



# **Drivers of intellectual capital and organisational performance: a focus on human capital, structural capital and relational capital**

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## **Abstract**

Intellectual capital (IC), conceptualised as the knowledge-based equity of organisations, has attracted a significant amount of scholarly and practitioner interest during the last decade. Measuring IC is complex, with researchers suggesting that understanding the blend or mix of IC components is important for organisational performance. A three-dimensional standard categorisation of IC, consisting of human capital, structural capital and relational capital components is adopted for this study to measure the impact of these components on performance.

A survey is administered to a diverse set of organisations in the greater Johannesburg area and data is analysed employing Partial Least Squares Path Modelling (PLS-SEM) as well as Covariance Based Structural Equation modelling (CB-SEM).

Study results provide support for a direct and positive association between the human and structural capital components of IC. Additionally, the results are compared with past findings across countries in Canada, Malaysia, Portugal and Belgium, allowing for further replications and insights to emerge. This study paves the way to increased empirical understanding on the components of IC and establishes the impact they have on organisational performance.

## **Key phrases**

*human capital; intellectual capital; relational capital; social capital; South Africa; structural capital*

## 1. INTRODUCTION

The construct of intellectual capital (IC) as initially conceptualised in 1969 by John Kenneth (Hormiga, Batista-Canino & Sánchez-Medina 2011:71) has been extensively researched since the 1990's (Cheng, Lin, Hsiao & Lin 2010; Dahlqvist, Davidsson & Wiklund 2000). Although the importance of IC is proliferating, many organisations face problems with its management; mostly due to measurement difficulties (Kim & Mauborgne 2009:73; Peng, Pike & Roos 2007:540). Additionally, it has been proposed that the true source of economic value is the creation of IC which is no longer simply the production of material goods (Chen, Cheng & Hwang 2005:159; Tripathy, Gil-Alana & Saho 2015:343).

From a practitioner perspective, Celenza and Rossi (2014:22) confirm that IC is an important source of value for an organisation and that the organisation can no longer be viewed from a purely financial perspective but rather framed as the sum of interdependent IC assets. Research shows that there is a growing awareness that IC adds significantly to the value of a business (Cronje & Moolman 2013:42) where more and more organisations seem to be identifying their core assets as the invisible and intangible elements constituting IC. Indeed, in many instances IC is seen as a major value contributor of an organisation's value (Bollen, Vergauwen & Schnieders 2005; Kamukama, Ahiauzu & Ntayi 2010) where homogeneous labour and dominant capital relationships have given way to heterogeneous labour and dominance of increasing returns to knowledge (ideas and innovations) in the knowledge economy (Autio, Pathak & Wennberg 2013:336; Callaghan 2016:1113).

The construct of IC has been conceptualised broadly (Bontis 1998:63; Roos, Roos, Pike & Fernstrom 2007:14; Ungerer & Uys 2005:2) with several studies relying on the three-dimensional standard categorisation of IC, in terms of human capital (HC), structural capital (SC), and relational capital (RC). These components have been used in past studies to represent the different dimensions of IC (Cabrita & Bontis 2008; Hormiga *et al.* 2011; Inkinen 2015; Mention & Bontis 2013).

First, HC regards the firm's employees and their knowledge, education skills, capabilities and characteristics (Bontis 1998:64). Secondly, SC 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 1998:64). Finally, RC 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 2015:521). These three components of IC have been propositioned as strategic resources that should be properly managed by organisations in order to avoid risks and derive maximum benefits from them (Cronje & Moolman 2013:47; Hallegatte & Rentschler 2015:195).

### 1.1 Study problem statement and purpose

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.* 2010:555; Kim & Mauborgne 2009:73). In this regard Hormiga *et al.* (2011:72) point out that many organisations do not recognise their intangible assets and do not manage them correctly to improve their performance.

While research studies indicate that IC as a whole has a uniformly strong positive effect on organisational performance, understanding of the impact that the different components have on performance is underdeveloped (Tsakalerou 2015a). For instance, Firer and Stainbank's (2003) study in South Africa finds that IC is positively related to profitability and negatively related to productivity, but not related to market valuation. Moreover, it has been suggested that the quest for understanding the roots of an organisation's value is dependent on interpreting IC components and their influence on organisational performance (Gogan 2014:11; Tsakalerou 2015b:375).

Recognising this gap in the literature the purpose of this study is to investigate the different components of IC by highlighting their individual relevance to organisational performance. By building on previous research the research question of this study is 'to what extent do the IC components of human capital (HC), structural capital (SC) and relational capital (RC) influence organisational performance'?

The primary study objective is to improve understanding of the impact of each of the IC components in terms their explanatory power in predicting organisational performance.

Secondary, in line with calls for researchers to undertake (Dahlgvist *et al.* 2000:2) replications and extensions of IC studies which are vital to knowledge development; this study compares research findings with similar studies conducted in Canada, Malaysia, Portugal and Belgium (Bontis 1998:65; Bontis *et al.* 2000:87; Cabrita & Bontis 2008:215; Cabrita & Vaz 2005:12).

Researchers of these prior studies (Bontis 1998; Bontis *et al.* 2000; Firer & Stainbank 2003) recommend generalization of their results to other countries and across industries to enhance understanding of IC. It has been shown in other domains such as strategy that researchers should not assume that findings in a developed economy would be equally applicable to an emerging economy; such as South Africa (SA) (Urban & Greyling 2015:263). A deep and thorough understanding of IC in the South African context is important not only for academic purposes but also because the subject has salience for practitioners and policy makers.

## 1.2 Study contribution

The study provides the following contributions to the management literature. First it adds to the existing body of knowledge by formulating a model and testing links between HC, SC, RC, and organisational performance. Rather than merely test IC a more nuanced approach is employed to show how the model constructs in terms of HC, SC and RC operate through different pathways or interact to increase overall organisational performance. The study also makes an important contribution in investigating HC, SC and RC as organisations that can configure these IC components in ways that enable them to overcome the constraints of the complex and unpredictable environment in Africa are likely to achieve increased long-term performance (Urban & Mohutsiwa 2014:58; Zoogah *et al.* 2015:8).

Recognising that most studies on IC are predominantly western in nature and have largely neglected the effectiveness of African organisations (Zoogah *et al.* 2015:10); the study context - SA may prove valuable. In SA as one of the primary goals of a firm is increased performance and this can be achieved by improving IC components in the face of growing global challenges. The study context is viewed as important since regional and national contexts influence IC (Unger *et al.* 2011:344) and in SA the complexity underlying HC, SC,

RC and performance is persistent (Grobler & Wörnich 2016:703; Urban & Greyling 2015:265).

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.

The article starts by highlighting relevant theoretical foundations and delineates the study variables to provide a basis on which the hypotheses are formulated. Next the research design is discussed and the hypotheses are tested using PLS and CB-SEM. Results and implications follow. The article ends by highlighting study limitations and avenues for future research.

## 2. THEORETICAL OVERVIEW

### 2.1 Intellectual capital

IC, conceptualised as the knowledge-based equity of organizations (Bontis 1998:64) has attracted a significant amount of scholarly and practitioner interest during the last few decades (Döring 2014:11; Mention & Bontis 2013:290) with the recognition that studying IC is based on different fields and across disciplines (Peng *et al.* 2007:540). Since its origin the notion of IC has been conceptualised broadly (Bontis 1998) with several studies relying on the key components of human capital; structural capital and relational capital to describe IC (Hormiga *et al.* 2011:72; Cabrita & Bontis 2008:213; Mention & Bontis 2013:288). Scholars engaged with IC research have proposed different definitions, conceptualisations, dimensions and categorisations (Djamil *et al.* 2013:133; Peng *et al.* 2007:540; Ungerer & Uys 2005:2).

Research suggests that the different components of HC, SC and RC can clarify the definitional and measurement controversies surrounding IC (Firer & Williams 2003:349; Johannessen *et al.* 2005:151; Ståhle *et al.* 2011:532). Several authors suggest that the

different components of IC need to complement each other in order for organisations to achieve their organisational goals (Gan & Saleh 2008:113; Shree & Urban 2012:293). Additionally, past empirical studies have been conducted which relate the different components of IC with organisational performance (Becker *et al.* 1997:40; Djamil *et al.* 2013:140; Youndt & Snell 2004:340).

Building on these research directions; for the purpose of this study IC is conceptualised broadly as an intangible resource which organisations use to improve performance and is constituted in terms of HC; SC and RC components (Bontis 1998:65; Gogan 2014:43; Roos *et al.* 2007:14; Ungerer & Uys 2005:3). These IC components are now described to indicate their underpinning in the study hypotheses. The rationale for the hypotheses rests on the empirical evidence discussed in the following sections, which indicate how the IC components are interrelated and associated with each other and organisational performance.

## 2.2 Human capital (HC)

The theory of human capital is rooted in the field of macroeconomic development theory, where Becker (1964:41) 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. HC represents the individual knowledge stock of an organisation as represented by its employees and which is inseparable from its bearer (Bontis *et al.* 2000:87; Mention & Bontis 2013:297).

HC comprises of the firm's employees and their knowledge, education, skills, capabilities and characteristics (Bontis 1998:64). 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.* 2000:87). Bontis (1998:65) describes HC as the collective capability to extract best solutions from the knowledge of individuals where the essence of HC is the sheer intelligence of the organisational member. Research shows that HC exemplifies the investment and costs in education and skills as held by employees through tangible and intangible resources (Becker 1964:23; Osterloh & Frey 2000:539).

Several previous studies report a positive link between the levels of HC present in an organisation and performance, where 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.* 2012:24).

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 (Shree & Urban 2012:295). Theory is also emerging where HC predictive models may serve as an operational management tool that has performance implications (Jacobs & Roodt 2011:3).

Moreover, research findings indicate that structuring HC with information systems may turn knowledge from being individual property to organisation property: such as SC (Bontis 1998:65). This transformation of HC into SC is important; as without SC, IC would only remain HC (Bontis 1998:66). Additionally, HC has been shown to have a significant influence on SC and RC (Bontis *et al.* 2000:87; Cabrita & Bontis 2008:215); where at the level of the organisation; HC and knowledge are socially embedded and are heavily influenced by social structures.

These relationships lead to the formulation of the first three hypotheses where it is predicted that:

- H1:** There is a positive relationship between human capital and structural capital
- H2:** There is a positive relationship between human capital and relational capital
- H3:** There is a positive relationship between human capital and organisational performance

### **2.3 Structural capital (SC)**

SC is the infrastructure that encourages human resources to create and leverage organisational knowledge (Mention & Bontis 2013:288). SC 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 1997:4; 1998:65).

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 (Cabrita & Bontis 2008:213). SC includes all the non-human storages of knowledge and deals with the mechanisms and structures that assist employees to achieve optimal learning (Bontis 1998:65; Bontis *et al.* 2000:89).

SC represents an organisation's capability to meet internal and external challenges through organisational learning (Cabrita & Vaz 2005:14). Organisational learning is in essence a social, interactive process, where knowledge generation and transfer is an important source of an organisation's sustainable competitive advantage, and is dependent on an individual's willingness and motivation (Chen & Huang 2009:106; Osterloh & Frey 2000:523). Consequently, IC is not just a function of knowledge acquisition; but organisations through their SC also need to provide opportunities for training which broadens employee insights, increases levels of motivation, stimulates exchange of experience and expertise in terms of RC and which ultimately increases performance (Tsakalerou 2015a:290).

Organisations where learning is embedded tend to have a culture that allows experimentation through searching for innovative solutions and shows support for creativity and tolerance for failure to enhance the organisations adaptability to the external environment and increase its SC and performance (Bontis *et al.* 2000:87; Chiva & Alegre 2009:325; Coldwell & Fried 2012:103). Moreover, SC has been linked to social capital which consists of both bridging and bonding ties, where both weak and strong ties have potential to build social capital (Shree & Urban 2012:296). Individuals with higher levels of social capital are likely to have enhanced access to information including trust from others. Access to adequate, reliable and timely information gained through social capital and networking is likely to significantly reduce transaction costs and increase performance (Shree & Urban 2012:296).

Kim and Mauborgne (2009:73) describe how strategy dictates processes and when these are institutionalised they become part of an organisation's structure. Such an institutionalised process adds to the organisation's levels of SC and RC. Research confirms that links



between SC and RC are important to increase performance as SC facilitates intra organisation co-ordination, represents organisational memory, and facilitates overall IC (Mention & Bontis 2013:288).

Consequently, following the rationale flowing from the aforementioned empirical evidence the next two hypotheses predict that:

**H4:** There is a positive relationship between structural capital and relational capital

**H5:** There is a positive relationship between structural capital and organisational performance

## 2.4 Relational capital (RC)

RC refers to the knowledge embedded in relationships with any stakeholder influencing the organisation and which is positively related to its longevity (Bontis *et al.* 2000:87). RC 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 2015:521).

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 2014:17). Cabrita and Bontis (2008) associate RC with customer capital; which is the knowledge embedded in relationships with customers, suppliers, industry associations and other stakeholders in order to influence organisational performance (Tripathy *et al.* 2015:345).

RC and organisational learning may be reinforced by the interaction of organisational actors with external stakeholders, through a complex structure of boundaries and agents who can bridge the gaps due to the inherent diversity in the external environment (Urban & Greyling 2015:265). Research finds that an organisational structure facilitating inclusive decision-making practices supports organisational learning and helps build RC (Chiva *et al.* 2007:231).

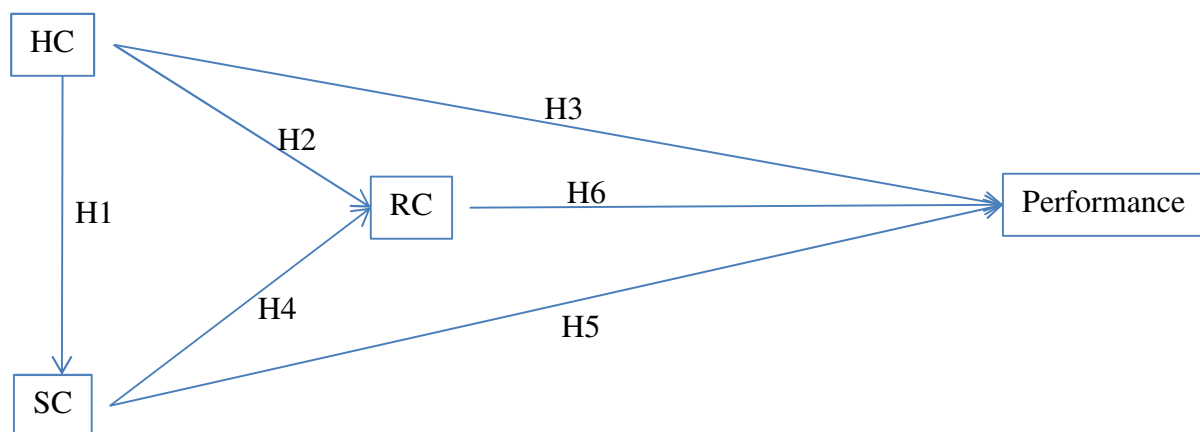
Failing to connect to the right network may limit access to resources and lower the morale of the staff, thereby hindering the capability of the organisation to increase and grow its RC

(Gogan 2014:21). Moreover, RC has been found to be positively associated with organisational performance in several studies (Bontis 1998:66; Bontis *et al.* 2000:89; Cabrita & Vaz 2005:12; Cabrita & Bontis 2008:221; Inkinen 2015:521).

The last hypothesis reflects the growing evidence in this regard where:

**H6:** There is a positive relationship between relational capital and organisational performance

A conceptual model is developed which represents the IC components of HC, RC and SC as influencing each other and organisational performance. Figure 1 presents the conceptual model and shows the hypothesis with the predicted relationships between the components.



**FIGURE 1: Conceptual model showing hypotheses**

Source: Authors' formulation

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.

## 2.5 Comparative studies

At this point, in line with the secondary objective of the study, past international studies are briefly mentioned to provide a concise background when comparing results. Four studies were selected as they used SEM to test different IC components that are illustrative of the relationships which exist between the IC components and performance as predicted in the present study hypotheses:

- **(S1)** The first study by Bontis (1998) was based in Ontario; Canada where significant findings were reported in terms of HC and RC, as well HC and SC. Moreover, a positive relationship was detected between RC and performance leading to the conclusion that the management of IC components is at the very core of the knowledge organisation.
- **(S2)** Bontis *et al.* (2000) investigated the three elements of IC - HC, SC and RC their inter-relationships within two industry sectors (service and non-service) in Malaysia. This study found that in the Malaysian context, HC is important regardless of industry and HC has a significant influence on SC in non-service industries compared to service industries. Additionally, RC has a significant influence over SC irrespective of industry and SC has a positive relationship with business performance regardless of industry.
- **(S3)** Cabrita and Vaz (2005) and Cabrita and Bontis (2008) tested the relationship between IC and performance in Portugal focusing on the banking sector. They report significant and positive relationships between HC and RC and RC and SC. Links to performance were established in terms of RC and SC. The conclusions drawn were that IC is a phenomenon of interactions; and value is created when the IC components interact.
- **(S4)** Mention and Bontis (2013) conducted an empirical investigation on the relationship between IC and performance in the banking sectors of Luxembourg and Belgium. This study context was the retail banking institutions and focused on international clients in the context of custodian and fund administration services. Their study confirmed that HC is positively related to SC, RC and performance.

Their study conclusions are that the components of IC are closely intertwined and that their identities might be more fragile than typically reflected in literature.

### **3. RESEARCH METHODOLOGY**

#### **3.1 Research design**

The study was based on a quantitative, cross-sectional empirical approach, using primary data sources. A research design involving a web-based, self-reporting survey instrument was administered to a set of targeted respondents in organisations across industries in the greater Johannesburg area, Gauteng province in SA. Johannesburg is situated in the Gauteng province the economic hub of SA which has the highest number of businesses (JCCI 2013:32).

#### **3.2 Data collection**

The population for this study was based on a sampling frame of the South African Chamber of Commerce and Industry (2013); the Gauteng Chambers of Commerce (2013); the Johannesburg Chamber of Commerce and Industry (JCCI 2013); and the Bizcommunity (Bizcommunity 2013). The sampling frame was based on generic membership lists representative of businesses operating in the greater Johannesburg area.

Following previous studies (Bontis 1998:65; Cabrita & Vaz 2005:13) which recommended that generalisation of the constructs under investigation be advanced; a diverse set of industries were surveyed. A simple random sampling method was used to select respondents from sampling lists. The respondent was the CEO or owner of the organisation or alternatively a person with high influence in the organisation. The rationale being that it is important that the respondent has a high level of strategic awareness (Shree & Urban 2012:301) within the organisation to answer questions relating to HC, SC, RC and organisational performance.

The respondents were further cross-screened against the study population. This was done to ensure that the sample was relatively similar to the population of businesses operating in the greater Johannesburg area. Moreover, to test for non-response bias (Armstrong &

Overton 1977) firm size and firm age were compared with non-responding firms by using secondary data from the abovementioned listings. Results of t-tests comparing these firms with the current study sample's mean scores on the variables revealed no differences ( $p > 0.10$ ) suggesting that the sample appears to be fairly representative of the population from which it is based. Additionally, the important issue about sampling in general is not statistical but theoretical representativeness, which is the elements in the sample represents the type of phenomenon that the theory makes statements about (Davidsson 2004:34).

The data collection phase was preceded by a pilot phase, during which 25 respondents were requested to comment on the questionnaire; allowing refinement of the instrument. An initial 1 110 surveys were sent out via email with a web link which the respondents had to click on to access the questionnaire. This was followed by a second and third email request for filling out the on-line questionnaire; one week and three weeks later respectively. These efforts resulted in 163 responses or a 15% response rate, This response rate was deemed acceptable considering the online e-mail-solicited surveys of this nature (Hair *et al.* 2010). No patterns among undelivered surveys were noticed as undelivered surveys were distributed approximately evenly among different regions and organisations.

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 10 years. More than half of these organisations had an annual turnover of over R 1 billion per annum which included manufacturers (26%), service firms (24%), high-technology firms (12%), low-technology firms (10%), and a mix of financial and insurance firms (27%). Based on the relative heterogeneity of the many different industry sectors sampled, that is a widespread across different JCCI member categories it was anticipated that the generalisability of the study was strengthened.

Ethical considerations were taken into consideration by ensuring that the instrument used posed no risk or danger to respondents. The study purpose and benefits to the sample population as well as the participant's rights and protections was made explicit and explained to the respondents at the start of the data collection process. Moreover; full and open information (informed consent) was made available to respondents, to ensure that no form of deception and misrepresentation was used to extract information from the

respondents. It was also made clear that all responses would be aggregated and no individual information would be revealed in the article results.

### 3.3 Measures

Based on previous research, suitable measures were identified where theoretical support was evident for each construct as discussed in the literature review section. The questionnaire was adapted from past studies (refer to Table 1) to accurately reflect the conceptual model in terms of the hypotheses as per the independent variables (IVs) and the dependent variable (DV).

The questions were formulated to measure perception; which is widely used in management studies (Urban & Greyling 2015:263). Moreover; in past studies HC, SC and RC have been shown to display high internal reliability, with reported Cronbach alpha values ranging from .77 to .93 (Bontis 1998:65; Bontis *et al.* 2000:87; Cabrita & Bontis 2008:214; Cabrita & Vaz 2005:14; Mention and Bontis; 2013:288).

Several researchers suggest that multiple indicators should be used to measure the complex construct of organisational performance (e.g.; Davidsson 2004:43; Steffens *et al.* 2009:128). Yet, measuring absolute firm performance is very difficult because the concept is both complex and multi-dimensional.

Financial indicators are probably the most common form of performance measurement across all business organisations even though it is a one-dimensional measure. Self-reported performance measures used in the literature include, amongst others: profitability; market value; employment growth; sales growth; and return on investment and equity (ROI; ROE) (Dahlqvist *et al.* 2000:3; Hormiga *et al.* 2011:76).

These performance indicators have been shown to have acceptable criterion-related validity using a range of both categorical and continuous criterion variables (Steffens *et al.* 2009:128).

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. Items were randomised and in some

instances, items were reverse coded in the scale analyses and the wording was adjusted to reflect the South African context.

**TABLE 1: Study measures**

Scale and items	Operationalisations	Literature support
<i>Independent variables</i>		
<p><b>Human Capital = 16 items:</b>                      e.g.; ‘our firm supports our employees by constantly upgrading their skills and education whenever each of them feels it is necessary’; and ‘our employees are widely considered as the best in the whole industry’.</p>	<p>HC was operationalised in terms of items relating to competence (skills and education); attitude (behavioural component) and intellectual agility (enabling one to change practise and consider innovative solutions).</p>	<p>Bontis (1997; 1998);                      Bontis <i>et al.</i> (2000);                      Mention and Bontis (2013)</p>
<p><b>Structural Capital = 13 items</b>                      e.g.; ‘the time it takes our firm to complete one whole transaction is the best in the industry’; and ‘our data systems make it easy to access relevant information’.</p>	<p>SC was operationalised in terms of items relating to strategic assets of an organisation comprising of non-human assets like information systems; routines; procedures and databases.</p>	<p>Cabrita and Bontis (2008); Cabrita and Vaz (2005)</p>
<p><b>Relational Capital = 20 items</b>                      e.g.; ‘the longevity of the relationships we have with our customers is admired by others in the industry’ and ‘most employees in the firm generally understand our targeted market</p>	<p>RC was operationalised in terms of items relating to knowledge embedded in relationships with customers; suppliers; industry associations and other stakeholders were included in the RC measure.</p>	<p>Cabrita and Vaz (2005);                      Mention and Bontis (2013)</p>

Scale and items	Operationalisations	Literature support
segments and customer profiles'.		
Scale and items	Operationalisations	Literature support
<b>Dependent variable</b>		
<p><b>Organisational performance = 10 items</b></p> <p>Sales growth; growth in profits and employees and market share growth.</p> <p>Success rate in new product launches</p> <p>Overall business performance and success</p>	<p>Organisational performance was operationalised using a mixed approach to capturing performance; particularly as successful organisations achieve high performance both in sales growth and profitability; with different developmental pathways.</p> <p>Following past studies; a composite of four commonly used performance measures pertaining to performance and growth were used. Firm performance was treated as a perceptive measure for the past three years (performance over three years is broad enough time-space to account for seasonal and cyclical variations in business practices and performance).</p> <p>Absolute growth was simply computed as the size at 1 year minus the size of the previous year.</p>	<p>Dahlqvist <i>et al.</i> (2000); Firer and Williams (2003); Hormiga <i>et al.</i> (2011); Steffens <i>et al.</i> (2009)</p>

Source: Authors compilation based on literature review



### 3.4 Data quality and analytical techniques

Data was analysed using the structural equation modelling (SEM) with the path modelling tool - PLS (Partial Least Squares). Structural equation modelling is a multivariate statistical analysis technique that is used to analyse structural relationships. In terms of sample size, Nicolaou and Masoner (2013:258) suggest that in order to conduct appropriate SEM analysis the sample size should at least be equal to ten observations per measured standard. Consequently, the sample size of 163 meets the rule of ten times the largest number of antecedent constructs leading to an endogenous reflective construct; of which there were three in this study – HC, SC and RC.

PLS path modelling can be described as an iterative combination of PCA which relates measurable constructs to path analysis (Bontis *et al.* 2000:87; Mention *et al.* 2013:290). This analytical technique has also used in previous studies with which comparisons will be made in terms of the results obtained in the present study (Bontis 1998:65; Bontis *et al.* 2000:87; Cabrita & Vaz 2005:14; Mention & Bontis 2013:289).

Empirical PLS analysis can be viewed as involving two steps. The first step is about testing the quality of the measurement model and the second step can then determine which of the hypotheses are supported by the analysis. Consequently, PLS path modelling can only be conducted on a model which is statistically valid and reliable (Barclay *et al.* 1995:286).

In the present study, considering that the conceptual model was classified as a latent reflective measurement model; values loading onto their respective constructs with values greater than 0.5 were deemed acceptable (Barclay *et al.* 1995:286) 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). In using covariant based SEM as a secondary tool the fit statistics are captured for the sake of reporting and not for the sake of modifying either the constructs or the models.

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 were taken to minimise the risk. Procedurally, the questionnaire

featured a 'counter-balanced' question order, and the respondents were requested to be honest in their responses while assuring completely anonymous (Podsakoff *et al.* 2003:885).

## 4. RESULTS

### 4.1 Reliability and validity results

Before estimating the structural model, the dimensionality, reliability and validity of the measurement scales were first assessed by means of exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Initially the adequacy of the inter-correlations across all the items was checked with Bartlett test of sphericity; and the sampling adequacy was tested through the Kaiser-Meyer-Olkin (KMO) measure. Both the results were significant ( $p < 0.001$ ) and a KMO value of 0.87 ( $\chi^2 = 176.01$ ) provided support for the adequacy of conducting factor analysis. EFA using the principal axis factoring method with Harris Kaiser Case II rotation was used. The goal of factor rotation is to rotate factors in multidimensional space to arrive at a solution with best simple structure.

Moreover, oblique rotation produces solutions with better simple structure because it allows factors to correlate and produces estimates of correlations among factors (Hair *et al.* 2010:34). Eigenvalues greater than one and factor loadings of  $\geq 0.5$  were regarded as significant (Hair *et al.* 2010). Based on the literature review three factors were expected to underlie the items measured. After a few attempts at factor analysis; using the scree plot method of factor extraction the presence of three factors; with Eigenvalues greater than one were detected. All items with significant factor loadings were retained explaining 80 percent of cumulative variance. Based on the results of this factor analysis the constructs as originally conceptualised were all retained representing the theoretical constructs of: Factor 1 = HC, Factor 2 = SC and Factor 3 = RC.

Since the EFA did not indicate a need to remove scale items, the next was to proceed with the CFA. The standardised factor loadings in the CFA were all significant at the 0.1% level. Additionally, the recommended fit indices suggest a satisfactory fit between the model and the data (Hu & Bentler 1999:3). In terms of the comparative fit index (CFI) close to or above 0.95 is recommended (present study = .0920);  $\chi^2(144) = 431.17$ ;  $p < 0.0001$ ; the root mean

square error of approximation (RMSEA) < 0.06 is recommended (present study = 0.080), and the standardized root mean squared residual (SRMR) < .08 is recommended (present study = 0.069). Reliabilities were tested for the constructs and the Cronbach's alpha coefficients values exceeded the benchmark of 0.70 as suggested by Nunnally (1978), where HC = .78; SC = .76; RC = .71.

**TABLE 2: Path analysis test results for the hypotheses**

	H1	H2	H3	H4	H5	H6	
<b>Path analysis utilising PLS-Graph</b>							
Path description	HC→SC	HC→RC	HC→OP	SC→RC	SC→OP	RC→OP	R-squared
Standardised beta coefficient	0.78	0.27	0.28	0.60	-0.13	0.50	37.8%
T-statistics	10.86	10.86	1.47	4.31	0.63	4.27	
Significant	***	***	N.S.	***	N.S.	***	
<b>Path analysis utilising SAS: CALIS procedure</b>							
Path description	HC→SC	HC→RC	HC→OP	SC→RC	SC→OP	RC→OP	R-squared
Standardised beta coefficient	0.77	0.27	0.28	0.60	-0.10	0.45	34.8%
T-statistics	23.97	3.91	2.70	9.26	-0.84	4.09	
Significant	***	***	N.S.	***	N.S.	***	

Significance: \* p-value < 0.1; \*\* p-value < 0.01; \*\*\* p-value < 0.001.

Source: Authors' work based on survey results

## 4.2 Hypotheses testing

First, a summary (Table 2) of the path modelling results for all the hypotheses as per the relationships in the conceptual model are displayed and discussed. Secondly, hypotheses are analysed separately and comparatively as per the secondary study objective (Table 3).

**TABLE 3: Comparative results**

Comparisons	Hypotheses	$\beta$ -path	t-value	Significance	Support
Present study results	H1 (HC -> SC)	0.78	10.86	High***	Yes
S1: Canada		0.49	22.06	High***	Yes
Present study results		0.39	2.61	Low*	Yes
S2: Malaysia		0.30	1.25	Low*	Yes
Present study results		0.78	12.56	High***	Yes
S3: Portugal		0.76	21.06	High***	Yes
Present study results		0.78	10.86	High***	Yes
S4: Belgium		0.63	n.m.†	Low*	Yes

Significance: \* p-value < 0.1; \*\* p-value < 0.01; \*\*\* p-value < 0.001. † 'not mentioned'

Source: Authors' work based on current survey results and past studies

Table 2 shows the summarised results of the path modelling which relied on path analysis utilising PLS-Graph. The standardised beta coefficient signifies the magnitude 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% (PLS-Graph) and 35% (CALIS) of variance in the DV is explained by the IVs. Based on Table 2 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 CALIS procedures ( $p < 0.001$ ).

Following these path modelling results H1, H2, H4 and H6 were further interrogated where each hypothesis was compared per model with past study results. Each past study model results were compared to the present study results as designated by the country in which the study was conducted (refer to section on comparative studies in literature review section). So the present study results (top line) are compared each past study results S1 to S4 results (line below). In some instances results were not available from past studies as indicated by the abbreviation 'na'.

Table 3 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 past studies (S1, S2, S3 and S4). In terms of hypothesis 4, where SC was expected to influence RC, statistically significant results were detected for S3 and S4 only. Results pertaining to hypotheses 6, where RC was predicted to effect organisational performance statistically significant results were detected only for S3 and S4 again (not shown for sake of parsimony and due to space limitations).

## 5. DISCUSSION

This article contributes to the IC research stream by improving understanding of the impact of HC, SC and RC in terms of influencing organisational performance. The study has addressed a gap in the literature where research studies indicate that understanding the impact that the different IC components have on performance is underdeveloped (Tsakalerou 2015a:288).

The article has paved the way to increase empirical understanding on the components of IC and has established the impact they have 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.

The study results support four of the six original hypotheses. These findings provide support for a direct and positive relationship between HC and SC (H1). 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 (H2). 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 (H4), where a strong and 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 (Peng *et al.* 2007:541).

Surprisingly the relationship between HC and organisational performance, as well as for SC and organisational performance was not significant, which contradicts past findings (Bontis 1998:65; Mention & Bontis 2013:288). Perhaps a direct relationship between HC, SC and organisational performance 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 organisational performance is detected which is supported by past findings (Cabrita & Bontis 2008:213; Mention & Bontis 2013:288).

Considering the study was undertaken in an under-researched emerging market context; SA, the adequacy of measures used in this study has now been established. The study established construct validity and reliability which adds to the growing knowledge base on the factor structure of HC, SC and RC.

Moreover, through the comparative analysis the results confirm that HC, SC and RC may considered as universal components that are important to performance regardless of country context. Even though organisations in SA face huge challenges in terms of developing appropriate and sustainable levels of IC (Firer & Stainbank 2003:27) the importance of HC, SC and RC to performance remains pivotal.

## 5.1 Management implications

In terms of management relevance, this study is a starting point in filling the gap in the management literature which has largely neglected the effectiveness of African organisations in terms of IC (Zoogah *et al.* 2015:8). By focusing on HC, SC and RC it is anticipated that South African managers can configure and leverage knowledge in ways that enable them to overcome the constraints of the complex and unpredictable environment in Africa (Urban & Mohutsiwa 2014:59), while also increasing their levels of performance.

From a management perspective, Celenza and Rossi (2014:23) confirm that IC is an important predictor of performance and is best managed and framed as the sum of interdependent IC assets. Research shows that there is a growing awareness that IC adds significantly to the value of a business (Cronje & Moolman 2013:43) where more and more organisations seem to be identifying their core assets as the invisible and intangible elements constituting IC.

Several recommendations are made for managers who want to benefit from the evident relationships between HC, SC, RC and performance. These include:

- Creating a formal audit mechanism to measure levels of HC, SC and RC in the organisation.
- Formulate performance indicators in terms of HC, SC and RC so that links between these components and performance can be well-defined.
- Showcase the organisation's IC portfolio as part of annual reporting.
- Invest in focussed training and development to increase employee levels of HC, particularly as HC is a key driver of both RC and SC and where such investments have the potential to improve performance.
- As SC arises from organisational architecture; processes and values, it is important to leverage these to facilitate learning, knowledge generation and transfer, which are important sources of an organisation's sustainable competitive advantage.
- Recognising the positive relationship between SC and RC, managers should design support-infrastructure and efficient processes which are conducive to enriching customer experiences and optimising stakeholder relationships. Such mechanisms

will ensure that HC, SC and RC complement each other and improve overall organisational performance.

## 5.2 Limitations and future research

The study has several limitations which 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 (Unger *et al.* 2011:4). Although non-response was checked for in the study it may well be that different relationships could have emerged if non-surviving firms were included in the sample. To remedy such bias; future researchers could try to obtain data from organisations that have exited the market place.

Another limitation was the sole use of financial indicators which may be biased towards short-term profitability at the expense of long-term growth (Steffens *et al.* 2009:132). Consequently the use of non-financial measures is increasingly recommended where a focus on issues such as customer satisfaction, customer referral rates, delivery time, waiting time and employee turnover are used (Shree & Urban 2012:294).

A design limitation of the article is that a cross-sectional design prevents demonstrating causation between the study variables. Consequently, in future research using longitudinal research designs is required to examine the potential and reciprocal links between HC, SC, RC and organisational performance over time.

Furthermore the study relied on perceptual data where responses may have been influenced by perceptual biases and social desirability. In order to reduce social desirability in reporting the survey instruction emphasised honesty for self-assessment.

Finally future studies could use a multilevel lens to try and illuminate different or additional institutional and organisational-level factors which may affect the relationship between IC and organisational performance.



## 6. CONCLUSION

By building on and complementing prior research the current study by employing PLS path modelling and covariant based SEM allowed for comparisons to be made in terms of the results obtained in the present study with past studies. 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 (2013:288) support that as HC is retained 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 (Bollen *et al.* 2005:1164).

## REFERENCES

- ARMSTRONG JS & OVERTON TS.** 1977. Estimating nonresponse bias in mail surveys. *Journal of Marketing Research* 14(3):396–402.
- AUTIO, E, PATHAK S & WENBERG K.** 2013. Consequences of performance-based culture or entrepreneurial behaviours. *Journal of International Business Studies*, 44(4): 334–362.
- BARCLAY D, HIGGINS C & THOMPSON R.** 1995. The partial least squares (PLS) approach to causal modelling: personal computer adoption and use as an illustration. *Technology Studies* 2(2):285–309.
- BECKER GS.** 1964. Human capital: a theoretical and empirical analysis; with special reference to education. Chicago, IL: University of Chicago Press.
- BECKER BE, HUSELID MA, PICKUS PS & SPRATT MF.** 1997. HR as a source of shareholder value: research and recommendations. *Human Resource Management* 36 (1):39–47.

**BIZCOMMUNITY.** 2013. Bizcommunity: membership listings [Internet: <http://www.bizcommunity.com/>; downloaded on 2015-08-15.]

**BOLLEN L, VERGAUWEN P & SCHNIEDERS S.** 2005. Linking intellectual capital and intellectual property to company performance. *Management Decision* 43(9):1161–1185.

**BONTIS N.** 1997. Intellectual capital questionnaire. Hamilton, Canada: Institute for Intellectual Capital Research.

**BONTIS N.** 1998. Intellectual capital: an exploratory study that develops measures and models. *Management Decision* 36(2):63–76.

**BONTIS N, KEOW WCC & RICHARDSON S.** 2000. Intellectual capital and business performance in Malaysian industries. *Journal of Intellectual Capital* 1(1):85–100.

**CABRITA MDR & BONTIS N.** 2008. Intellectual capital and business performance in the Portuguese banking industry. *International Journal of Technology Management* 43(1):212–237.

**CABRITA MDR & VAZ JL.** 2005. Intellectual capital and value creation: evidence from the Portuguese banking industry. *Electronic Journal of Knowledge Management* 4(1):11–20.

**CALLAGHAN CW.** 2016. The relative 'invisibility' or intangibility of human resource management knowledge dynamics: a perspective. *Journal of Contemporary Management* 13:1112–1136.

**CELENZA D & ROSSI F.** 2014. Intellectual capital and performance of listed companies: empirical evidence from Italy. *Measuring Business Excellence* 18(1):22–35.

**CHEN MC, CHENG SJ & HWANG Y.** 2005. An empirical investigation of the relationship between intellectual capital and organisations' market value and financial performance. *Journal of Intellectual Capital* 6(2):159–176.

**CHEN C & HUANG J.** 2009. Strategic human resource practices and innovation performance - the mediating role of knowledge management capacity. *Journal of Business Research* 62(1):104–114.

**CHENG MY, LIN JY, HSIAO TYN & LIN TW.** 2010. Invested resource; competitive intellectual capital; and corporate performance. *Journal of Intellectual Capital* 11 (4):433–450.

**CHIVA R & ALEGRE J.** 2009. Organisational learning capability and job satisfaction: an empirical assessment in the ceramic tile industry. *British Journal of Management* 20(3):323–340.

**CHIVA R, ALEGRE J & LAPIEDRA R.** 2007. Measuring organisational learning capability among the workforce. *International Journal of Manpower* 28(3/4):224–242.

**COLDWELL DA & FRIED A.** 2012. Learning organizations without borders? A cross-cultural study of university HR practitioners' perceptions of the salience of Senge's five disciplines in effective work outcomes. *International Journal of Cross Cultural Management* 12 (1):101–114.

**CRONJE J & MOOLMAN S.** 2013. Intellectual capital: measurement; recognition and reporting. *South African Journal of Economic Management Sciences* 16(1):41–56.

**DAHLQVIST J, DAVIDSSON P & WIKLUND J.** 2000. Initial conditions as predictors of new venture performance: a replication and extension of the Cooper *et al.*; study. *Enterprise and Innovation Management Studies* 1(1):1–17.

**DAVIDSSON P.** 2004. Researching entrepreneurship; international studies in entrepreneurship. New York, NY: Springer.

**DJAMIL AB, RAZAFINDRAMBININA D & TANDEANS C.** 2013. The impact of intellectual capital on an organisation's stock return: evidence from Indonesia. *Journal of Business Studies Quarterly* 5(2):132–145.

**DÖRING H.** 2014. Cause-effect relationships between intellectual capital and the competition success of software companies. Paper presented at the *Proceedings of the 6th European Conference on Intellectual Capital*. (Slovak University of Technology (STU); Trnava; Slovak Republic on 10-11 April).

**FIRER S & STAINBANK L.** 2003. Testing the relationship between intellectual capital and a company's performance: evidence from South Africa. *Meditari Accountancy Research* 11(1):25–44.

**FIRER S & WILLIAMS SM.** 2003. Intellectual capital and traditional measures of corporate performance. *Journal of Intellectual Capital* 4(3):348–360.

**GAN K & SALEH Z.** 2008. Intellectual capital and corporate performance of technology-intensive companies: Malaysia evidence. *Asian Journal of Business and Accounting* 1(1):113–130.

**GOGAN LM.** 2014. A new platform to evaluate intellectual capital. Paper presented at the *Proceedings of the 6th European Conference on Intellectual Capital*. (Slovak University of Technology (STU); Trnava; Slovak Republic on 10-11 April).

**GROBLER PA & WÄRNICH S.** 2016. Human resource development (HRD) practices in local vs foreign companies in South Africa: is there a difference? *Journal of Contemporary Management* 13(1):702–724.

HAIR JF, BLACK WC, BABIN BJ & ANDERSON RE. (eds.) 2010. Multivariate data analysis: a global perspective. 7<sup>th</sup> ed. Upper Saddle River, NJ: Pearson.

HALLEGATTE S & RENTSCHLER J. 2015. Risk management for development—assessing obstacles and prioritizing action. *Risk Analysis* 35(2):193–210.

HORMIGA E, BATISTA-CANINO RM & SÁNCHEZ-MEDINA A. 2011. The role of intellectual capital in the success of new ventures. *International Entrepreneurship and Management Journal* 7(1):71–92.

HU L & BENTLER PM. 1999. Cut-off criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modelling: A Multidisciplinary Journal* 6(1):1–55.

INKINEN H. 2015. Review of empirical research on intellectual capital and firm performance. *Journal of Intellectual Capital* 16(3):518–565

JACOBS C & ROODT G. 2011. A human capital predictive model for agent performance in contact centres. SA *Journal of Industrial Psychology* 37(1):19 pages. doi: 10.4102/sajip.v37i1.940.

JCCI see JOHANNESBURG CHAMBER OF COMMERCE AND INDUSTRY

JCCI. 2013. Regions; affiliates and members JCCI. [Internet: <http://www.jcci.co.za/members/>; downloaded on 2015-11-18.]

JOHANNESSEN JA, OLSEN B & OLAISEN J. 2005. Intellectual capital as a holistic management philosophy: a theoretical perspective. *International Journal of Information Management* 25 (2):151–171.

KAMUKAMA N, AHIAUZU A & NTAYI JM. 2010. Intellectual capital and performance: testing interaction effects. *Journal of Intellectual Capital* 11(4):554–574.

KIM WC & MAUBORGNE R. 2009. How strategy shapes structure. *Harvard Business Review* 87(9):72–80.

MENTION AL & BONTIS N. 2013. Intellectual capital and performance within the banking sector of Luxembourg and Belgium. *Journal of Intellectual Capital* 14(2):286–309.

NICOLAOU A & MASONER MM. 2013. Sample size requirements in structural equation models under standard conditions. *International Journal of Accounting Information Systems* 14(4):256–274.

NUNNALLY JC. 1978. Psychometric theory. 2<sup>nd</sup> ed. New York, NY: McGraw-Hill.

OSTERLOH M & FREY BS. 2000. Motivation; knowledge transfer; and organizational forms. *Organization Science* 11(5):528–550.

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PENG TJ, PIKE S & ROOS G. 2007. Intellectual capital and performance indicators: Taiwanese healthcare sector. *Journal of Intellectual Capital* 8(3) 538–556.

PODSAKOFF PM, MACKENZIE SB, LEE JY & PODSAKOFF NP. 2003. Common method biases in behavioural research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology* 88(5):879–903.

ROCA-PUIG V, BELTRA'N-MARTIN I & CIPRES MS. 2012. Combined effect of human capital; temporary employment and organizational size on venture performance. *Personnel Review* 41(1):22–32.

ROOS G, ROOS G, PIKE S & FERNSTROM L. 2007. Managing intellectual capital in practice. London, UK: Routledge.

SHREE S & URBAN B. 2012. Internationalisation processes and links with capital factors: the case of South Africa. *Teorija Ir Praktika (Business Theory and Practice)* 13(4):292–303.

STÅHLE P, STÅHLE S & AHO S. 2011. Value added intellectual coefficient (VAIC): a critical analysis. *Journal of Intellectual Capital* 12 (4):531–551.

STEFFENS P, DAVIDSSON P & FITZSIMMONS J. 2009. Performance configurations overtime: implications for growth- and profit oriented strategies. *Entrepreneurship and Theory in Practice* 33(1):125–148.

TRIPATHY T, GIL-ALANA L & SAHO D. 2015. The effect of intellectual capital on firms' financial performance: an empirical investigation in India. *International Journal of Learning and Intellectual Capital* 12(4):342–357.

TSAKALEROU M. 2015(a). A meta-analysis of intellectual capital and firm performance: when the whole is more than the sum of its parts. *International Journal of Learning and Intellectual Capital* 12(3):287–299.

TSAKALEROU M. 2015(b) Multi-variable analysis and modelling of intellectual capital effects on firm performance. *International Journal of Learning and Intellectual Capital* 12 (4):372–385.

UNGER JM, RAUCH A, FRESE M & ROSENBUSCH N. 2011. Human capital and entrepreneurial success: a meta-analytical review. *Journal of Business Venturing* 26(3):341–358.

UNGERER M & UYS K. 2005. A theoretical model for developing core capabilities from an intellectual capital perspective (Part 2). *South African Journal of Industrial Psychology* 31(2): doi: 10.4102/sajip.v31i2.190.

URBAN B & GREYLING BC. 2015. Open source software adoption and links to performance. *International Journal of Technology Learning; Innovation and Development* 7(3):261–278.

---

**URBAN B & MOHUTSIWA M.** 2014. Planning flexibility and entrepreneurial orientation: a focus on SME performance and the influence of environmental perceptions. *Management Dynamics: Journal of the Southern African Institute for Management Scientists* 23(1):58–74.

**YOUNDT MA & SNELL SA.** 2004. Human resource configurations; intellectual capital; and organisational performance. *Journal of Managerial Issues* 4(4):337–360.

**ZOOGAH DB, PENG MW & WOLDU H.** 2015. Institutions; resources and organisational effectiveness in Africa. *The Academy of Management Perspectives* 29(1):7–31.