An Empirical Study on the Impact of the Process of Measuring IC on Performance

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Abstract: This paper explores the relevance and importance of measurement of IC and its impact on performance in the Caribbean hospitality industry. A survey using a 7-point Likert scale was administered to hotel managers to test the relationship between measurement of IC and performance controlling for hotel size and rating of the hotel. The data analysis techniques used were exploratory factor analysis (EFA), confirmatory factor analysis (CFA) and hierarchical multiple regression. The analysis of hierarchical multiple regressions allowed us to support the hypothesis that measurement of IC explained a significant additional proportion of variance in performance above and beyond that of number of hotel rooms and hotel ranking. This finding of a significant and positive relationship between measurement of IC and performance has relevance to both IC academics and practitioners, as it validates the use of measurement of IC to enhance performance. This paper adds to the extant literature on IC within the Caribbean and the hospitality industry both under-research areas in terms of IC.

Keywords: Caribbean, intellectual capital, hospitality industry, measurement of IC

1. Introduction

Since the 1990s, the concept of intellectual capital (IC) has received attention from academic researchers, practitioners, businesses and governments. More specifically, the benefit of intellectual capital to organizations has received significant attention, though no common method for its valuation has been determined. The transition of economies from industrial base to knowledge base was the catalyst for the search for greater understanding of the intangible drivers for this new economy. Whereas, many corporate leaders understand the physical and financial assets of the organization and how to effectively manage them, they are less knowledgeable about the components of intellectual capital.

In today's knowledge-based economy it has been argued that intellectual capital (IC) is the major driver of performance in an organization and that IC can be leveraged to create and sustain a competitive advantage. An area that has attracted significant empirical research is measurement of IC with a plethora of literature being published in support of methods for measuring intellectual capital (Sveiby 1997, Dumay 2009, Ramirez 2010, Pucar 2012). Sveiby (2005) identified 34 such measurement techniques and Andreissen (2004) identified 24. Although there have been several published articles outlining the merits and demerits of the various methods for measuring IC, there has been no agreement on an acceptable measurement system. An early assessment of IC measurement models by Pike and Ross (2004) concluded that none of the methods used to measure IC was compliant with measurement theory. They argue that some of the methodologies provide useful guidance for managers, but the failure to agree on terminology and defining attributes impacts on the measurement characteristics of distinctiveness, agreeability and independence. Despite the lack of a consensus on a model for the measurement of IC it has been empirically tested that IC impacts performance. Whereas the extant literature has documented the relationship among the components of IC and performance very little empirical work has examined the impact of the process of measuring IC on performance. Therefore

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the aim of this paper is to report on an empirical investigation of the relationship between the process of measuring IC and performance in the Caribbean hospitality industry.

2. Literature review

Intellectual capital research initially focused on defining IC and its components. Several authors have argued that intellectual capital represents the resources of an organisation that have been formalized, captured and leveraged to create assets of a higher value (Bontis 1999, Sveiby 1997). Some authors sought to define IC using the accounting concept of asset. Roos and Roos (1997) defined intellectual capital as the hidden assets of the company not fully captured on the balance sheet; while Brennan (2001) defines it as the intangibles such as patents, intellectual property rights, copyrights and franchises. Dzinkowski (2000) defined intellectual capital as a residual being the difference between book value of the firm and its market value. Other early writers use management processes terms as their approach to defining the construct. Stewart (1997) asserts that intellectual capital is "the intellectual material – knowledge, information, intellectual property, experience – that can be put to use to create wealth", while Lynn (1998) states that "Intellectual capital represents knowledge transformed to something of value to the organisation". Booth (1998) argues that intellectual capital is the ability to translate new ideas into products or services and it comprises people related assets, non-people related (market assets) and internal assets. It can be argued, therefore, that intellectual capital represents an intangible resource that has been created or acquired by the firm and used to provide probable future economic benefits to the entity. The debate continues pertaining to defining IC and to date there is still a lack of consensus on an agreed taxonomy of IC.

To further aid the understanding and analysis of IC a three factor conceptual framework comprising human capital, relational (customer) capital and structural capital has emerged. This classification is consistent with Sveiby (1997) who divided intellectual capital into three areas, namely, employee competence, internal structure and external structure, Stewart's (1997) human capital, structural capital and customer capital, and Edvinsson's (1997) human capital and structural capital subdivided into organisational capital and customer capital.

The first component, human capital (HC) is a multi-dimensional construct encompassing tangible and intangible aspects which serves as one of the inputs into the productive process. HC is not a physical asset of the organisation measured by the number of employees but it relates to employees' education, skills, training, experience, attitudes about life and business, genetic inheritance and values (Edvinsson and Malone 1997; Litschker et al., 2006). Martin-de-Castro et al (2006) in defining human capital speaks to an aspect of its intangibility as they assert that human capital refers to the tacit or explicit knowledge which people possess, as well as their ability to generate it, which is useful for the mission of the organisation and includes values and attitudes, aptitudes and know-how.

The construct relational capital refers to either the relationships existing between employees and external economic actors (Stewart, 1997), or relationships existing among employees and other departments within the organisation (Tsai and Ghoshal 1998). According to Cohen and Kaimenakis (2007) relational capital represents the potential an organisation has due to extraneous intangible assets. Some authors have further deconstructed relational capital into social capital and business capital (Martin-de-Castro et al. 2006); customer capital (Bontis 2002) and market assets (Brooking 1996). Business capital refers to the value of relationships which the firms maintain with customers and suppliers whereas the main theme of customer capital is the knowledge embedded in the marketing channels and customer relationships that an organisation develops through the course of conducting business. This includes customer contracts, relationships, loyalty, satisfaction, market share, image, reputation, brands, distribution networks and channels (Mayo, 2001). It is obvious that due to the external nature of customer capital it cannot be easily developed or codified and is reliant upon its interaction with human capital and structural capital.

Structural capital is the supportive infrastructure that enables human capital to function and includes all the non-human storehouses of knowledge in organizations. Structural capital embodies both tangible and intangible firm-specific attributes, encapsulating databases, organisational charts, process manuals, strategies, and anything whose value to the company is higher than its tangible value (Bontis, 1999; Roos et al. 1997). The concept of SC also incorporates the organisational structure, legal parameters, patents, trademarks, culture, manual systems, research and development, software systems, and informal ways of doing things (Edvinsson and Malone, 1997; Nelson and Winter, 1982). SC has been argued as being responsible for the company's renewal and value creating processes.

2.1 Measurement of IC

Measurement of IC has also attracted a significant amount of the initial research. Sveiby (2005) suggests four categories of intellectual capital measurement techniques; direct intellectual capital methods, scorecard methods, market capitalization methods and return on assets methods. Prior research by Luthy (1998) had categorized them into two; the methods that relate to component-by-component evaluation and methods that measure the value of the composite of intellectual assets in financial terms. Sudarsanam et al (2005) similarly divided them into; models that estimate the aggregate value of intellectual capital at a point in time, and models that value the investment in intangibles each at a time. It is apparent from the categorization of the models that some models are geared towards the management accounting function while others the financial accounting function.

Measurement systems evolved to optimize any critical assets required to support any constrained resource. Intellectual capital measurement techniques evolved as a result of IC becoming the constrained resource in this intangible economy where people have become the critical asset in organisations (Boudreau and Ramstad 1997). These measurement techniques sought to reveal value linkages and provide managers with continuous leading indicators to determine how IC was being improved by organizations activities and how such improvements led to organisational success. However, a number of these measurement schemes have been criticized for not meeting the science based measurement criteria of completeness, independence, distinctness, agreeability and scaling (Pike and Roos 2004, Roos 2005). Boudreau and Ramstad (1997) argued that the failure of measurement systems was due to the tendency of framing these measures too much in terms of financial measurement systems and not enough in terms of their ultimate purpose. Chahabaghi and Cripps (2006) purport that the potential of IC will not be realized if management continues to force thinking about IC into the existing frameworks based on accounting and management control. This thinking is not only advocated for practitioners, but for academic researchers as well, so that a deeper understanding of how IC works and how IC is utilised in organisational change can be developed (Mouritsen, 2005).

Measurement is the core of accounting and without an understanding of what is measured and how it is measured proper comprehension of accounting is totally impossible (Ijiri 1967). A number of models have been developed over the years to measure IC and its constructs. It is imperative that the attributes identified in measurement theory be applied to IC models to ensure that they meet the criteria established. This would require an understanding of what is meant by the construct measurement from a measurement perspective. Measurement theory, in its most basic form, is about the systematic assignment of numbers to represent some attributes of an object or an event of interest (Mock and Grove 1979). Salterio (1998) on the other hand, contends that measurement is not only about the measurement assignment process, which he terms, the factual level but also incorporates a purposive level, which deals with the relevance of measures. In taking this two-tier approach to measurement as advocated by Salterio (1998) in relation to IC, consideration should be given to the behavioural characteristics of the users as well as the process of assigning numerical values (or qualitative descriptors) to intellectual capital attributes.

In assessing the validity of measurement in the intellectual capital arena, we can look at measurement from another perspective, its ability to affect behaviour rather than to represent properties of objects in numerical terms. Flamholtz (1980) asserted that the principle purpose of measurement in organisations is to influence the behaviour of people, their perceptions, motivation, decisions and actions. He argued that prior attempts to examine measurement have focused extensively upon the system's output and have not explicitly examined the nature and functions of the process or act of accounting measurement. Flamholtz (1980), in describing his "psycho-technical systems model of measurement", argues that measurement is intended to perform certain predefined psychological functions through its process and its output. The output function, which is the numbers produced by the act of measurement, is used as an input signal to facilitate decisions and actions. The process function on the other hand, according to Flamholtz (1980), serves as a catalyst for systematic planning, establishes an operational criterion, and motivates the decision-makers.

This dual role of measurement when applied to IC enables the classification of the measurement techniques into internal focus measures and external focus measures (Carrington and Tayles 2011). Therefore, those measures designed with an internal focus will address the issues raised about behavioural changes within the organisation, whereas those with an external focus requires that the properties outlined in the scientific approach to measurement must be adhered to. The measurement of IC from an internal focus and the resulting behavioural implication of such have not received much attention in the literature pertaining to the measurement of IC. On the other hand, research pertaining to the scientific approach to measurement which is quite appropriate for those measures that have an external focus, has attracted a fleeting glance in the literature.

While the current IC studies have provided a foundation that has successfully furthered our understanding of IC, some theoretical tensions remain concerning the synergistic, dynamic and contextual nature of IC. This gap in our knowledge is one of the areas that need to be filled in order for a clearer understanding of IC. So, the aim of this paper is not to answer the question of "What are the organisation's measures of IC?" but rather to answer what is the impact of measurement of IC on the performance of the entity. Therefore to contribute to the literature on IC, two basic research questions were framed for this study:

- Do hotel managers recognize the importance of measurement of IC components and its impact on their operational decisions?
- Is there a relationship between the measurement of IC and performance?

3. Methodology

A quantitative approach, using a 7-point Likert scale questionnaire as the data collection method, was used to assess the impact of the process of measurement of IC on performance while controlling for size and rating of hotels in the Caribbean. The independent variable, measurement of IC, assessed the extent to which managers engage in collecting, analyzing and reporting data relating to the components of IC. Thirteen items drawing on the work of Moon and Kym (2006), Sveiby (1997), Stewart (1997), Bontis (1998), Kaplan and Norton (1992), Brander Brown and McDonnell (1995), Salterio (1998) and Flamboltz (1980) were used for this construct. The dependent variable was a composite scale of items relating to managers' perception of changes in performance of financial and non-financial measures. This variable was assessed by 14 items, guided by the work of Brander Brown and McDonnell (1995), Fitzgerald and Moon (1996) and Bontis (1998) customized for the hospitality industry. The use of perceived measures of organizational performance is supported by Dess and Robinson (1984) and has been used in other IC studies by Bontis et al, (2000), Khong and Nair (2006), Tayles et al (2007) and Carrington and Tayles (2011).

The telephone directories of the fifteen Caribbean territories provided a sampling frame of 1,429 accommodation properties. Information glean from the websites of the Caribbean Tourism Organisation and

the Caribbean Hotel Association revealed that of the 1,429 accommodation properties a large number comprised of villas, guesthouses and boutique hotels with less than thirty rooms. These properties tend to have a small number of employees and very simple procedures, and it may be argued that there is little development of IC in such entities. The sample was therefore reduced to 429 by eliminating properties with less than 40 rooms.

Given the demographics and geography of the Caribbean, a local resident was used as the conduit for the distribution and return of the questionnaires. The initial posting resulted in 46 questionnaires being returned. Follow up processes were implemented which resulted in a 184 questionnaires representing a 38 percent return rate. Non response bias was evaluated using Lambert and Harrington (1990) approach. The t-tests revealed no significant difference among the twenty survey items tested. These results do not rule out non-response bias, but suggest that non-response may not be a problem.

The data were entered in SPSSv19 and subjected to both univariate and multivariate analysis. The univariate analysis assessed the means, standard deviations, kurtosis and skewness of all variables in the data set. The results of the skewness and kurtosis which were used to assess normality, revealed that only one of the items with a skewness of -2.472 and kurtosis of 7.199 was above the threshold advocated by Wess et al (1995) and was deleted. Table 1 provides some descriptive statistics on the hotels included in the survey.

Table 1: Descriptive statistics of selected variables

	Mean	St. Deviation	Range
Number of rooms	133.36	121.513	40 – 856
Number of employees	155.37	176.26	20 – 843
Occupancy level	71.41	12.62	34% - 95%
Revenue per available room	US$ 208.02	208.18	$26 - $1,098
Hotel rating	3.516	0.823	2 - 5

An assessment of means for the two control variables, size of the hotel and hotel rating revealed 133.36 and 3.516 out of 5 respectively. Further analysis of the descriptive statistics pertaining to rating of the hotels revealed that 14.5% were 5 stars; 29.1% were 4 stars; 50.0% were 3 stars, and 6.1% were 2 stars. The range for hotel size was between 40 and 856 rooms. These results would suggest that most of the properties included in the study were large hotels with above average ratings.

The empirical findings of this study rely heavily on the credibility of the responses, two proxy measures to assess the quality of the responses of the respondents were used; the positions they hold within the hotel and the number of years working experience at the hotel. The analysis of the respondents profiles showed that they hold high hierarchical positions within their respective hotels. More specifically, the 184 respondents can be clustered as follows: 33.7% General Managers, 22.5% Hotel Operations Managers; 33.1% Human Resources Managers, 7.7% Accountants, and 3% Marketing Managers. In addition, they have on average 7.6 years of experience in their respective positions at the hotel. This suggests that the responses received regarding the hotels' measurement of its IC were expected to be reliable, since the respondents' profile indicate that they had adequate knowledge in relation to their respective hotel and the Caribbean hospitality industry as a whole.

3.1 Factor analysis

Exploratory factor analysis (EFA) was then used to ascertain whether the survey questions loaded on the respective dimensions for measurement of IC and performance. Principal components analysis with a varimax rotation was used to factor analyze the fourteen items relating to performance and thirteen items relating to measurement of IC. Correlation matrices among the 27 items revealed a number of correlations in excess of 0.3 thus patterns in responses to variables are therefore anticipated. An analysis of the anti-image correlation matrix revealed all elements on the diagonal of this matrix were greater than 0.5. The Bartlett's test of sphericity, a measure of homogeneity of variables, which test the null hypothesis that the original correlation matrix is an identity matrix (Field 2000), showed an approx. Chi square of 1476.545, with 231 df and significance 0.000. Pallant (2005) posits that this test should be statistically significant at $p<0.05$. The results indicated that the correlation matrix was suitable for factor analysis. The Kaiser-Meyer-Olkin measure of overall sampling adequacy which provides a means to assess the extent to which indicators of a construct belong together was 0.883 which according to Kaiser and Rice (1974) is meritorious. The original non-rotated principal component analysis using SPSS reveals that the smallest eigenvalue which is associated with the 27 factors is 0.093, not dangerously close to zero. In addition, none of the squared multiple correlations exceed 0.9, the largest being 0.7245. This finding would indicate that multicollinearity and singularity are not a threat in this data set.

Several runs were conducted in SPSS specifying different number of factors to find the optimal number of factors, which is termed restrictive factor analysis by Anderson and Gerbing (1988). The first run of the data on the 27 items yielded five factors with eigenvalues greater than 1 that explained 69.035 per cent of the variance. In evaluating the number of factors and variables to retain, the factor loadings were taken into account. According to Comrey and Lee (1992) a factor loading of 0.63 is very good with overlapping variance of 40 percent. The data were rerun specifying two factors and a cut off factor loading of 0.63. The results of this iteration revealed an explained variance of 55.531 percent, nine variables loading on to factor 1 with the minimum factor loading of 0.739 and six variables loading on to factor 2 with the minimum factor loading of 0.659. The variables which did not load onto any factor were subsequently deleted. The third run of data set specifying 2 factors with 15 variables yielded an explained variance of 65.441 percent.

3.2 Reliability Tests

The reliability of the factors derived from the factor analysis was assessed using Cronbach's alpha. This coefficient assesses the consistency of the entire scale and is one of three methods for assessing the reliability of a measurement scale. Peter (1979) asserts that reliability is the degree to which measures are free from error and therefore yield consistent results. The reults of the assessment of reliability of the scales are presented in table 2.

Table 2: The factors scales and Cronbach's alpha

Factor	Number Of items	Cronbach's alpha
Measurement of IC	6	0.834
Performance	9	0.942

According to Hair et al (2006) the lower limit for Cronbach's alpha is 0.70, therefore the above factors indicate that they meet this criterion, which suggests an acceptable level of internal consistency and reliability for the factor. Further analysis of the scales by examining the tables showing the respective item-total statistics

showed that all 15 items have corrected item-total correlation of above 0.5 and the Cronbach's alpha would be reduced by removing any item.

3.3 Construction of scales

In order to define which factors determine the measurement of IC and performance measures, confirmatory factor analysis (CFA) was used. The software used in this study was AMOS for calculating the estimates of the CFA model. In CFA, variables with high factor loadings will be assigned to the respective factors. An acceptable threshold for factor loadings according to Hair (2006) is 0.5 or above.

The measurement model for the construct measurement of IC consisted of six observed variables, 1 latent variable and 6 error terms. Selected data relating to the Amos output for the measurement of IC is provided in table 3.

Table 3: Selected AMOS output relating to Measurement of IC

			Estimate	S.E.	C.R.	FL	r^2		Estimate	S.E.	C.R.
Q68	M5	<--- meas	1.000			.444	.197	E1	.014	.005	2.744
Q69	M6	<--- meas	2.071	.288	7.198	.856	.733	E2	.069	.012	5.957
Q70	M7	<--- meas	2.576	.524	4.916	.657	.432	E3	.059	.007	8.734
Q71	M8	<--- meas	2.360	.460	5.127	.758	.575	E4	.126	.017	7.371
Q72	M9	<--- meas	2.224	.456	4.875	.642	.412	E5	.101	.013	7.524
Q73	M10	<--- meas	2.808	.577	4.863	.638	.407	E6	.165	.022	7.565

	X^2	df	p	GFI	IFI	CFI	RMSEA
	6.728	5	.242	.984	.991	.991	.044

An analysis of the results indicates that the loadings for five of the indicators for the measurement of IC construct are appropriate as they exceed 0.5. All error variances are positive, and all critical ratios are significant as they exceed 1.96. The unstandardized coefficients are greater than twice the corresponding standard error thus it can be argued that this construct exhibits convergent validity. The r^2 for five of the six measures exceed 0.40, variance extracted 0.41 and construct reliability is 0.858 which supports the view that this construct has adequate convergent validity. The results for the structural model for measurement of IC indicated that the model has an acceptable fit as all indices are within the acceptable thresholds.

The measurement model used in CFA for the dependent variable performance consisted of 1 latent variable, 9 indicators and 9 error terms. An analysis of the results of the CFA for the dependent variable revealed that all the loadings for the indicators for the performance construct are appropriate as they exceed 0.7. All error variances are positive, and all critical ratios are significant as they exceed 1.96. The unstandardized coefficients are greater than twice the corresponding standard error thus it can be argued that this construct exhibits convergent validity. The r^2 are all above 0.45, variance extracted 0.6462 and construct reliability is 0.9661 which supports the view that this construct has adequate convergent validity. The indices used in the evaluation of the structural model for perceived performance were GFI- 0.919, CFI - 0.929, IFI - 0.930, RMSEA -

0.73 and chi-square of 111.0 df =27. The results would indicate that the model had an acceptable fit as all the selected indices are within the acceptable thresholds.

A single scale for each research variable was then created by averaging a respondent's scores over the items measuring the variable. The mean for measurement of IC was 5.540 out of a maximum of 7 indicates there was an above average measurement of IC in hotels in the Caribbean. The dependent variable performance has a mean of 5.426 and a standard deviation of 1.02721. The relationship among the critical research variables was also assessed using Pearson's correlation. Corfirmat

Finally, to examine the impact of measurement of IC on performance a hierarchical multiple regression analysis was performed. Variables that explain performance were entered in two steps. In step 1, performance was the dependent variable and (a) hotel size measured in number of rooms, and (b) rating of hotel (the standard used in the hospitality industry measured by number of stars) were the independent variables. In step 2, measurement of IC was entered into the step 1 equation. Before the hierarchical multiple regression analysis was perform, the independent variables were examined for collinearity.

4. Discussion of results

The six items which loaded on the independent variable measurement of IC supports the finding of Atkinson and Brander Brown (2001) who in their empirical study of performance measures in UK hotels reported that customer satisfaction, customer loyalty and market share were measured 89%, 78% and 62% respectively. Additionally, it has been empirically tested that metric of customer satisfaction enhances financial performance (Ittner and Larcker 1998; Yoo and Park, 2007) and increases loyalty which results in improved profitability (Bowen and Chen 2001). These items which were used to construct the scales for measurement of IC and performance are show in the table 4 below.

The relationship among the critical research variables were assessed using Pearson's correlation. The results revealed that measurement of IC is moderately and positively associated with performance and this association was significant at p<.001. This finding suggests that in hotels where there is evidence of the process of measurement there is enhanced performance. The control variable of number of rooms has a weak but positive significant association with performance, suggesting a slight relationship between these two variables. This finding may suggest that performance is slightly affected by the size of the hotel. An interesting finding was negative and weak association of hotel ratings to the other variables in the study. This inverse relationship suggests that hotels with high ratings have a weak and negative significant association with the dependent variable performance and the independent variable measurement of IC. Table 5 shows the results of the Pearson's correlation analysis.

Table 4: The results of the rotated component matrix

Rotated Component Matrix[a]		
	Component	
	1	2
P1 RevPar [revenue per available room]	.803	
P2 Occupancy percentage	.808	
P3 Growth in profits	.833	
P4 Labour productivity	.846	

P5 Sales growth	.866	
P6 Customer satisfaction	.750	
P7 Market share	.776	
P8 After-tax return on investment	.739	
P9 Overall performance	.885	
M5 Measure Customer satisfaction		.699
M6 Measure Employee satisfaction		.713
M7 Measure Customer complaints		.799
M8 Measure Customer retention		.827
M9 Measure Employee training		.814
M10 Measure Market share		.748
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

Table 5: Pearson's correlation coefficients (N=184)

Variable	#Rooms	HR	ICM	HP
Number of rooms (#Rooms)				
Hotel ratings (HR)	-0.353			
Measurement of IC (ICM)	0.213	-0.295		
Performance (HP)	0.189	-0.275	0.489	

The correlation statistics are all significant at p<.001.

4.1 Hierarchical multiple regression

The research question which relates to the impact of measurement of IC on performance was assessed by the use of hierarchical multiple regression. The results of the variance inflation factor (all less than 2.0) and collinearity tolerance (all greater than 0.85), shown in table 6, suggests that the estimated βs are well established in the following regression model.

Table 6: Collinearity statistics from hierarchical multiple regression on performance

Independent variable	Collinearity Statistics	
	Tolerance	VIF
Hotel ranking	.859	1.164
Number of rooms	.896	1.116
Measurement of IC	.892	1.121

The results of the step 1 indicated that the variance accounted for as measured by (R^2) with the first two independent variables equaled 0.051 (adjusted R^2 =0.039) which was significantly different from zero (F = 4.050, p<0.05). In step 2, the measurement of IC was entered into the regression equation. The change in variance accounted for (ΔR^2) was equal to 0.101, which was statistically different from zero (F = 8.892, p<0.001). Measurement of IC explained a significant additional proportion of the variation in performance above and beyond that of number of rooms and hotel ranking with a ΔR^2 equal to 10.1%. Measurement of IC accounts for 13.5% of variation in performance. Measurement of IC is positively and significantly related to performance (β=0.323, p<0.001). This finding suggests that hotels with a higher level of measurement of IC performed better.

Table 7: Results from hierarchical multiple regression on performance

Independent variable	Coefficient	t-statistic	p-value
Hotel ranking	-0.096	-1.855	0.066
Number of rooms	0.106	1.365	0.175
Measurement of IC	0.323	5.381	0.000
Notes: Adjusted R^2 =.135 F-value = 8.892 (p<0.001)			

The results of this analysis were used to answer in the affirmative the fundamental question of whether measurement of IC has a significant and positive impact on performance. These results supports Widener (2006) findings that firms that establish a performance measurement system that provide top managers with critical information pertaining to its resources and capability will positively affect their performance. This argument supports an earlier call from Kaplan and Norton (1996 page 21) who asserted that "if you can't measure it, you can't manage it". This finding of a significant relationship between measurement of IC and performance corroborates a number of other empirical studies that referred to performance measures. Hoque (2005) found a positive and significant association between managers' use of non-financial measures and performance. Olson and Slater (2002) found that overall performance relative to competitors was positively associated with the extent to which organisations match the use of their measures to the four balance scorecard categories. Van der Stede et al., (2006) report that firms that use objective and subjective performance measures increased their perceived performance. Hyvonen's (2007) results indicate that the use of 'contemporary' performance measures leads to higher perceived customer- related performance in firms. These studies support the premise that entities that measure their intellectual capital appear to be more beneficial in their overall performance as these intellectual capital measures are important drivers of long-term economic success.

5. Conclusion

This research sought to examine the impact of process of measuring IC on performance in hotels within the Caribbean. The use of CFA enabled the researcher to validated a number of indicators that can be used to measure IC and performance in relation to the hospitality industry. This created two scales that can be tested in other industries. The analysis of data indicated the process of measurement impacted significantly on performance. Another contribution of the research, especially for those firms in the accommodation sector, is the recognition of the benefits of measuring IC, as this study supports earlier findings of the impact of measurement of IC on performance. This brings managers' attention to the long term benefits of measuring IC, and therefore management within the hospitality sector should develop integrated measurement systems that incorporate IC factors with the financial measures.

This study showed the linkage between measurement of IC and performance. However, the survey data relied on perceptual measures of organizational performance. Although objective measures are more desirable, perceptual measures are regularly used in research. While the perceptions of managers on performance was defended as a strength of this study, obvious limitations rest with this approach as it is conceivable that managers did not respond to the performance questions in a truthful fashion. Therefore, additional work is needed to test how closely perceptions of performance correlate with actual performance in this sample. In addition, future researchers might consider defining the individual performance factors more specifically than was done in this study to hone more accurate and specific performance information from respondents. In addition, there is a possibility that the explained variance offered by each independent variable is biased and or inflated because of omission of the impact of tangible resources (Galbreath and Galvin 2004). Therefore it would be interesting to investigate models that incorporate both tangible and intangible factors of production.

Finally, data limitations aside, this research is a step to gaining a further understanding of the beneficial impacts of measuring IC on firm performance. It is hoped that other researchers will adopt and improve on this research, to provide the much needed empirical support to the foundational theories for IC. Based on the findings of this study managers in the hospitality industry and scholars should continue to pursue approaches to better understand the process of measuring IC and performance.

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