Impact of Intellectual Capital on Realizing University Goals in a Sample of Jordanian Universities

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Abstract

Purpose – This paper aims to examine the direct impact of four components of   intellectual capital   (leadership and strategy, human capital, structural capital, and   relational capital) on realizing university goals(academic goals, maintaining and developing staff, improving community relationships, achieving the university's plans and programs, and attracting the new students) in a sample of three Jordanian universities: University of Jordan (the oldest and largest Jordanian University founded 1962), Al Zaytoonah University of Jordan (a private university founded in 1993) and   Middle East University(a private university founded in 2005). To measures   the impact of   its components   on realizing university goals, a set of hypotheses were developed, questionnaire was built and evaluated by reference group, and data from a sample of   university staff to test these hypotheses. Intellectual capital has a significant effect on university performance in meeting its goals. Furthermore, leadership, human and relational capital have in general a significant effect on realizing majority of university goals, and   more than structural capital.

Keywords：Intellectual capital, university leadership human, structural, relational capital, university goals.

1. Introduction

It was in the industrial era when the power and importance of capital and   its model machine was   discovered. The physical capital-based machine gained control from the beginning of the industrial revolution until the middle of the last century. With the computer   revolution and the growing importance of information as a source of   wealth in the new economy, the   intellectual capital (IC)became an   important factor.

Unlike industrial capital, which is a physical and tangible entity, IC   is intangible, making it difficult to measure and evaluate. Thus, there was a delay in dealing with IC's control of real money for decades with the exception of a few cases that cannot be overlooked, such as patent and copyright cases. With the growing importance of intangibles; in particular knowledge assets and intellectual capital and their growing role in maximizing a company's assets, it is no longer possible to ignore the true value of these assets, especially since many companies, such as private consulting firms and professional and specialized companies, do not have   physical capital and rely totally on employees' experience and knowledge (intellectual assets).

Universities also depend heavily on intellectual capital. They carry out several functions, educational, research, and consultancy activities are   based on scientific knowledge and knowledge work. The importance of this study comes from the fact that universities base their evolution on education   they provide about   intellectual capital.

There are many factors that can contribute to the development of intellectual capital and enhance its role in achieving the objectives of the university. For example, the university development of different intellectual-capital models, the existence of programs to attract experienced faculty, programs to develop relations between the university and stakeholders, and information-technology and knowledge-sharing culture.

2. Literature Review

Traditional business culture makes it difficult to understand the dimensions of the shift toward a knowledge-based economy and intellectual assets; mainly due to the many and profound differences between   physical and intellectual capital. While physical capital is embodied in buildings, machinery and tangible assets, IC is embodied in mental power hidden in employees (Edvinsson and Malone,1997), in the knowledge and experience of staff, and in sources of knowledge stored in databases and corporate systems and culture (Al-Ali,2003,p6). Researchers proposed different definitions for the term intellectual capital including   the following:
Intellectual capital interferes with many terms such as invisible assets (Lev, 2001), non-financials (Gazdar,2007), hidden assets(Roos and Roos,1997), knowledge assets, skills and expertise assets, and all nonmaterial entities of value to the organization.
• IC does not have a unified definition (Engstrom *et al.,* 2003). Each author presents his perspective according

to the definition deemed appropriate. Table 1 provides a set of definitions that reveal the range of interests by intellectual-capital researchers:

Table 1. Definitions of intellectual capital

Author	Definitions
Guthrie et al., (2007)	New intangibles and their value, such as staff competences, customer relationships, computer and administrative systems still receive little recognition in traditional financial reporting models.
Lev (2001)	Non-physical sources of value generated by innovation , unique organizational designs, or human resource practices
Edvinsson and Malone (1997)	is divided into three basic forms: human capital, structural capital and customer capital. All individual capabilities, skills and experiences of employees and managers are included under the term human capital.
Roos and Roos, (1997)	Both what is in the heads of employees (human capital) and what is left in the organization when people go home in the evening (structural capital which consists of customer, process and Renewal and Development capital).
Bontis (1998)	The collection of intangible resources and their flows.
Swart (1997)	The total stocks of the collective knowledge, information, technologies, intellectual property rights, experience, organization learning and competence, team communication systems, customer relations, and brands that are able to create values for a firm.
OECD (1999)	The economic value of two categories of intangible assets of a company: organisational (``structural'') capital and human capital.

- The increasing importance of intellectual capital in organizations helps improve business opportunities to generate value (Mouritsen, 2006) and increases the extent of participation in market value where IC is the difference between book value and market value of a company (Kristandl and Bontis, 2007). IC also contributes to improving the company's performance(Firer and Williams, 2003 Lonnqvist and Mettanen,2002 and Schiuma and Lerro, 2008).

- To better understand and analyse intellectual capital, researchers divided it into two components: regulatory capital and human capital (OECD, 1999). Other divided it into three components: human capital, structural capital, and customer or relational capital (Stewart, 1999) or four components (Brooking, 1996, Rafiee *et al.,* 2010). Table 2 provides multiple categories of the components of intellectual capital with examples for each of its components.

- Intellectual capital has unique characteristics making it different from other components (Lönnquist and Mettanen, 2002) and thus making it invisible, closely related to knowledge and experiences of employees , customers, and technologies of an organization. It offers better opportunities for an organization to succeed in the future.

- There are many different models for measuring and evaluating intellectual capitalsuch as: economic value added (EVA) (Stewart, 1999), human resource and costing accounting (HRCA)(Johanson and Nilson, 1996), Skandia navigator (Edvinsson and Malone, 1997), value chain scoreboard (Lev, 2001), among others. The multiplicity of these methods and models reveals that there will be discrepancies when measuring IC on both the organizational level and the national level (Bontis,2001, Edvinson,2002, Malhotra, 2003).

Table 2. Components of Intellectual Capital

Researcher	Components	Examples
Stewart (1999)	• Human capital • Structural capital • Customer capital	• Individuals, teams, leadership • Structures, regulations, patents, databases • Contracts, loyalty, Marks
Edvinsson & Malone (1997)	• Human capital • Customer capital • Capital renewal and development • Process capital	• Skills, experience, knowledge workers • Relations with customers, suppliers, contracts • Projects to research and development, new products • Technologies, the banner of art.
Svieby (1997)	• The internal structure • The external structure • Human structure	• Systems and processes, business models, databases, documents, copyrights, know-coded. • Alliances, relations with customers, partners, suppliers, strategic investors, local community, reputation and excellence • Capacity, knowledge, experiences and individual and collective capacity to solve problems.
Roos et al. (2001)	• Human capital • Relational capital • Organizational capital	• Competence, skills, and intellectual agility. • Relationships with relevant stakeholders. • processes, systems, structures, brands
Marr *et al.* (2004)	• Human Resources • Market Assets • Infrastructure • Intellectual Property	• Experience, capacity to solve problems, creativity, leadership and administrative skills • Brand, contracts, customers, distribution channels, licensing and franchise contracts. • Technologies, techniques, processes. • Trade secrets, design rights.
European Commission, 2006	• Origins of human capital • Structural capital assets • Capital assets Relations	• Level of education, experience, cognitive • Structures, processes, information technologies And communications. • Contracts, cooperation projects and networking projects, the European Union.
Mertens & van Der Meer (2005)	First Level • Human capital • Structural capital • Rational Capital	Second Level: • Tangible resources • Intangible resources
Kok (2007)	• Human capital • Structural capital • Rational Capital	• Experience, the know-how, capabilities, skills, and expertise. • Systems, networks, policies, culture, distribution channels, and other organizational capabilities. • Internal and external relations.
Uadiale and Uwuigbe (2011)	• Human capital • Structural capital • Customer/rational Capital	• Knowledge, skill, innovativeness • Organizational capital • Process capital • Innovation • Relationships with customers, suppliers, industry associations

3. Intellectual Capital in Universities

The university is a scientific institution with a core activity of either the creation of knowledge through scientific research, knowledge improvement through counselling, or learning and sharing through education. In the new economy, knowledge is the "new oil" and intellectual capital is the factory (Adams and Oleksak, 2010). The university is an excellent example of a model that produces new knowledge, experiences, and knowledge dis-

semination and distribution through books, studies, and documentation. Universities play the same role factories played in the industrial revolution, and the ideas and new experiences in it play the same role the new equipment played in the traditional economy. In this context, we need to be aware of the importance of the university and the role it plays in supporting intellectual capital. Some factors we need to take into consideration include the following:

• Compared to other acts, marginal revenue for the realization of knowledge is the highest, whether in agriculture, industry, or so-called non-knowledge workers. This has resulted in some knowledge workers being called gold-collar workers (Kelly, 1985). This group represents a layer of new employees who possess knowledge and capacity of a scientific and professional nature exclusive high incomes, named newclass workers (Drucker, 1994). According to the OECD(1999), knowledge workers are groups of scientists, engineers, and specialists in information and communication technology or professionals who produce knowledge. According to the German national planning office, knowledge workers are divided into three categories: researchers and scientists, graduates of higher education, and human resources personnel in the world of technology (Harrison & Kessels, 1999).

• The transition to a knowledge-based economy has led to the increase in demand for knowledge workers who have completed higher education and represent the highest category of human capital at the level of the institution or country. This can be seen in the increase of enrolment rates (defined by the ratio between the numbers enrolled at a given stage of education over the whole population in the same age in higher education, in OECD countries and in the world. In OECD the rates rose from 8.9 per cent in 1960 to 38.1 per cent in 1990 and to 49.4 per cent in 1995. In the world enrolment rates rose from 3.1 per cent to 18.9 per cent (Checchi, 2005).

As noted in OECD states, the rate of growth of knowledge workers was highest (3.3%) compared to all other categories. whereas, the demand for industrial workers (manual labourers) showed negative growth. Table 3 shows the rate of growth in basic groups among workers.

Table 3. Ratio of Average Change in Core Sets of Acts (1992-1999)

Growth rate (%)	Group
+3.3	Knowledge workers
+2.2	Service workers
+1.6	Administrators
+0.9	Data Workers
-0.2	Workers producing goods

Source: Harrison R. and Kessels J.(2004),Human Resource Development in a Knowledge Economy, by, Palgrave Macmillan, New York, p15.

Although general education and higher education are two forms of human investment, and despite their positive direct and indirect impact on productivity and on improving the quality of public social life, they are still considered a risky investment. Table 4 illustrates the returns per unit cash invested in primary education (top), followed by higher education

Table 4. Returns on Investment in Education (%)

Countries	Primary education	Secondary education	Higher education
Low-income countries	21.3	15.7	11.2
Middle-income countries	18.8	12.9	11.3
High-income countries	18.9	13.1	10.8

Source: The world Bank(2006), Where is the Wealth of Nations?, Washington, p91.

But how can this be explained? Some refer to the law of diminishing revenue in the area of education to explain this phenomenon since the single currency unit invested in primary education has a higher return than investing in secondary and higher education. Table 4 illustrates this revenue gap and productivity is greatly reduced in high-income developed countries with revenue in higher education (9.5%) and in secondary (10.3%) and primary education (13.4%). However the gap peak in low-income countries follows that in middle-income countries as shown in table 4.

• Arab universities are still in the process of building IC, even though many universities, such as Cairo University founded in 1953, Baghdad 1956and Damascus, 1958 were founded in the middle of the last century. This phase is characterized as a "stock" phase, when universities completed their structure based on their national needs as well as budget limits.

• For the purposes of this study IC in universities is defined below:

• The main components of intellectual capital proposed in this study are:
  - Human capital (scientific and administrative staffing)
  - Structural capital (regulations, programs, and organizational routines)
  - Relational capital (university relations with internal and external stakeholders)

- Leadership and its strategic version. The leadership component is responsible for the university's long-term goals. The goal of this component is to convert knowledge from stock to flow and results. This component is important because of the increased competition among different schools to improve their resources and capacities to emerge among world university rankings. Ittner and Larcker (2003) noted four errors in building intellectual capital: one of them was unclear combination between intellectual capital and corporate strategy. Numerous studies have confirmed this component as a corporate vision (Sánchez *et al.,* 2006), philosophy and management process in universities (Rafiee and Mosivi, 2010), strategy (Petty and Guthrie, 2000), and return on vision versus return on investment (Liebowitz and Suen, 2000, p62).

• Subcomponents: Where key components of IC are converted to subcomponents. These subcomponents can serve as a good guide in developing the universities and their major processes and output.

4. Study Variables

Variables of the study are determined as follows

1. Independent Variables: Independent variables representing the components of IC, consists of leadership and strategy, human capital, structural capital, and relational capital. The last three components were used in several studies relating to intellectual capital. However, study (Sánchez *et al.,* 2006) noted that goals and strategic capabilities should be considered as components. Rafiee *et al.(*2010) explained the sub-components of IC include philosophy and scientific and organizational culture.

   Wheatherly (2003, p2) adopted a fourth component of intellectual capital: social capital, which includes the practices and philosophy of management, and others identified a management and culture as a component of IC (Labaki and Pallas, 2006, p257). Ittner and Larcker(2003) noted four errors in assessing IC, and one of these error represented in lacking integration of IC into strategy.

2. Dependent Variables: Universities have always been human-capital intensive (highly qualified individuals) in their education process. Universities are also characterized by their infrastructures and relationships with their environment. Accordingly, Five dependent variables were identified, and directly linked to university objectives. These components are: Academic goals related to teaching, maintaining and developing staff, attracting new students, achieving the university's plans and programs, and improving community relationships.

4.1.Questionnaire

The questionnaire consisted of three main sections: properties of the sample, statements related to sample opinions on intellectual-capital components with 5-point scale, and university main objectives: realizing university goals, maintaining and developing staff, attracting new students, achieving the university's plans and programs, and improving community relationships. SPSS 18 was used for data analysis.

4.2.Study Sample

According to the information listed on Jordanian universities in Arab and foreign universities directory (http://universities.roro44.com/ar/online), the total number of Jordanian universities(governmental and private) is 28. Three universities were selected as a sample:

1. University of Jordan. The oldest Jordanian University, founded 1962, is a state university and has the largest number of faculty and students among the three universities. A random sample of 25instructors was conducted.

2. Al Zaytoonah University is a private university founded in 1993. A random sample consisting of 20 teachers, teaching at various colleges, was selected.

3. Middle East University is a graduate university founded in 2005. A random sample consisting of 15 faculty members was selected from various colleges.

Table 5 demonstrates the characteristics of each sample:

Table 5 Characteristics of Respondents

Characteristics	*Data*	Frequency	%
Gender	Male	38	79
	Female	12	21
	Total	50	100
Age	< 30	7	14
	39–30	10	20
	49–40	11	22
	59–50	16	32
	60 ≥	6	12
	Total	50	100
Marital status	Single	11	25
	Married	39	75
	Total	50	100
Degree	Master	9	18
	Ph.D.	41	82
	Total	50	100
Academic titles	Lecturer	11	22
	Assistant professor	14	28
	Associate professor	12	24
	Professor	13	26
	Total	50	100
Year of experience	< 5 years	5	10
	5–9	10	20
	10–14	10	20
	15–19	14	28
	20 ≥	11	22
	Total		100
Specialty	Natural and engineering science	12	24
	Humanities	38	76
	Total	50	100

5. Hypotheses of the Study

The main hypothesis was formulated to formally state the impact of intellectual-capital components (leadership and strategy, human, structural , and rational capital) on the major goals of the university (academic goals, maintaining and developing staff, improving community relationships, achieving the university's plans and programs, and attracting the new students).

Ho$_1$ There is a statistically significant impact of intellectual-capital components (strategic leadership, human, structural, and rational capital) on realizing academic goals in the target sample.

Ho$_2$ There is a statistically significant impact of intellectual-capital components on maintaining and developing staff in the target sample.

Ho$_3$ There is a statistically significant impact of intellectual-capital components on attracting new students in the target sample.

Ho$_4$ There is a statistically significant impact of intellectual-capital components on achieving the university's plans and programs in the target sample.

Ho5 There is a statistically significant impact of intellectual-capital components on improving community relationships in the target sample.

5.1 Hypotheses Tests

To ensure appropriate resolution to achieve the objectives of the study, the following were conducted:

i.   Validity test: Based on the literature, a draft questionnaire was initially prepared and tested by five professors from Al-zaytoonah   University of Jordan to ensure that the content represents what needs to be tested and meets the research variables. The draft questionnaire was returned and adjusted based on the recommendations from the reviewers to build the final version that was used in the research.

ii. Reliability analysis: To ensure internal consistency among the questionnaire items, the reliability analysis applied Cronbach's alpha   to the independent variables (components of IC). This analy-

sis is necessary to study scale features and internal consistency between the questionnaire items, and their correlation. The results showed links between phrases associated with leadership and strategy (.969), human capital (.825), structural capital (.909), and relational capital (.918). These were all larger than 60% which means the questionnaire was good fit to be used in the study.

iii. Collinearity test: When using multiple regression to test hypotheses, it is necessary to carry out multicollinearity test as well as to ensure variable independence. For this reason, the variable inflation factor (VIF) was calculated. VIF values were between 1 and 2.7. Because they are less than 5,then the independent variables of the study were not highly linearly related.

6. Results

Concerning the importance of IC components, the descriptive data in Table 6 shows a high level of importance, a mean of 3.946–3.755 and a average of means 3.287.

Table 6. The Importance of intellectual capital components

Component	Mean	Standard deviation	Ranking	Importance level
Human capital	3.755	0.67403	1	High
Strategic leadership	3.266	0.76105	2	Median
Structural capital	3.1822	0.58529	3	Median
Rational capital	2.946	0.69377	4	Median
Average	3.287			Median

* For the 5-point scale, the levels of important are the low-importance degree = 1 - < 2.33; the medium importance degree = 2.33 – 3.66; the high-importance degree = > 3.66.

To test the study hypotheses, multiple regression and the determination coefficient were used to describe the impact of all components of intellectual capital on each of the objectives of the whole, and to determine the impact of each component of intellectual capital on each of the objectives of the university.

Hypothesis testing (HO1): As can be seen in Table 7, the results showed that the coefficient of determination (R^2 =.254 at significance level p-value < .05) means that there is a positive relationship between IC components and achieving academic goals.

In order to test the hypothesis of IC components separately, the results of regression coefficient as shown in (ß) column indicate that there is a significant effect of all these components. The impact of the components of the IC on achieving the objectives were ordered from the most impact to the least impact as in: human, leadership , relational and structural.

Table 7. The impact of intellectual capital.- Components on realizing academic goals

Subfactors	ß	T	Sig
Strategic leadership	.201	1.490	.032
Human capital	.287	2.217	.028
Structural capital	.111	.517	.007
Rational capital	.155	2.226	.031
R^2 = .254	F = 3.822		Sig = .009

Hypothesis testing (HO2): Coefficient of determination was .172 as shown in table 8, that means there is a significant relationship between intellectual-capital and maintaining and developing staff components. Results as shown in (ß) column indicate that there is an impact of IC components ordered in: structural, human and relational, whereas there was no statistically significant impact by component of strategic leadership.

Table 8. The impact IC Components on maintaining and developing Staff

Components	ß	T	Sig
Strategic leadership	.302	.168	.067
Human capital	.130	2.016	.005
Structural capital	.138	2.140	.020
Rational capital	.085	.335	.038
R^2 = .172	F = 2.345		Sig = .009

Hypothesis testing (HO3): According to the coefficient of determination (R^2= .146) as shown in Table 9. That means there is a positive relationship between intellectual capital and attracting new students. According to the regression coefficient in (ß) column, the most influential component is relational capital, followed by human capital and capital strategic leadership, whereas there was no statistically significant impact by structural capital.

Table 9. The impact   IC   Components on attracting   new students

Components	ß	T	Sig
Strategic leadership	.117	.756	.022
Human capital	.185	1.231	.045
Structural capital	.090	.380	.097
Rational capital	.359	1.692	.009
R^2 = .146	F = 1.196	Sig = .012	

Hypothesis testing (HO4): Results shown in Table 10 indicate that there is a positive relationship between IC components achieving   university's plans and programs. According to regression coefficient in (ß) column, the most influential components on achieving   university's plans and programs , are   human, and relational capital, whereas there was no statistically significant   impact   by strategic leadership and structural-capital.

Table 10. The impact   IC   Components on achieving university's plans and programs

Components	ß	T	Sig
Strategic leadership	.014	.556	.078
Human capital	.274	1.620	.012
Structural capital	.090	.103	.118
Rational capital	.126	2.284	.030
R^2 = .240	F = 3.551	Sig = .001	

Hypothesis testing (HO5): According to the coefficient of determination shown in Table 11, there is a positive relationship between IC components and improving community relationships. The most influential components is relational capital followed by strategic leadership and human capital, whereas there was no statistically significant impact by structural capital.

Table 11. The impact   IC   Components on improving community relationships

Subfactors	ß	T	Sig
Strategic leadership	.274	1.856	0.017
Human capital	.245	.675	.005
Structural capital	.102	1.005	.320
Rational capital	.285	.405	000
R^2 = .242	F = 3.583	Sig = .013	

7. Discussion

Results show that intellectual capital has a positive impact on university performance in general. The results show a positive effect of the components of intellectual capital on achieving university goals. This is consistent with many studies that emphasized the impact of intellectual capital on organization performance in Jordan (Sharabati et al, 2010) and in Nigeria   (Uadiale and Mushrazoil,2003). Ahangar (2011), using VAIC accounting cool, showed the positive impact of intellectual capital on profitability and productivity in Iranian companies. All intellectual-capital components had a positive impact on achieving the goals of the university, although human capital was ranked first and most important, followed by leadership and capital relational, structural capital ranked last among the components. The results also showed that the components of intellectual capital had a positive impact on conservation and development by university owners and   had   positive impact on leadership. Additionally,   the effect of structural capital was   most influential, also leadership was important   in organizations generally, but this importance varied   from one organization to another. Although university leadership importance varies among universities, it was proven that this variation was due to having highly qualified employees.

Relational capital, human capital and leadership capital   have had   a   positive impact on attracting new students, whereas   structural capital did not have a significant impact. Universities attract students through efforts at developing relationships with the local community. This result in a greater impact of relational capital over structural capital as well as leadership. Although human capital showed the biggest positive impact on the achievement of plans and programs at the university, structural capital and leadership did not show any significant effect. This may be interpreted as due to academic and scientific showing and conferences where the role of human capital has more effect.

With regard to the impact of intellectual capital on improving relationships with the local community, leadership, human capital, and relational capital had a positive impact. Structural impact, on the other hand, did not have much impact. This shows that the university leadership places importance on research over relationships and external activities, furthermore, effect of structural capital does not appear significant, which means that universities do not use their systems, programs, and information technology effectively. A survey study con-

ducted in British universities showed that intellectual capital is not used effectively only in 30 per cent) of universities (Morgan Cole, 2006, p3). A study (Gregorio and Shane,2003)   pointed out that some universities are less able to exploit intellectual capital. Thus intellectual capital at universities is still in need of greater attention and efforts to improve its effectiveness

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