Intellectual Capital and Business Performance in Algerian companies

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Abstract:

The purpose of the study is to investigate the impact of Intellectual Capital (IC) In Algerian Companies' Business Performance (BP). The data was collected from 307 employees by means of a questionnaire. Statistical techniques such as descriptive statistics, t-test, ANOVA test, correlation and multiple regressions were employed. To confirm the suitability of data collection instrument, a Kolmogorov-Smirnov (K-S) test, Cronbach's Alpha and factor analysis were used.

The present study found that each of the three types of intellectual capital to be associated with increased business performance . Human capital, structural capital and relational capital exhibited weak relationship with business performance .

The relationship between structural capital and performance become statistically significant in the study with weakness relationship . IC should be taken into serious consideration when formulating the companies' strategy. Finally, these results refer the necessary to increase the awareness of the manager to the importance of the intellectual capital component's in result to increase the business performance .

Key Words: Intellectual Capital (IC), Human Capital (HC), Structural Capital (SC), Relational Capital (RC), Algerian companies, Business Performance (BP).

Introduction :

The economy world has complementally changed through the reliance to the knowledge as a main key to achieve a competitive advantage and the increasing to the depend to the labor and financial factors . At present , to be able to remain and continue achieve a part in the market ,it is useful that the company takes consideration to the intellectual assets especially human resources .

In the mid of 1980s , several companies took consideration the gap between book value and market value expanding , whene in the early of 1980 , a general notion of intangible value was detected (Bontis, 2001)..While , in the beginning of eighties , economists and professionals have constructed statements of IC measurement models. Moving towards the nineties , several models were developed to evaluate and disclosure the IC of a company to other parties, while, in the late 1990s, scholars have based IC into a popular subject and extensively discussed it in relevant conferences and other releases.

Many researchers show that the intellectual capital is a critical factor to create wealth,accordingly it must study this new capital through different ways (definitions, components , measures) .

The purpose of this research is to study **how can intellectual capital impact the business performance through its different component in the Algerian companies** .

1- Definitions of intellectual capital :

As many authors point out , a major proportion of growth companies are valued beyond book value .The market value of a firm consists of its financial capital and " something else ".The first term is the firm's book value and is formed by organizational financial and physical assets.The "something else " term represents the firm's intellectual capital , defined as resources created from internal learning and development of valuable relationships.(Ordonez de Pablos .P , 2002)

The term "intellectual capital " was first used by the economist John Kenneth Galbraith in 1969 (Andriessen , 2006 ;Bontis , 1998; Stewart , 2006 ; Steenkamp , 2007) Stewart (1997) defines intellectual capital as the intellectual material –knowledge , informations , intellectual property , experience – that can be put to use to create wealth" Union Fenosa , a top Spanish firm, defines intellectual capital as " the set of intangible values that promote the organizational capability for generating profits now and in the future"(Union Fenosa ,1999) .

Most definitions of intellectual capital tend towards including the knowledge of the firm and the recognition that intangibles can constitute claims to future benfits.This is consistenet with the generally from resources not conventionally found on the balance sheet (Sveiby,1997)

2- Measuring Intellectual Capital :

What we cannot measure , we cannot manage , many researchers propose different measurement model's due to the difference in the intellectual capital definition's :

2-1 Intangible Asset Monitor :

Sveiby (1997) believes that difficulties in measuring intangible assets can be overcome. He foresees an intangible model as clearly understood as that of an organization's book value equal to tangible assets minus visible debt .Sveiby asserts that key to such a system is having a coherent conceptual framework. Sveiby proposes a conceptual framework based on three families of intangible assets : external structure , internal structure and individual competence. In his conceptual model ,Sveiby identifies three measurement indicators : *growth* and *renewal* .i.e, change ,*efficiency* and *stability* for each of the three intangible assets. He recommends managers select one or two variables indicative of each indicator similar to those developed in the example of his Intangible Assets Monitor model shown below.

Table 1 : Sample Measures for Intagible Assets

	External Structure	**Internal Structure**	**Competence of People**
Growth & Renewal	*organic volume growth *growth in market share *satisfied customers *quality index	*investment in IT *time devoted to R&D *attitude index of personnel toward managers ,culture,customers	*share of sales from competence enhancing customers *growth in average professional experience *competence turnover
Efficiency	*Profit per customer *sale per employee	*propotion of support staff * sales per support staff	*change in added value per employee * change in proportion of employee

Source: Bontis.N (2001**), Assessing Knowldge Assets: A Review of the Models Used to Measure Intellectual Capital,**International Journal Management Reviews,Vol 3,Issue 1 ,p53

2-2 Skandia Navigator : In the 1980s,Skandia innovated its management to cope with the diversity and complexity of customers'needs.After this reformation ,Skandia's management felt that new management system "resulted in "hidden value" for Skandia that was not reflected in traditional financial statements and they wanted a way to visualize that value within the company and to communicate it to the stock market"(Yasuhiro,2006).To do so,they defined intellectual capital as difference of market value and book value

This is the first dynamic intellectual capital model .Skandia divides the market into financial capital and intellectual capital focusing on the breakdown of the latter.On one level,intellectual capital is comprised of human capital and structural capital (as we shown in the first s section) .Areciprocal relationship exists between both as the latter makes up the infrastructure of the former and in turn human capital helps develop structural capital.(Sandra, Munoz and Lopez –Guzman ,2000)

As can the model shows five areas or focuses exist where the company centres its attention and among those areas ,the value of intellectual capital of the organization within its environment is included. Focusing on the metaphor of the house ,the roof shapes the *financial approach*,the old states of accounting that make up the measurement of past history of the company at any specific time .Working down toward the walls of the house,one advances towards the present ,where the focuses of *clients and of processes* are found.The foundations of the structure look towards the future ,and transmit an innovative approach and development.This measures the preparation of the company for the future,with the *development of new products* ,strategic actions and so on.Lastly ,in the center of the house ,a fifth focus exists ,*the human* one,since the employees are understood as the heart and soul of the model.Without them ,the house would not have inhabitant to allow the other areas to develop.

2-3 **Technology Broker (Bontis ,2000) :**

Annie Brooking (1996) proposes three measurement models to help calculate IC elements called the Technology Broker's IC audit. Brooking makes a practical contribution to IC measurement . As we are mentioned previously in the chapter one , Brooking defines IC as the combined amalgam of four components : Market assets ,human centered assets, intellectual property assets and infrastructure assets . Brooking begins the diagnose process by having the organization answer twenty questions that make up the IC indicator. The results of this test suggest that the less a company is able to answer in the affirmative to the 20 questions, the more it needs to focus on strengthening it's intellectual capital.

Each component of Brooking's IC model is then examined via a number of specific audit questionnaires that ask questions specific to those variables thought to contribute to that asset category. For example, to identify the hidden value due to **Market-Related intangibles**, Brooking asks *15 Brand audit, 14 Customer audit, 7 Name audit, 5 Backlog audit*, and *6 Collaboration audit* questions. **Intellectual Property intangible assets** are identified by *9 Patent audit, 6 Copyright audit, 3 Design audit*, and *4 Trade-Secret audit* questions. **Human-Centered hidden assets** are identified by *5 audit questions* about Employee Education, *5 Vocational audit, 12 Work-related Knowledge audit, 8 Occupational Assessment audit, 8 Work-related Competency audit, 10 Corporate Learning audit*, and *3 Human-centred Asset Management audit* questions. Lastly, **Infrastructure hidden assets** are evaluated by *6 Management Philosophy audit, 4 Corporate Culture audit, 31 Corporate Culture Collaboration audit, 7 Information Technology Systems audit, 6 Database audit*, and *4 IT Manager audit* questions. In total, the Technology Broker IC Audit is comprised of *178 ques*

3- **Literature reviews:**

In this part , we try to collect some research about our topic ., then take only a snapshot from each study , this section will focus on interrelationships among intellectual capital components and the impact of IC components on business performance :

Hosain, Freyedon & Homayouni (2011**)** concluded : there is meaningful relationship between intellectual capital and firm's performance. Also the human capital have important role in enhance of productivity in Iranian corporative companies. If in the firms pay attention to absorption of expert personnel and develop of satisfaction of current staff in organization their performance will improvement. Chang & Hsieh (2011**) :** Empirical study is conducted on 367 Taiwan semiconductor companies using Pearson correlation and linear multiple regression whereas financial information is generated from a third party database from Taiwan Economic Joumal. The result shows that a company's IC in general has a negative impact on its financial and market performance. Also the VAIC method allows managers to measure their IC and to benchmark against the competitors in the same industry and shows that the R&D expenditure(that added in the VAIC method) have the better explanation in the management of the knowledge –based economy . Yaghoubi , Kazemi & Moloudi(2010)The results illustrated that there is positive significant correlation between the mean scores of intellectual capital and organizational intelligence dimensions namely strategic vision, shared fate, appetite for change, heart, alignment and congruence, knowledge development, performance pressure and total scores of organizational intelligence ($p<0.01$).

Santos-Rodrigues, Dorrego & Jardon (2008) **:** they use a survey from 68 firms working on the auto components sector, established in the Northern Spain and Northern Portugal. They found firstly, that innovativeness has two main dimensions, perfectly differentiated, the product-process innovation and the management innovation; secondly that the intellectual capital components influences differently each type of innovation capacity (innovativeness).

This study shows that the innovation is one of the element of the intellectual capital that has an effect on a firm's performance . Sharbati et.al (2013) investigate the impact of intellectual capital on business performance in Jordanian Telecommunication Companies(JTC) through 84 managers, by dividing intellectual capital into : human capital , structural capital and relational capital , the results showed a positive significant effect of IC on JTCs' business performance . The results also indicated that relational capital is positively and significantly affect JTCs' business performance , while structural capital and relational capital do not significantly affect JTCs' business performance The Empirical results also indicated that there are strong inter-relationships and interactions among the three components of Intellectual capital .

Huselid (1995) evaluated the links that exist between systems of high performance work practices and a company's performance. The study concluded that these practices have a significant impact on a company's performance. Youndt *et al* (1996) examined the relationship between human resource management, manufacturing strategy and a company's performance. The study concluded that human resource systems are directly related to a company's performance. Miller *et al* (1999) examined manager's perceptions of the usefulness and potential use of intellectual capital. The study concluded that managers place great emphasis on intellectual capital regardless of the type of industry. Van Buren (1999) examined the relationship between a core set of intellectual capital indicators and a company's performance. The study – the first to link intellectual capital to a company's performance – concluded that intellectual capital is associated with a company's performance.

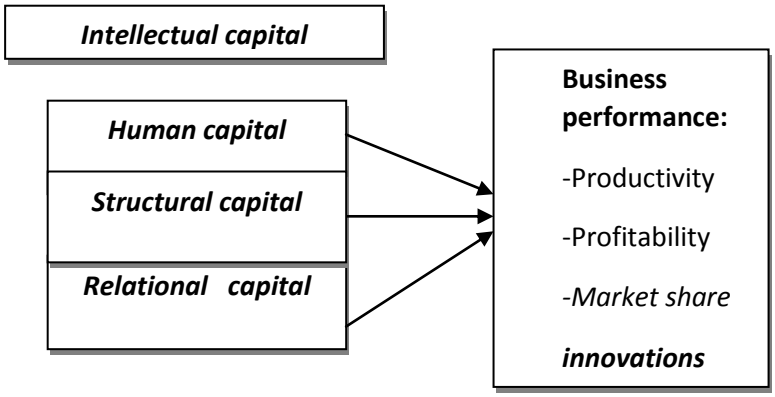
4- research methodology :

This study is designed to examine the relationship between Intellectual Capital and Business Performance in different Algerian companies using model of A.Sharbati ,S.Jawad & N.Bontis (2010)

4-1 Study model :

The model subdividing the higher-order construct of intellectual capital into its three components human capital, structural capital and relational capital :

Figure 1 : conceptual model



Source: Bontis,Sharbati and Jawad , 2010

4-2 Study hypothesis : The study is intended to open few windows towards intellectual capital management and measurement. Since the accumulation of intellectual capital is outpacing the accumulation of physical assets as the key driver of competitiveness in the so called new economy the study is aimed at measuring the extent to which intellectual capital enhances business performance and adds value to the organisation and the hypotheses for the study is described as follows.

Hypothesis 1: An organisation's level of intellectual capital is positively related to business performance.

The sub hypothesis are :

Hypothesis 1a: An organisation's level of human capital is positively related to business performance.

Hypothesis 1b: An organisation's level of structural capital is positively related to business performance.

Hypothesis 1c: An organisation's level of relational capital is positively related to business performance.

Hypothesis 2:Business performance is positively influenced by Intellectual capital.

The sub hypothesis are :

Hypothesis 2a: Business performance is positively influenced by human capital .

Hypothesis 2b: Business performance is positively influenced by structural capital .

Hypothesis 2c: Business performance is positively influenced by relational capital .

5- Study methods and procedures:

5-1 Sample study :

Our sample of this research was employees working in companies including : Banks, Industrial Goods and Services, Insurance , Telecommunications. Most of the respondents are situated in the medium level of the companies

Data collected through quantitative survey approach . The questionnaires is distributed to 320 employees that work in different companies .

The response rate was 67.3 per cent. A description of the respondents is represented in table 20 . As per the table-2 demographic profiles of the respondents consist of small, medium, and large organisation, where respondents from large organization constitute almost half of the total population in the study. Female participants in the study was one third where as male participants consisted of two third of the total population. Age wise distribution depicts 31-40 age group dominates in the study consisting of more than 40% of the total sample , The almost of the respondent have the license diploma ,it consists28,7%. . The respondents having less than 5years of experience at current organisation is very well present in the study consisting of 56,35%

Table 2 :Respondent profile

Parameter	**Group**	#	%
Sex	Female	181	59
	Male	126	41
Age	20-30	48	15,6
	31-40	139	45.3
	41-50	91	29,6
	>50	29	12,1
Education	Primary	60	19.5
	Medium	68	22,1
	Secondary	83	27
	License	88	28,7
	Post Graduation	8	2,5
Profession	General manager	54	17,5
	Account	46	15
	Branch manager	121	39,4
	Others	86	28
Total Experience	>5years	173	56,35
	< 5 years	134	43,65
Total		307	100

5-2 Descriptive analysis :

5-2-1 The test of the reliability :

In order to test for the reliability Cronbach's alpha was used to test the reliability of the measures. All variable and sub-variable items were confirmed valid since their factor loading values were more than 0.4. This result mirrors previous studies conducted by Bontis (1998), Bollen et al.(2005) and Bin Ismail (2005).; as shown in the table 3

Table 3: The test of the reliability and Normality

Items	*Cronbach's alpha*	(K-S) Z	Sig
Human capital	0.678	0.674	0.345
Structural capital	0.756	0.104	0.634
Relational capital	0.589	0.554	0.324
Business performance	0.566	0.789	0.213

5-2-2 The Kolmogorov-Smirnov test:

The Kolmogorov-Smirnov test for normality was used to see whether the responses had a normal curve about the mean. Just over half of the items were considered to have normal distributions. However, the assumption of normality is not a major issue for structural modelling.

All dependent and independent variables were tested for normality. If the significance level was more than 5 percent, normality was assumed (Bollen et. al. 2005, Sharabati et. al. 2010 ,Sharbati et,al .2013).

The table 3 shows that all the independent and dependent variables are normally distributed.

5-2-3 Study Variables Analysis

Table 4 depicts the mean scores of each variable and its corresponding construct. Generally speaking, all items scored in the affirmative (1 = strongly disagree, 5 = strongly agree, with 3 the mid-point) with mean values greater than 3.0. The only item below the mid-point was the use of intellectual property at 2.45

The Tablev4 : Statistical results of summary variables

Items	**Mean**	**Std.Dev**	**t-value**
Intellectual capital	3,69	0,904	42,249
Human capital	4.03	0.843	48,177
Structural capital	3.19	0.945	32,552
Relational capital	3.87	0.924	46,019
Business Performance	3.25	0.461	28,602

5-2-4 Testing hypothesis :

Hypothesis 1: An organisation's level of intellectual capital is positively related to business performance.

As defined in table-5,the regression equation of the business performance with human capital, structural capital and relational capital.

The regression equation of business performance component with human capital, structural capital and relational capital clearly depict the model is well fit with R less than 0.5**.** human capital is weak in explaining the relationship with R value 0.22.

The effect of human capital , structural capital and relational capital on business performance are significant with R value 0.22 , 0.387 and 0.335 in this arrangement and intellectual capital as a whole has a positive relationship with business performance with R value 0.420(that mean the reject of the null hypothesis and accept the alternative hypothesis).

Table 5 : Correlation matrix

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1.Learning and education													
2.Employees satisfaction	**0.446**												
3.Innovation and creation	**0.583**	**0.412**											
4.Human capital	**0.330**	**0.311**	**0.200**										
5.Systems and programs	**0.346**	**0.438**	**0.407**	**0.587**									
6.Researchand development and	**0.443**	**0.545**	**0.563**	**0.551**	**0.386**								
7.Intellectual propert rights	**0.329**	**0.324**	**0.416**	**0.463**	**0.539**	**0.694**							
8.Structural capital	**0.410**	**0.370**	**0.529**	**0.510**	**0.507**	**0.465**	**0.373**						
9.Customers satisfaction	**0.435**	**0.473**	**0.356**	**0.306**	**0.431**	**0.487**	**0.472**	**0.465**					
10.Knowledge about partners, suppliers a customers	**0.289**	**0.410**	**0.480**	**0.461**	**0.469**	**0.272**	**0.300**	**0.487**	**0.306**				
11.Alliances, licensin and agreements	**0.385**	**0.399**	**0.477**	**0.472**	**0.550**	**0.48**	**0.323**	**0.392**	**0.497**	**0.480**			
12.Relational capita	**0.222**	**0.404**	**0.599**	**0.375**	**0.217**	**0.478**	**0.326**	**0.215**	**0.714**	**0.676**	**0.681**		
13.Business performance	**0.255**	**0.385**	**0.360**	**.220**	**0.369**	**0.391**	**0.358**	**0.387**	**0.445**	**0.416**	**0.384**	**).335**	

Hypothesis 2:Business performance is positively influenced by Intellectual capital.

Business performance was regressed again three variables of intellectual capital namely (Human capital, structural capital and relational capital)

The equation for business performance was expressed in the following equation:

$Y's = \beta'_0 + B'_1X_1 + B'_2X_2 + B'_3X_3$, Where,

Ys = Business performance

B'_0 = constant (coefficient of intercept)

X_1 = Human capital

X_2 = Structural capital

X_3 = Relational capital

B'_1, …., B'_3 = regression coefficient of three variables .

Table 6: Regression results of business performance based on the dimensions (N=307) dependent variable : Business performance independent variable :Three intellectual capitals (Model 2)

Model		Sum of Square	Df	Mean Square	F	Sig.
1	Regression	3906.946	1	3906.946	65.175	0.000
	Residual	18283.406	305	59.946		
	Total	22190.352	306			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	0.987	1.805		6.098	0.000
	HC	0.396	0.086	0.220	8.073	0.000
	SC	0449	0.2107	0.433	4.190	0.000
	RC	0.345	0.254	0.387	3.325	0.001

p> 0.05

$Ys = 0.987 + 0.396\ X_1 + 0.449\ X_2 + 0.345\ X_3$

Table (6) showed the results of the regression analysis and the impact of intellectual capital to the business performance. To predict the goodness-of fit of the regression model, the multiple correlation coefficient (R), coefficient of determination (R_2), and F ratio were examined. First, the R of independent variables (three factors, X_1 to X_3) on the dependent variable (Business Performance, or Ys) is 0,420 , which showed that the business performance had positive and low overall association with the three attributes. Second, the R_1(correlation between human capital and business performance) is 0.220, suggesting that more than 20% of the variation of business performance was explained by the human capital . Last, the F ratio, which explained whether the results of the regression model could have occurred by chance, had a value of 65.175 (p =0.000) and was considered significant. The regression model achieved a satisfactory level of goodness-of-fit in predicting the variance of business performance

in relation to the four attributes, as measured by the below – mentioned R, R_1, and F ratio. In other words, at least one of the three attributes was important in contributing to business performance. In the regression analysis, the beta coefficients could be used to explain the relative importance of the three attributes (independent variables) in contributing to the variance in business performance (dependent variable). As far as the relative importance of the three intellectual capital attributes is concerned, structural capital, B_2=0.433, p=0.000) carried the heaviest weight for business performance, followed by relational capital, B_3=0.387, p=0.000 and human capital, B_1=0.220, p=0.001.

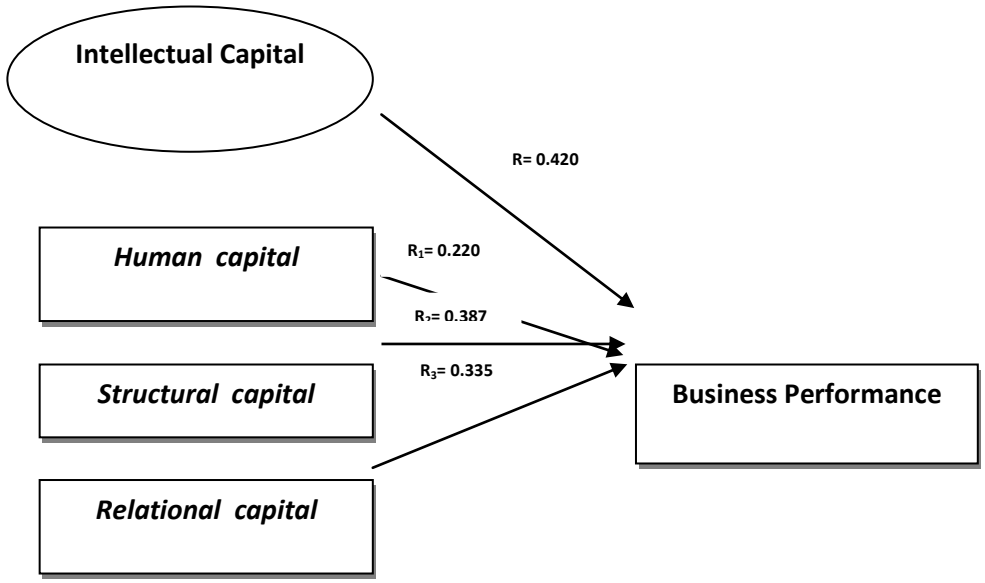
The results showed that a one-unit increase in structural capital would lead to a 0,433 unit increase in business performance, one-unit increase in relational capital would lead to a 0.387 unit increase in business performance and one-unit increase in human capital would lead to a 0.220 unit increase in business performance.

In conclusion, the results of multiple regression analysis agree hypothesis 2, that there is the effect of intellectual capital to the overall business performance. So, there is a relationship and an impact of intellectual capital on the business performance .

The table also shows the results of the statistical analysis that mentions that there is an influence of the intellectual capital dimensions on business performance, with F calculated(65.175) , which amounted to 30that means it is significant at the level of 0.05 that means the reject of the null hypothesis and accept the alternative hypothesis.

The results are summarized in the figure 2 :

Figure 2 :Summaries results



5-2-5 Discussion :

The present study found that each of the three types of intellectual capital to be associated with increased business performance . Human capital, structural capital and relational capital exhibited weak relationship with business performance .

The relationship between structural capital and performance become statistically significant in the study with weakness relationship .

Since individuals form the basis of organisational level of learning and knowledge accumulation (Structural Capital) and institutionalization of knowledge and knowledge sharing is lowly encouraged in Algerian industries , there is weak co-relation between structural capitals with its bottom line

This results refer the necessary to increase the awareness of the manager to the importance of the intellectual capital component's in result to increase the business performance .

This study explores the performance of intellectual capital in Algerian firms, and finds out that structural capital and relational capital have better performance, and human capital presents the poorest performance, showing that Algerian firms give little prominence to human resource management. It is observed that there is a significant positive correlation among the three dimensions of intellectual capital (human, structural and relational capital) and business performance, and also a positive correlation among these three capitals.

Based on correlation analysis of 9 sub-dimensions of intellectual capital and business performance, it is learnt that "staff education and training" as well as "cooperation with clients" have an obvious relationship with business performance. But it is clearly seen from the average score of the items in the sub-dimensions that "staff education and training" in the human capital presents the poorest performance. As pointed out by Hecker: establish training and education as top priority: transform your firm into a "learning institution". Companies should encourage lifelong learners.(Sharbati,2010)

To get the maximum benefits from the concept of intellectual capital, it should be considered at all four levels: individual, group, organization and country. It is important for the companies to harvest the full potential of its people by investing in appropriate technological infrastructure so that human capital can be converted (or processed) into increased wealth and a higher standard of living. This can be achieved for organizations regardless of size (Serenko et al., 2007).

The results of this study have shown that there is in fact weak and positive evidence that the companies uses this study are becoming managing intellectual capital effectively and that in turn is influencing business performance positively.

- **Conclusion**

The Algerian companies should head the management team and directs the company's business policy. A charismatic leader with vision, energy and a strong desire to succeed, he generates commitment and loyalty within all levels of the company. The top managers are functional specialists who have the task of agreeing goals and milestones for the activities within their functions. The top managers also act as key project members. They assume entrepreneurial roles and are required to continue the process of innovation, in which they proactively seek to create opportunities or solve problems to serve business needs. The key project members affect the performance of the project at two levels. Firstly they influence the day-to-day operations of the project. This ensures the effectiveness of the resulting activities and processes that produce the innovative output of the project. Secondly, they work to interconnect the activities that drive value creation by working closely with their alliance partners.

The company should embed its knowledge in the routines, structures and procedure through social interaction and codification processes, adding to the organisational memory.

The Algerian companies should adopt an IC strategy that help their to built a competitive advantage. Defining the role of IC in a formal way. It can be done by designing a map for IC in each organization. Managers should design systems and set up appropriate programs for monitoring and managing IC and related databases. Finally, identifying key people in each department as IC champion. Managers at Algerian organizations would be responsible for preparing a plan for managing IC and linking it to the organization's strategic goals (Sharbati et .al ,2013)

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