC would only remain HC (Bontis 1998) and unlike HC, SC is owned by the organisation (Mention, Bontis 2013). In sum, at the level of the organisation, human capital and knowledge are socially embedded and are heavily influenced by social structures (Osterloh, Frey 2000). Consequently, IC is not just a function of knowledge acquisition, but organisations also need to provide opportunities for training which broadens employee insights (Chen, Huang. 2009) and stimulates exchange of experience and expertise, in order to increase organisational performance (Mention, Bontis 2013).

1.3. Structural capital (SC)

SC is the infrastructure that encourages human resources to create and leverage organisational knowledge (Mention, Bontis 2013). SC is closely related to social capital that is concerned with the value of social networks, bonding similar people and bridging between diverse people, with norms of reciprocity (Uslaner 2001). SC is a valuable strategic asset comprising of non-human assets like information systems, routines, procedures and databases. It contains architecture for retaining, packaging and transferring knowledge along the value chain (Chiva, Alegre 2009). SC includes all the non-human storages of knowledge and deals with the mechanisms and structures that assist employees to achieve optima learning (Bontis 1998; Bontis *et al.* 2000). Research findings in

terms of the relationship between SC and performance indicate a complex relationship (Mention, Bontis 2013). SC represents one of the most important factors in driving performance as it provides networks to others involved in supply chains, distribution and other businesses, and increased SC eases the accessibility to specific resources (Chiva, Alegre 2009). Structuring HC with information systems may turn knowledge from being individual property to organisation property, in terms of SC (Bontis 1998). HC has a significant influence on SC and RC a significant influence over SC irrespective of industry (Bontis *et al.* 2000; Cabrita, Vaz 2005). The links between SC and HC and RC are important to increase performance as SC facilitates intra organisation co-ordination and represents organisational memory and facilitates IC (Mention, Bontis 2013).

1.4. Relational capital (RC)

RC refers to the knowledge embedded in relationships with any stakeholder influencing the organisation (de Pablos 2003), and which is positively related to its longevity (Bontis *et al.* 2000). Implementing knowledge management initiatives, building project databases and fostering dialogue internally and externally with different stakeholders generally enhances the capability of the organisation to increase its level of RC (Gogan 2014). Research finds that an organisational structure facilitating inclusive decision-making practices supports organisational learning and helps build RC (Chiva *et al.* 2007). Intellectual stimulation is positively related to delegative leadership that is a characteristic of creative organisations, which have confidence in the abilities of their workforce (Osterloh, Frey 2000). Cabrita and Bontis (2008) connect relational capital with customer capital, which is the knowledge embedded in relationships with customers, suppliers, industry associations and other stakeholders in order to influence organisational performance. Moreover, RC has been found to be positively associated with organisational performance in several studies (Bontis *et al.* 2000; Cabrita, Vaz 2005). This relationship is evident when relational databases and communication channels are established which could then be leveraged to increase IC of collaborators and employees, creating a feeling of unity while fostering dialogue and commitment towards the achievement of the organisational performance (Gogan 2014).

2. Hypotheses and conceptual model

Hypotheses (H 1–6) are formulated building on past research and empirical findings where the relationship between the different components of IC and organisational performance were examined in Canada, Malaysia, Portugal, Luxembourg-Belgium and South Africa (Bontis 1998; Bontis *et al.* 2000; Cabrita, Vaz 2005; Cabrita, Bontis 2008; Mention, Bontis 2013). Following these past studies, which suggest that the components of IC are closely intertwined, a conceptual model is developed which represents the IC components of HC, RC and SC as directly influencing organisational performance. Figure 1 presents the conceptual model and shows the hypothesis with the predicted relationships between the constructs.

The following links in terms of the hypotheses are made based on the aforementioned literature: HC is positioned as a driver of SC (H1) as well as RC (H2) following the

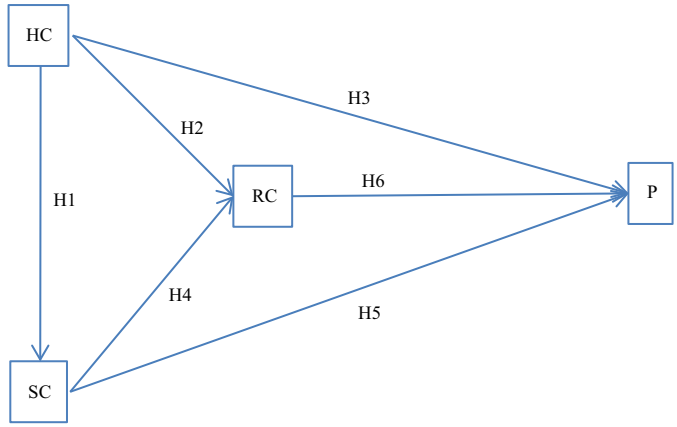

Fig. 1. Study model with hypotheses

rationale that forming HC with information systems may turn knowledge from being individual property to SC and RC (Bontis 1998). HC is also expected to influence performance (H3) as several studies confirm a positive relationship between the HC and performance (Bontis 1998; Bontis *et al.* 2000; Rauch *et al.* 2005; Inkinen 2015). SC is also linked to RC (H4) as SC facilitates intra-organisation co-ordination and represents organisational memory in terms of RC (Mention, Bontis 2013). In addition, SC is expected to influence performance (H5), as it represents one of the most important factors in driving performance insofar SC provides structures to connect with people involved in supply chains, distribution and other businesses, and provides accessibility to specific resources (Chiva, Alegre 2009). Lastly, RC is linked to performance as research has reported a positive association with organisational performance (H6) (Bontis *et al.* 2000; Cabrita, Bontis 2008), as a result of developing databases and fostering dialogue internally and externally with different stakeholders generally enhances efficiencies and effectiveness leading to increased performance (Gogan 2014).

These components of IC may also be viewed as a set of interrelated processes that together describe and offer insights into IC more coherently. Indeed, all three components represent the causal chain of IC, and are representative of an iterative process. By relying on such a multidimensional process orientated approach towards studying the components of HC, SC and RC, the study is likely to have greater explanatory power and practical importance.

3. Research methodology

3.1. Data collection

Simple random sampling method was used to select respondents from sampling lists from the South African Chamber of Commerce and Industry (SACCI 2013), the Gauteng Chambers of Commerce (2013), the Johannesburg Chamber of Commerce and Industry (2013), and the sampling frame from Bizcommunity (Bizcommunity 2013). Following previous studies (Bontis 1998; Cabrita, Vaz 2005) which recommend gener-

alization of the constructs under investigation, a diverse set of industries were surveyed, which included amongst others manufacturers, service firms, high-technology firms, low-technology firms and a mix of financial and insurance firms. The respondent was the CEO or owner of the organisation or alternatively a person with high influence in the organisation (Cabrita,Vaz 2005). An initial 1 110 surveys were sent out electronically and after continuous follow-ups and after courteous reminders a total number of 163 responses was obtained (15% response rate). This response rate was deemed acceptable considering the online e-mail-solicited surveys of this nature (Hair *et al.* 2010). Sample characteristics reveal that the majority (73%) respondents worked in organisations, which had between 500 and 700 employees, while close to a third, had been in existence for over 50 years. More than half of these organisations had an annual turnover of over 1 billion rand per annum. Based on the relative heterogeneity of the many different industry sectors sampled, it was anticipated that the generalizability of the study was strengthened.

3.2. Measures

Based on previous research, suitable measures were identified where theoretical and empirical support was evident for each construct as discussed in the literature review section. The questionnaire was adapted from past studies (Bontis 1997; Bontis 1998; Cabrita, Bontis 2008) to accurately reflect the conceptual model in terms of the hypotheses as per the independent variables (IV) – HC (16 items), SC (13 items) and RC (20 items). Various performance measures have been noted in the literature which include: profitability, market value, employment growth, sales growth, return on investment and equity (ROI, ROE), and level of satisfaction (Dahlqvist *et al.* 2000; Hormiga *et al.* 2011). These variables reflect the dependent variable (DV) – organisational performance (OP) (10 items). All items were measured along a seven-point Likert-type scale, ranging from "mostly disagree" = (1) to "mostly agree" = (7), where respondents were required to indicate the extent of their agreement with each statement. In some instances, items were reverse coded in the scale analyses and the wording was adjusted to reflect the South African context. Since the study used a self-report questionnaire to capture the individual-level measures at one point in time, common method bias may affect empirical results and conclusions. A number of procedural and statistical steps were taken to minimise the risk. Procedurally, in order to reduce socially desirable responses and item ambiguity, the questionnaire featured specific, clear, concise items, with a "counter-balanced" question order, and the respondents could choose to remain completely anonymous (Podsakoff *et al.* 2003). Statistically, to ensure rigour in the results all items relating to the IV and DV variables were explored in a single Principal Component Analysis (PCA), using Harman's one-factor test (Podsakoff *et al.* 2003) to check if one component accounted for most of the variance. Five components with eigenvalues greater than 1.0 were detected, which accounted for 59 per cent of the variance. The largest component accounted for 18 per cent. These results suggest that common method bias was not a serious concern in this study.

3.3. Analytical techniques

Data was analysed using the primary path modelling tool – PLS (Partial Least Squares). PLS path modelling can be described as an iterative combination of PCA, which relates measurable constructs to path analysis (Hair *et al.* 2010). In the present study, considering that the conceptual model was classified as a latent measurement model, values loading onto their respective constructs with values greater than 0.5 were deemed acceptable and the resulting constructs were then tested for composite reliability, internal consistency reliability, convergence validity and discriminant validity. Additionally, a covariant-based SEM was used by specifically using the CALIS procedure (SAS).

4. Results

4.1. Construct reliability and validity results

Factor analysis resulted in the retention of the latent variables (LV) and manifest variables (MV) after each stage of filtering, which included: (1) conorganisationatory factor analysis with a cut off at 0.5, (2) individual factor analysis with a cut off at 0.5, (3) individual factor analysis with a cut off at 0.7 and (4) individual FA with a cut off at 0.78 respectively. A second order factor analysis was then conducted using confirmatory factor analysis (CFA) which showed an overall good fit with the following indices: Chi-square = 5.36 (df = 3, $p < 0.001$), SRMSR = 0.01, RMSEA = 0.05 (90 percent CI = 0.00 – 0.10), CFI = 0.99, NNFI = 0.99 (Bentler 1990). Discriminant validity was assessed using Fornell and Larcker's (1981) criteria. The square root of average variance extracted (AVE) for each construct was compared to the shared variance between constructs and all other constructs. Apart from RC (0.64), the explained variance exceeded all combinations of shared variance, confirming discriminant validity. Table 1 shows the final data set. It compares the MVs retained in the present study with the MVs retained in past studies. Reliabilities were tested for the constructs which was derived at by retaining 22 manifest variables with loadings of 0.78 and upwards. Across all factors, the Cronbach's alpha coefficients values exceed the benchmark of 0.70 as suggested by Nunnally (1978).

Table 2 summarises the current study and comparative fit statistics for the covariance-based structural equation models (CB-SEM). The fit statistics in Table 2 provide a reasonable fit status of the models. These models were built up from the constructs as derived using partial least squares (PLS) as previously mentioned, where: * M1: Canada (Bontis 1998); *M2: Malaysia (Bontis *et al.* 2000); *M3: Portugal (Cabrita, Bontis 2008); *M4: Belgium (Mention, Bontis 2013).

4.2. Hypotheses testing

Initially, a summary (Table 3) of the path modelling results for all the hypotheses as per the linkages in the conceptual model is displayed and discussed. Secondly, each hypothesis is analysed separately and comparatively as per the study objectives (Tables 4–7). Table 3 shows the summarised results of the path modelling which relied on path analysis utilising PLS-Graph. The standardised beta coefficient signifies the magnitude

Table 1. Constructs: final data set and country comparisons

South Africa	Canada	Malaysia	Portugal	Belgium	South Africa	Canada	Malaysia	Portugal	Belgium
Human Capital					Structural Capital				
H8	H6	H3	H1	H3	S8	S1	S7	S2	S4
H9	H8	H8	H3	H4	S10	S2	S9	S3	S7
H11	H9	H10	H5	H9	S15	S3	S10	S6	S8
H16	H11	H11	H6	H11		S4	S11	S7	S9
H17	H15	H20	H7	H12		S5	S12	S8	S12
H20	H18		H8	H15		S6		S9	S13
	H20		H9	H17		S10		S10	S14
			H10	H20				S11	S16
			H11					S12	
			H12					S15	
			H15						
			H17						
			H18						
			H20						
Relational Capital					Performance				
C8	C1	C5	R6	R1	P2	P2	P2	P1	P1
C9	C5	C6	R8	R5	P3	P3	P3	P2	P8
C14	C6	C7	R9	R10	P4	P4	P4	P3	P9
C16	C8	C10	R10	R13	P5	P5	P5	P4	P10
C17	C9	C14	R11	R14	P6	P6	P6	P5	
	C14	C16	R14	R15	P7	P7	P7	P6	
	C15	C17	R16	R16	P8	P8	P8	P7	
			R17	R17	P10	P9	P9	P8	
			R18			P10	P10	P9	
			R19					P10	
			R20						
			R21						
			R22						
			R23						

Table 2. Comparative fit statistics

Model	Present study fit statistics		Comparative fit statistics		
			Information criteria		
	ANR	R^2-statistic	AIC	CAIC	SBC
M1*	0.572	0.312	84.133	116.883	108.883
M2*	0.415	0.221	44.901	77.651	69.651
M3*	0.121	0.320	24.937	61.780	52.780
M4*	0.524	0.356	81.334	171.396	149.396

Note: ANR – Average normalised residue; AIC – Akaike Information Criterion; CAI – Consistent Akaike Information Criterion (Bozdogan); SBC – Schwarz Bayesian Criterion.

and direction of the relationship between each of the constructs, while the R-squared value indicates explanatory significance, which is relatively high considering that 38 per cent (PLS-Graph), and 35 per cent (CALIS) of variance in the DV is explained by the IVs. Based on Table 4, apart from H3 and H5, all of other hypotheses – H1, H2, H4 and H6 are supported in terms of the significant results obtained both on the PLS-Graph and on CALIS procedures ($p < 0.001$).

Table 3. Hypotheses testing: path modelling results for H1–H6

Path analysis utilising PLS-Graph							
Path description	HC→SC	HC→RC	HC→OP	SC→RC	SC→OP	RC→OP	R-squared
Standardised beta coefficient	0.776	0.271	0.276	0.601	–0.131	0.495	37.8%
T-statistics	10.86	10.86	1.47	4.31	0.63	4.27	
Significant	***	***	N.S.	***	N.S.	***	
Path analysis utilising SAS: CALIS procedure							
Path description	HC→SC	HC→RC	HC→OP	SC→RC	SC→OP	RC→OP	R-squared
Standardised beta coefficient	0.769	0.27	0.276	0.599	–0.101	0.445	34.8%
T-statistics	23.97	3.91	2.70	9.26	–0.84	4.09	
Significant	***	***	N.S.	***	N.S.	***	

Note: *p-value < 0.1; **p-value < 0.01; ***p-value < 0.001.

Following these path-modelling results H1, H2, H4 and H6 are further interrogated where each individual hypothesis is compared per model with past studies. Each model is compared to past studies as designated by the country in which the study was conducted. So the present study M1 results (top line) are compared to M1 Canada results (line below), and so on. In some instance results were not available from past studies as indicated by "n.m." Table 4 provides a summary of the results pertaining to Hypotheses 1. It is evident from the statistically significant results that Hypothesis 1 where HC was predicted to effect SC is supported across all models.

Table 4. Comparative summary results for Hypothesis 1

Model	Hypotheses	β-Path	t-value	Significance	Support
M1: Study results	H1 (HC→SC)	0.776	10.86	High	Yes
M1: Canada		0.493	22.06	High	Yes
M2: Study results		0.39	2.61	Low	Yes
M2: Malaysia		0.304	1.25	None	Yes
M3: Study results		0.778	12.56	High	Yes
M3: Portugal		0.755	21.06	High	Yes
M4: Current		0.776	10.86	High	Yes
M4: Belgium		0.633	n.m.	Low	Yes

Table 5 provides a summary of the results pertaining to Hypotheses 2. It is evident from the statistically significant results that Hypothesis 2 where HC was predicted to effect RC is only partially supported for Model 3 and 4.

Table 5. Comparative summary results for Hypothesis 2

Study	Hypotheses	β-Path	t-value	Significance	Support
M1: Study results	H2 (HC→RC)	n.m.	n.m.	n.m.	n.m.
M1: Canada		n.m.	n.m.	n.m.	n.m.
M2: Study results		n.m.	n.m.	n.m.	n.m.
M2: Malaysia		n.m.	n.m.	n.m.	n.m.
M3: Study results		0.271	2.46	Low	Yes
M3: Portugal		0.391	5.76	High	Yes
M4: Study results		0.271	2.29	Low	Yes
M4: Belgium		0.497	n.m.	Low	Yes

Table 6. Comparative summary results for Hypothesis 4

Study	Hypotheses	β-Path	t-value	Significance	Support
M1: Study results	H4 (SC→RC)	n.m.	n.m.	n.m.	n.m.
M1: Canada		n.m.	n.m.	n.m.	n.m.
M2: Study results		n.m.	n.m.	n.m.	n.m.
M2: Malaysia		n.m.	n.m.	n.m.	n.m.
M3: Study results		0.601	4.62	High	Yes
M3: Portugal		0.405	5.97	High	Yes
M4: Study results		0.601	4.31	High	Yes
M4: Belgium		0.267	n.m.	Low	Yes

Table 6 provides a summary of the results pertaining to Hypotheses 4. It is evident from the statistically significant results that Hypothesis 4 where SC was predicted to effect RC is only partially supported for Model 3 and 4.

Table 7 provides a summary of the results pertaining to Hypotheses 6. It is evident from the statistically significant results that Hypothesis 6 where RC was predicted to effect P is only supported for Model 3 and 4.

Comparisons of means tests are conducted to evaluate the effects of firm characteristics on the variables under study. Individual one-way ANOVA tests found two statistical differences in both HC and SC in terms of firm size (less than 500 employees): $F(5, 253) = 2.98$, $p = 0.0122$, as well as for firm age (less than 10 years old): $F(4, 724) = 2.32$, $p = 0.0106$.

Table 7. Comparative summary results for Hypothesis 6

Study	Hypotheses	β-Path	t-value	Significance	Support
M1: Study results	H6 (RC→OP)	n.m.	n.m.	n.m.	n.m.
M1: Canada		n.m.	n.m.	n.m.	n.m.
M2: Study results		n.m.	n.m.	n.m.	n.m.
M2: Malaysia		n.m.	n.m.	n.m.	n.m.
M3: Study results		0.586	5.86	High	Yes
M3: Portugal		0.291	4.58	Medium	Yes
M4: Study results		0.495	4.27	High	Yes
M4: Belgium		0.037	n.m.	None	Yes

5. Discussion

This article contributes to the IC research stream by analysing the relationship between HC, SC, RC hypothesized to influence organisational performance. The article has paved the way to increase understanding on the components of IC and determine their influence on organisational performance. Moreover, the study results offer insights and contribute towards examining HC, SC and RC as enablers to increased organisational performance in an African emerging market context. Additionally, by building on and complementing past studies (Bontis 1998; Cabrita, Vaz 2005) the current study offers the ability for replication studies and further comparisons to be made from an African emerging marketing setting.

Overall, the empirical evidence emanating from this study supports four of the six original hypotheses. The results provide support for a direct and positive relationship between HC and SC. Based on the PLS results this relationship is the strongest of the entire model set and suggests that it is crucial for an organisation to optimise the utilisation of its HC for the sake of optimising its SC in terms of support-infrastructure and processes. There is also evidence of a direct and positive relationship between HC and RC. This relationship is also relatively strong and suggests that HC is important for RC in terms of customer and market positioning as well as for optimising stakeholder relationships. Results also show a significant, direct positive relationship between SC and RC, where a strong, significant relationship suggests that proper support-infrastructure and efficient processes are conducive to enhanced customer and market positioning and optimising stakeholder relationships. These positive findings support the notion that HC, SC and RC need to complement each other in order to achieve organisational goals (Mention, Bontis 2013). Indeed, IC is an important source of value for any organisation and can no longer be viewed from a purely financial perspective but should be framed as the sum of interdependent assets configured as HC, SC and RC.

Surprisingly the relationship between HC and P, as well as for SC and P was not significant, which contradicts past findings (Bontis 1998). Perhaps a direct relationship between HC, SC and P is not detectable in terms of the current measures used but should

also be analysed through indirect effects and interaction effects instead. Nonetheless, a direct and positive relationship between RC and P is detected which is supported by past findings (Cabrita, Bontis 2008).

Comparing the results with previous literature and findings highlights the importance of studying IC across a set of diverse organisations, particularly as past findings across countries find similar strong relationships between HC, SC and RC. Specifically, HC seems to be a key driver of both RC and SC, where Mention and Bontis (2013) support that HC is owned by the employee and as such is not fully under the control of the organisation, yet HC has the potential to provide a sustainable competitive advantage if the organisation succeeds in properly controlling and leveraging HC to influence SC, RC and ultimately performance. This line of reasoning corresponds with the notion that in order to successfully transfer the knowledge contained in HC into the organisation's SC domain, information systems, efficient processes, human resource systems and incentives must all be in place (Cabrita, Bontis 2008).

Conclusions

By focusing on HC, SC and RC, the study results indicate that organisations can configure and leverage knowledge in ways that enable them to overcome the constraints of the complex and unpredictable environments and increase their levels of performance. Specifically, the significance of nurturing SC, as it arises from RC in terms of organisational architecture, processes and values, is important to leverage HC and facilitate organisational learning. The results point to the importance of HC to organisational performance where managers need to properly control and leverage HC to influence levels of SC and RC.

Practical implications of the findings relate to policymakers and managers who want to derive evidence-based performance benefits from IC in terms of HC, SC, RC. The findings highlight the importance of developing formal audit mechanisms to measure levels of HC, SC and RC. The study has several limitations that open up avenues of future research. For instance, there was an absence of analysis of firm survivor bias in the study sample. This is, in principle, an important methodological issue because firm survival itself may be determined by HC. Consequently, the results of the study cannot be generalized to all organisations. It is also recommended that scales used in this study be improved upon in future studies with constructs that capture the dynamic nature of the IC process. Another limitation of the article is that a cross-sectional design prevents demonstrating causation. Consequently, in future research using longitudinal research designs is required to examine the potential reciprocal links between HC, SC, RC and performance. Finally, future studies could examine the moderation effects of national culture on the relationship between IC and performance, as well as account for specific environmental factors, which may influence this relationship.

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