

Zagreb International Review of Economics & Business, Vol. 14, No. 2, pp. 1-22, 2011

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ISSN 1331-5609; UDC: 33+65

Testing the Relationship between the Efficiency of Value Added Intellectual Coefficient and Corporate Performance at Commercial Banks in Amman Stock Exchange (ASE)

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Abstract: The principal purpose of the present paper is to investigate the association between the efficiency of value added Intellectual Coefficient (VAIC) by the major components of a banks resource base {physical capital (CEE), human capital (HCE) and structural capital (SCE)} and three traditional dimensions of banks financial performance. The three traditional dimensions of banks financial performance are (1) profitability, (2) productivity and (3) market valuation. The study Used 14 commercial banks data drawn from Amman Stock Exchange (ASE) reporting period 2002-2007. The paper used two models to testing, the first between the Value Added Intellectual Coefficient (VAIC) as the efficiency measure of three intellectual capital components and market valuation. The second model explores the relation between every intellectual capital variables as independent variables and banks financial performance dimensions include return on assets, return on equity and employee productivity.

Keywords: Intellectual Capital, Human capital, Capital employed Structural Capital, VAIC, Financial Performance

JEL Classification: G32

Introduction

Banking sector, considered as ever growing child, in any country plays a pivotal role in setting the economy in motion and in its development process, while the banking structure - the number and size distribution of banks in a particular locality and the relative market power of specific banking institutions - determines the degree of competition, efficiency and performance level of the banking industry (Azad, 2000).

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The increasing gap between firms' market and book value has drawn wide research attention to explore the invisible value omitted from financial statements (Lev & Radhakrishnan, 2003), documented that, over the period of 1977-2001, the market-to-book value ratios of US Standard and Poors (S&P) 500 corporations increased from slightly above 1 to over 5, implying that about 80 per cent of corporate market value has not been reflected in financial reporting. The limitations on financial statements in explaining firm value underline the fact that the source of economic value is no longer the production of material goods, but the creation of intellectual capital.

Intellectual capital includes human capital and structural capital wrapped up in customers, processes, databases, brands, and systems (Edvinsson & Malone, 1997), and has been playing an increasingly important role in creating corporate sustainable competitive advantages (Kaplan & Norton, 2004). Given the significance of emerging economies to the overall wellbeing and balance of the global economy, it is important to establish an understanding of the developing of intellectual capital in different socio-political and economic settings.

This study aims to evaluate the relationship between intellectual capital capability and financial performance of commercial banks in Jordan. It is to examine interrelationships among intellectual capital components and organizational performance, with the level of human capital efficiency (HCE), capital employed efficiency (CEE) and structural capital efficiency (SCE). As an exploratory study, this study should indicate factors in determining the performance of commercial banks in Jordan, from the perspective of intellectual capital performance.

Problem Definition

Intellectual capital management has been the core of the enterprise operation in knowledge era. Through research by Bornemann et al. (1999) found enterprises, which manage their intellectual capital better, owned stronger competitive advantage than the general enterprises, and companies which strengthen their own intellectual capital management often perform better than other companies (Bornemann et al. 1999).

Given the growing gap between the market and book values of firms, investigation into how to measure firms' intellectual capital and whether capital market is efficient with intellectual capital has been drawing broad research interest. If intellectual capital does not exist in organizations then why does stock price react to changes in management? Obviously, investors and financial markets attach value to the skills and expertise of CEOs and other top management. Recent contributions have suggested that knowledge and information are actually subject to increasing returns, as opposed to the decreasing returns typical of the traditional resources (Bontis, Drag-

onetti, Jacobsen, & Roos, 1999). If this is true, then knowledge and information become even more attractive to companies than before. Having a good base of knowledge means that a company can in future years start leveraging that base to create even more knowledge thus increasing its advantage on the competitors.

The problem that confronts businesses, users of accounting information, standard setters and regulators is how to best understand and communicate the difference between the value of a company (usually expressed as market capitalization) and the accounting book value of that company. It is possible to simply attribute the entire difference to some ill-defined notion of intangibles. The rise of the new economy is principally driven by information and knowledge and it is attributed to the increased prominence of intellectual capital. Intellectual capital appears to be a key construct in explaining this difference

Hence, this study intends to explore the relationship between Value Added Intellectual Coefficient (VAIC), firms' market valuation (Market – to – book value ratios) and financial performance in context of banking industry of Jordan

Importance and Contribution of this Study

Corporate performance is a term frequently used by various stakeholder groups, scholars and policy makers alike. Whilst the common use of this phrase may imply a shared understanding a search of a precise definition of corporate performance is highly elusive. A possible explanation for this lack of consensus is that corporate performance potentially describes a variety of facets of a firm's overall well-being ranging from its financial to output levels to market returns. Another factor contributing to an inability to formulize a specific definition of corporate performance is the development of alternative theoretical frameworks, combined with increasing recognition that the traditional underlying factors of production have significantly altered in the latter decades of the 20th Century.

Since Adam Smith the principles of neoclassical economics have formed the general cornerstone of the major theoretical paradigms of business disciplines such as management, finance and accounting. Also, labor and capital were generally perceived as the primary production factors needed to achieve healthy returns. Discontent with these traditional views have led to alternative views of the firm being proposed whilst intellectual capital assets are now increasingly recognized as the chief pivotal forces behind wealth creation

The prime objective of this study is to empirically examine the association between a developing measure of intellectual capital – namely the Value Added Intellectual Coefficient (VAIC) developed by Pulic (1998) and market – to – book value ratios. Following Chen, Cheng, and Hwang (2005), Firer and Williams (2003), and Goh (2005), this study also uses VAIC as an aggregate measure of corporate intel-

lectual ability. Further, this study also analyses whether intellectual capital contributes to firms' financial performance: (1) return on equity, (2) return on assets, (3) employee productivity. Findings from this study will assist to determine if Jordanian firms appear to continue to rely on traditional business practices and perceptions (that is, a reliance on natural resources for wealth creation) or are shifting towards a greater reliance on intellectual capital factors of production in determining productivity, profitability and market valuation. This study will also assist to discover the investors' perception on corporate performance and to determine the factors, which they value more while investing their money. Hence, the purpose of this initial stage of research is to aid the development of a relationship rather than approaching towards a robust conclusion.

Theoretical Framework

The Importance of Intellectual Capital

There is increasing evidence that the drivers of value creation in modern competitive environments lie in a firm's intellectual capital rather than its physical and financial capital. Studies of listed companies consistently find significant gaps between the accounting book value of organizations and their market value (Cuganesan et al., 2006). Analysis made publicly available by the consulting firm Accentor indicates that, for knowledge intensive firms, tangible assets and resources typically comprise between fifteen and twenty-five percent of company value (Ballow et al., 2004). The same study also finds that, across the majority of listed companies in the United States, expectations of future growth value (as opposed to current earnings) comprise almost sixty percent of current company value. Adopting a formal framework to facilitate intellectual capital reporting is a way for firms to explicitly identify, audit and manage intangible sources of value creation and communicate these both internally and externally.

The Motivation to Disclose Intellectual Capital

There are a number of incentives that may accrue to firms who chose to voluntarily disclose intellectual capital. Petty (2003) identifies that the predominate incentive for firms to disclose their intellectual capital is to 'render the invisible visible in line with the axiom 'what gets measured gets managed''. This supposes that if intellectual capital is not reported, there is a risk that it is not receiving sufficient attention from management and other stakeholders (Guthrie and Petty, 2000), potentially diluting firm value.

Other evidence suggests that capital markets respond favorably towards a firm who reports on their intellectual capital (Garcia-Ayuso, 2003; Lev, 2001). It is pos-

ited that reporting on intellectual capital may attempt to resolve uncertainty about the firm, thereby improving the stock price (Stewart, 1997) and leading to a reduction in volatility of stock prices, a decrease in firm cost of capital, and an increase in intrinsic value (Garcia-Ayuso, 2002). Lev (1999) suggests there is a positive correlation between intellectual capital disclosure and market capitalization which is also likely to be a key motivator for listed firms to voluntarily adopt disclosure of intellectual capital. More broadly, several other theories might also explain why companies choose to report voluntarily on their intellectual capital, including legitimacy theory (Suchman, 1995) and institutional theory (Sethi, 1979).

VAIC and Market Valuation

Market values are values of firms as evaluated by the market. It is the overall values of stocks owned by firm. In other words, it is the amount one must pay to buy the entire firm at a specific time. The rise and fall of market values depend on numerous factors such as the firm's book value, profit level, economic outlook, speculation or confidence on a firm's ability to create value. There has been much debate about book and market values of a firm. Traditional accounting measures book values from the balance sheet. Book value is the difference between a firm's total assets and liabilities.

In other words, if a firm sells off its entire assets and pays for all its liabilities, the remaining amount is the book value. In the traditional accounting measures, assets mainly refer to physical and financial capital (Goh, 2005). Most intellectual capitals, except goodwill, are not been regarded as asset. The reason being an asset, as defined by International Accounting Standard Committee, is a resource controlled by a firm due to past action and from which future benefits are expected. Examples of asset are land, building and machinery. Due to the intangibility of intellectual capital, it could not be owned and controlled by firm (Goh, 2005).

A good example is knowledge of an employee, which cannot be owned or controlled by firm. For this reason, intellectual capital is not considered as an asset. In fact, the expenses to acquire intellectual capital are considered as an expense. By excluding intellectual capital, traditional accounting therefore underestimates the true value of firms. However, if the market is efficient, investors will place higher value for firms with greater intellectual capital (Riahi-Belkaoui, 2003). Therefore, intellectual capital is expected to play an important role in enhancing both corporate value and financial performance

VAIC and Financial Performance

Donaldson and Preston (1995) argue, since Adam Smith the dominate theoretical perspectives of the various business disciplines view the firm as an organization that

obtains its resources from its investors, employees and suppliers to produce goods and services for its customers. In principal, this traditional view contrives corporate performance to be the financial returns to a firm's owner from the utilization of tangible resources. Alternatively, more recent theoretical views suggest investors, employees, suppliers, customers and other relevant stakeholders (such as unions, government) both contribute and receive benefits from a firm. Further, these alternative theoretical views, such as resource-based theory, see firms as being collections of physical and intangible assets and capabilities. This contrasting view also leads to a different view of corporate performance. Advocates of resource-based theory, for example, suggest corporate performance is a function of the effective and efficient use of the respective tangible and intangible assets of the firm.

Further, value added (also called wealth creation) is considered the appropriate means of conceptualizing corporate performance rather than the mere financial returns to a firm's owner. In the opinion of Firer and Williams (2003), and also supported by other researchers (Edvinsson, 1997; Pulic, 1998; Pulic 2000; Stewart, 1997; Sveiby, 2000; Sveiby, 2001), traditional measures of corporate performance based on conventional accounting principles of determining income may provide unsuitable accounting in the new economic world, where competitive advantage is driven by intellectual capital. Use of traditional measures may lead investors and other relevant stakeholders to make inappropriate decisions when allocating scarce resources. Intellectual capital is the moving force for business success (Pulic, 2002). Increasingly, entrepreneurs find performance of intellectual capital significantly affects their firms' bottom lines and thus could not be ignored. Growth of a firm's intellectual capital has been interpreted as an early indicator for subsequent performance. Corporate performance refers to the overall well being of firms, which are measured through sales, asset, profit, book and market values (Goh, 2005).

The Influence of Intellectual Capital to Organization Performance

Several research indicate significant prove if intellectual capital influence to organization performance. In globalization era, all organization effort has to competitive advantage. To achieved competitive advantage needs both physical capital and intellectual capital. The study result of Hitt et al. (2001) proved the role intangible capital more dominant compare with tangible capital. Another research indicate that intellectual capital recognized as important resources which give use for create organization efficiency, effectively, productivity, and innovative better than physical capital and financial capital (Najibullah, 2005).

The research result by Pulic (1999) show that intellectual capital can create value added for organization. Its study support the idea if intellectual capital as very important resources for organization. Consistent with research before, intellectual capital has potential as wealth creator in business organization (Karp, 2003). The ability

intellectual capital as strategic resources can see through its role as a driver in increasing business performance. In this case, the intellectual capital is an important key to achieve competitive advantage. The opposite research result before, studied by Iswati (2007) show that no influence between intellectual to bank's performance in Jakarta Stock Exchange. Interest for depth further, the Peña (2002) result proved his hypothesis, that the new organization performance depend on intellectual capital management which achieved by entrepreneur in preparation period. This result strongly support about intellectual capital role in business life cycle, start from preparation stage till maturity stage. Breman (2001) has test the influence of intellectual capital to business performance for organization which go public in Ireland.

The performance variables consist of productivity, skill, and organization profitability. Its result show that the influence of intellectual influence profitability variable. Besides that, Walker (2001) did research the relation between intellectual capitals with three dimension of organization performance; there are profitability, productivity, and market price. Walker's result there is significant positive relation between human being capital and organization performance in both yang low knowledge base organization and high knowledge-base organization. Based on literature review which explains before, this leads to the following hypothesis.

Previous Empirical Evidence

Knowledge and information are nowadays the drivers of company life, much more so than and, capital or labor. What does this mean for managers? The increased importance of knowledge does not simply add an additional variable to the production process of goods: it changes substantially the rules of the game. The capacity to manage knowledge-based intellect is the critical skill of this era (Quinn, 1992). The wealth creating capacity of the enterprise will be based on the knowledge and capabilities of its people (Savage, 1990). Even management guru Drucker (1993) declares the arrival of a new economy, referred to as the "knowledge society". He claims that in this society, knowledge is not just another resource alongside the traditional factors of production – labor, capital, and land – but the only meaningful resource today (Bontis, 2001). Chung-Fah Huang, Sung-Lin Hsueh, (2007). However, only relational capital has a direct influence on business performance. Human capital has an influence upon the business performance via the relational capital. Sri Iswathia and Muslich Anshoria, (2007), the main conclusion from this particular study is intellectual capital has influence on bank's performance. B.A. Ranjith Appuhami, (2007), the findings enhance the knowledge base of intellectual capital and develop a concept of intellectual capital in achieving competitive advantages in emerging economies such as Thailand's. Nik Maheran Nik Muhammad, Nik Rozhan, Nik Ismail, (2006) it was found that Company's value added was very much related to the

amount of Capital employed as compared to other variables. The trend of Intellectual capital shows positive relationship for almost all sectors. However the relationships were found insignificant Farah Margaretha, Arief Rakhman, (2006). It was found a significantly negative between intellectual capital and market-to-book value ratio (M/B) and positively associated between the three of intellectual capital component and return on equity (ROE) as financial performance. Zhang Ji-jian, Zhu Nai-ping, Kong Yu-sheng, (2006) They find that intelligence capital, as enterprise's another important capital, is having more and more important influence on enterprise's achievement compared to matter capital. Further analysis indicates that it can further study the relationship of enterprise's intellectual capital and enterprise's performance in microcosmic intellectual capital. Richard M. Petty, Suresh Cuganesan, Nigel FinchGuy Ford, (2005), However, there has been little support by the accounting profession to recognize the value of intellectual capital or adopt a common disclosure framework. There has also been very little progress by firms in extending their voluntary reporting frameworks, beyond just rhetoric, and attempting to quantify their intellectual capital. Steven FirerS, Mitchell Williams, (2002) suggest physical capital remains the most significant underlying resource of corporate performance in South Africa despite efforts to increase the nation's intellectual capital base.

The present study attempts to explore this issue by empirically analyzing the association between a relevant measure of intellectual capital and three traditional measures covering different sub constructs of corporate performance. The first dimension is the banks productivity, or the efficiency with which inputs are converted to outputs. The second dimension is commonly referred to as profitability, or the degree to which banks revenue exceed its costs. The third dimension that has conventionally accepted name or label but referred to as market evaluation in this study concentrates on the degree to which a company's market value exceeds its book value. This last dimension is related to banks performance because if the bank was not operating well (not performing), then its market value would probably be limited to the net book value of its assets.

Given the exploratory nature of the present study no formal hypotheses are formed. Nonetheless, intuition may imply some possible formative propositions. For example, by convention most traditional measures of profitability focus on the financial returns from tangible assets. Consequently, it is likely that such measures are unlikely to capture the value added by intangible assets. Alternatively, market evaluation considers the broader aspects of a firm including both its intangible and tangible assets. As a result, there is likely to be a closer association between market evaluation measures of corporate performance than those for profitability.

This paper contributes to existing literature as follows: first, the research will provide the evidence of the impact of intellectual capital on investors' capital gain on shares in the banking sector by using data from listed in ASE. The findings of the research will enhance the importance of intellectual capital in emerging econo-

mies. Second, the research indirectly provides evidence of the relationship between intellectual capital and corporate performance. Capital gains earned by investors significantly depend on firm performance. Investors in the market place tend to demand shares of firms having higher performance than those with average performance in the market. Finally, the paper provides evidence of application of VAIC as an aggregated, standardized measure of corporate intellectual ability, specifically, the explanatory power of VAIC and its components towards share price changes in the banking, industries in Jordan, since investors' capital gain is directly related to share price changes. Results from the present study are of interest to numerous parties such as shareholders, institutional investors, scholars and policymakers. For example, policymakers with the ability to influence the direction and nature of the business environment in Jordan can utilize the findings from this study to determine if changes to present policies are required to further promote the development of the nation's intellectual capital rather than physical capital resources.

Despite the increasing recognition of intellectual capital in driving firm value and competitive advantages, an appropriate measure of firms' intellectual capital is still in infancy (Chen, Cheng, & Hwang, 2005). If knowledge is the key to future success, but is not adequately reflected in traditional accounting financial measures, and if financial measures are the main drivers of top management's decision making, what measuring system would fulfill the requirements of the new economy and the needs of modern companies? In answering these questions, different measures have been developed in order to present the intellectual capability of the firms. According to Sackmann et al. (1989, p. 235) the objective of HRA is to 'quantify the economic value of people to the organization' in order to provide input for managerial and financial decisions.

Value Added Intellectual Coefficient (VAIC) Instead of directly measuring firms' intellectual capital, Pulic (2000a, 2000b) proposed a measure of the efficiency of value added by corporate intellectual ability (Value Added Intellectual Coefficient (VAIC)). The major components of VAIC can be viewed from a firm's resource base – physical capital, human capital, and structural capital. VAIC is being increasingly used in business (Pulic, 2000b) and academic applications (Firer & Williams, 2003; Williams, 2001). Firer and Williams (2003) identified several advantages of using VAIC. Accounting Standard Committee is a resource controlled by a firm due to past action and from which future benefits are expected. Examples of asset are land, building and machinery. Due to the intangibility of intellectual capital, it could not be owned and controlled by firm (Goh, 2005). A good example is knowledge of an employee, which cannot be owned or controlled by firm. For this reason, intellectual capital is not considered as an asset. In fact, the expenses to acquire intellectual capital are considered as an expense. By excluding intellectual capital, traditional accounting therefore underestimates the true value of firms. However, if the market is efficient, investors will place higher value for firms with greater intellectual capital (Firer & Williams, 2003; Riahi-Belkaoui, 2003). Therefore, intellectual capital is expected to play an important role in

enhancing both corporate value and financial performance. Using VAIC as a measure for corporate intellectual ability, the researcher hypothesizes the following:

Hypotheses:

Model (1):

H1: There is no significant relationship between explanatory power of intellectual capital components and market to book value in the Jordanian commercial banks.

- There is no significant relationship between values added intellectual coefficient and market to book value in the Jordanian commercial banks.

- There is no significant relationship between human capital efficiency and market to book value in the Jordanian commercial banks.

- There is no significant relationship between capital employed efficiency and market to book value in the Jordanian commercial banks.

- There is no significant relationship between structural capital efficiency and market to book value in the Jordanian commercial banks.

Model (2):

H2: There is no significant relationship between values added intellectual coefficient (VAIC) and financial performance (profitability and productivity) in the Jordanian commercial banks.

H3: There is no significant relationship between human capital efficiency (HCE) and financial performance (profitability and productivity) in the Jordanian commercial banks.

H4: There is no significant relationship between capital employed efficiency (CEE) and financial performance (profitability and productivity) in the Jordanian commercial banks.

H5: There is no significant relationship between structural capital efficiency (SCE) and financial performance (profitability and productivity) in the Jordanian commercial banks.

A sample consists of 14 commercial banks enlisted in the Amman Stock Exchange (ASE) was selected. The annual reports of the selected banks are only source of required data. Since the current study is of financial in nature, the financial statements and the subsidiary notes would be better of searching for information looked-for.

Research Design and Hypotheses

Data and Model Specification

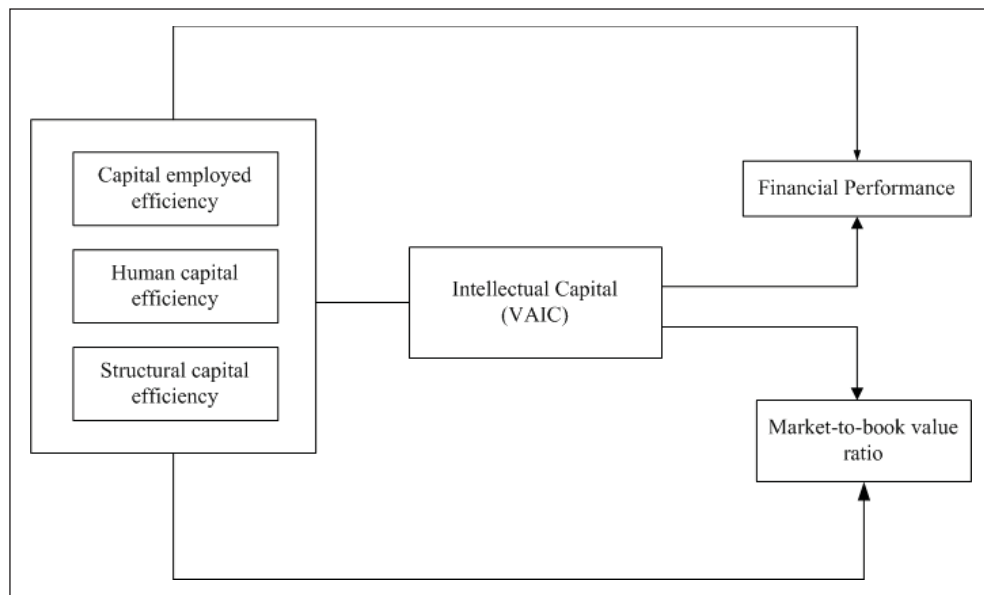
This study focuses on the Intellectual Capital efficiency of financial sector in Jordanian Banks. The annual reports of the commercial banks that listed in Amman Stock Exchange and for the year 2002 to 2007 were chosen for this study. The model introduced by Pulic (1998) were used to measure value added Intellectual Capital

(VAIC) and Panel data analysis vis-a vis multiple regression was used to identify the relationship between Values added Intellectual Capital (VAIC) and its components such as Human Capital coefficient (HC), Capital Employed coefficient (CE) and Structural Capital coefficient (SC).

Value added intellectual coefficient (VAIC) model introduced by Pulic (1998), enables the firm to measure its value creation efficiency (Pulic, 2001, 2002). VAIC method used financial statements of a firm to calculate the efficiency coefficient on three types of capital – that is human capital, structure capital and capital employed. Though VAIC uses accounting data, it does not focus on the cost of the firm. It's only focus on the efficiency of resources that create values to the firm (Pulic 2000, Boremann 1999). A higher value for VAIC shows a greater efficiency in the use of firm capital, since VAIC is calculated as the sum of capital employed efficiency, human capital efficiency and structural capital efficiency. Pulic (2001) identified that firms' market value have been created by capital employed (physical & financial) and intellectual capital.

The conceptual framework for the proposed study is given below:

Figure 1: The conceptual framework, Cooper & Schindler, (2003)



The conceptual framework (Figure 1) illustrates the name of research variables and relationship within them. The hypotheses developed to be tested clearly support this model. In this study, the researcher is going to investigate the relationship between market-to-book value ratios, value added intellectual coefficient (VAIC) and its components, financial performance in context of banking industry of Jordan.

Research that studies the relationship between two or more variables is also referred to as a correlation study (Cooper & Schindler, 2003). That is why a correlation research design has been adopted in order to test the hypotheses. The model (Figure 1) also suggests this type of design. Here, market-to-book value ratios (M/B), financial performance (ROA, ROE, & EP) are considered as the dependent variable, whereas value added intellectual coefficient (VAIC) and its component capital employed efficiency (CEE), human capital efficiency (HCE), and structural capital efficiency (SCE) are considered as independent variable

Measures of Variables

1. Dependent Variables (Financial Performance Variables)

(1) Market-to-Book Value Ratios of Equity (M/B):

M/B is measured by the market value divided by the book value of common stock:

Market value of common stock = no. of shares outstanding × stock price at end of the year

Book value of common stocks = book value of stockholders' equity – paid - in capital of preferred stocks

(2) Profitability:

The Three financial performance variables (profitability and productivity), following Chen, Cheng, and Hwang (2005), are defined as follows:

1. Return on equity (ROE) = pre - tax income ÷ average stockholders' equity

ROE represents returns to shareholders of common stocks, and is generally considered an important financial indicator for investors.

2. Return on total assets (ROA) = pre - tax income ÷ average total assets

ROA reflects firms' efficiency in utilizing total assets, holding constant firms' financing policy.

Productivity:

3. Employee productivity (EP) = pre - tax income ÷ number of employees

EP is a measure for the net value added per employee, reflecting employees' productivity.

Independent Variables (VAIC and CEE, HCE and SCE):

VAIC has been used as a measure for corporate intellectual ability (Pulic, 2000).

The procedures calculating VAIC are as follows:

Calculating value added (VA):

$$VA = OUTPUT_{it} - INPUT_{it} \quad (1)$$

OUTPUT_{it} = Total income form all products and services sold during the period of t

INPUT_t = All expenses (except labor, taxation, interest, dividends, depreciation) incurred by firm for the period of t.

Consistent with Riahi-Belkaoui (2003), the calculation of value added can be expressed as equation (4):

$$R = S - B - DP - W - I - DD - T \quad (2)$$

Where:

R is changes in retained earnings;

S is net sales revenues;

B is bought-in materials and services (costs of goods sold);

DP is depreciation;

W is wages (employee salaries);

I (total interest expenses)

DD is dividends;

And T is taxes.

Equation (2) can be re-arranged as equation (3) and (4):

$$I. S - B = DP + W + I + DD + T + R \quad (3)$$

$$S - B - DP = W + I + DD + T + R \quad (4)$$

Equation (3) is the gross value added approach, whereas equation (4) is the net value added approach. The left-hand side of the equations calculates the gross (or net) value added, and the right-hand side of the equations represents the distribution of the value created by firms, including employees, debt-holders, stockholders, and governments. VA has been defined by Chen, Cheng, and Hwang (2005) as the net value created by firms during the year, and because DD plus R is equal to net income under the clean surplus assumption, equation (4) can be expressed as follows:

$$VA = S - B - DP = W + I + T + NI \quad (5)$$

Where: NI is after-tax income.

Being exploratory in nature, the current research sticks to the very foundation of VAIC model and thus intends to use the equation no. one for measuring value added

Calculating CE (Capital Employed), HC (Human Capital), and SC (Structural Capital):

Following Pulic (2000), and Firer and Williams (2003), the three major components of firm resources CE, HU and SC are, by definition, as follows:

$$\begin{aligned} \text{CE} &= \text{physical capital} + \text{financial assets} \\ &= \text{Total assets} - \text{intangible assets} \\ \text{HC} &= \text{total expenditure on employees} \end{aligned}$$

$$\text{SC} = \text{VA} - \text{HC}$$

Calculating VAIC and Its Three Components:

By definition, the three components of VAIC are calculated as follows:

$$\begin{aligned} \text{CEE} &= \text{VA} \div \text{CE} \\ \text{HCE} &= \text{VA} \div \text{HC} \\ \text{SCE} &= \text{SC} \div \text{VA} \end{aligned}$$

Where:

CEE is indicator of VA efficiency of capital employed;

HCE is indicator of VA efficiency of human capital;

SCE is indicator of VA efficiency of structural capital.

CEE and HCE can be viewed as the value-added by a dollar input of physical assets and human capital, respectively. SCE represents the proportion of total VA accounted for by structural capital. Finally, VAIC (Value Added Intellectual Coefficient) is the sum of the three components of VA efficiency indicators.

$$\text{VAIC} = \text{CEE} + \text{HCE} + \text{SCE}$$

The Final Models of the Study:

Model (1):

VAIC Components and Market Valuation:

$$\text{MBit} = \alpha_0 + \alpha_1 \text{VAICit} + \alpha_2 \text{CEEit} + \alpha_3 \text{HCEit} + \alpha_4 \text{SCEit} + \epsilon_{it} \quad (1)$$

Model (2):

VAIC Components and Financial Performance:

$$\text{ROEit}, \text{ROAit}, \text{EPit} = \alpha_0 + \alpha_1 \text{VAICit} + \epsilon_{it} \quad (1)$$

$$\text{ROEit}, \text{ROAit}, \text{EPit} = \alpha_0 + \alpha_1 \text{SCEit} + \epsilon_{it} \quad (2)$$

$$\text{ROEit}, \text{ROAit}, \text{EPit} = \alpha_0 + \alpha_1 \text{HCEit} + \epsilon_{it} \quad (3)$$

$$\text{ROEit}, \text{ROAit}, \text{EPit} = \alpha_0 + \alpha_1 \text{CEEit} + \epsilon_{it} \quad (4)$$

Data and Main Empirical Results

Table (1) presents descriptive statistics of all the variables concerning the current research. Descriptive statistics include mean, and standard deviation. The results indicate every year of sample study and overall years. The mean for Market – to – Book value ratios (2.09; standard deviation = 1.09) indicates that investors generally value the sample firms in excess of the book value of net assets as reported in the financial statements.

M/B has mean of 2.09 means over 50% of banks' market value is not reflected on financial statements. Comparison of CEE (.0279; standard deviation = 0.01352), HCE (.9963; standard deviation = .79427), and SCE(.4448; standard deviation = 0.46278), suggests that during 2003-2004, the sample banks were generally more effective in generating value from its human capital rather than physical and structural assets.

The findings are consistent with the prior research conducted by Firer and Williams (2003) on a sample of 75 publicly traded firms and Williams (2002), VAIC (1.4690; standard deviation = 1.01833), ROA (1.6855; standard deviation = 1.62094), ROE (12.6487 standard deviation = 7.50697), EP (31791.27; standard deviation = 27423.317).

Table 1: Descriptive statistics for (MB/ROE/ROA/EP/CEE/HCE/SCE/VAIC) in every year and in overall years

year	Index	MB	ROE	ROA	EP	CEE	HCE	SCE	VAIC
2002	Mean	.8486	9.8457	.5643	11287.263	.0216	.8222	.1395	.9833
	N	14	14	14	14	14	14	14	14
	Std.Dev	.48532	10.93913	2.01587	16115.391	.01121	.43402	.28774	.63564
2003	Mean	1.7000	8.5700	.9421	13701.177	.0254	1.1908	.2295	1.4457
	N	14	14	14	14	14	14	14	14
	Std.Dev	.90903	5.80535	1.04578	14691.024	.00736	1.49898	35630	1.67081
2004	Mean	2.6264	13.1743	1.7014	26591.129	.0259	.6947	.2844	1.0050
	N	14	14	14	14	14	14	14	14
	Std.Dev	65538	5.50786	.98972	18124.918	.01554	.29048	.49417	74787
2005	Mean	3.3186	19.5014	2.9343	52652.912	.0284	.9749	.7405	1.7438
	N	14	14	14	14	14	14	14	14
	Std.Dev	1.16208	7.21148	1.82133	35563.536	.01419	.51939	72638	.90914
2006	Mean	1.9857	13.5614	2.0886	43007.940	.0361	.9053	.6418	1.5831
	N	14	14	14	14	14	14	14	14
	Std.Dev	.69456	3.27286	1.11920	23245.016	.01533	.55949	.13771	.65586
2007	Mean	2.0800	11.2393	1.8821	43507.248	.0301	1.3902	.6330	2.0533
	N	14	14	14	14	14	14	14	14
	Std.Dev	.75954	4.52649	1.49107	24617.768	.01336	75995	.12145	.81228
2002 TO 2007	Mean	2.0932	12.6487	1.6855	31791.278	.0279	.9963	.4448	1.4690
	N	84	84	84	84	84	84	84	84
	Std.Dev	1.09618	7.50697	1.62094	27423.317	.01352	.79427	.46278	1.01833

Linear Multiple Regression Results

Tables (2, 3, 4, 5 and 6) used model (1) and shows the output of SPSS Statistics software. Table (2) used a multiple regression and shows the significant result (P value (F) = .003 < 0.01) of the overall independent variables of test and market valuation which suggests that at least one independent variable, such as human capital, structural capital, has a positive correlation with capital gain on shares (MR).

According to Table (3) .158 of the total variation in capital gain on shares can be explained (explanatory power) by the variation in the Value Added Intellectual Capital Coefficient and its components, such as human capital efficiency, structural capital efficiency, and physical capital efficiency Table (4) shows the coefficients of the linear regression in the respect of independent variables. The Value Added Intellectual Capital Coefficient (VAIC) shows a negative relationship with capital gain on shares (MR) (P-Value = 0.804). But the capital employed efficiency shows a significant negative relationship with capital gain on shares (MR) (P-Value = 0.094 < 0.1, and the human capital efficiency have positive relationships with capital gain on shares. Finally, structural capital efficiency shows a significant positive relationship with capital gain on shares (MR) (P-Value = 0.002 < 0.01).

This investigation does not provide much detail about why capital employed and VAIC variables has a negative relationship with capital gain, and it may be due to the special features of the finance and banking sector in Jordanian. Therefore, further research can be done to investigate the relationship between capital gain on shares and capital employed, VAIC since this result does not comply with some existing research.

Though the human capital efficiency has a positive relationship with capital gain on shares, it has been excluded in the final regression analysis in coefficient Table (4) and is mentioned in the excluded variables Table 5. It implies that the independent variable "human capital efficiency" has less power in explaining the variation in the capital gain on shares. In my opinion, a major contribution of this study is that it increases the explanatory power of the VAIC.

Table 2: Linear multiple regression results between market to book value and independent variables (CEE/HCE/SCE/VAIC) in year from 2002 to 2007

ANOVA					
Model	Sum of Squares	df	Mean Square	F	SIG
Regression	15.795	3	5.265	5.018	.003***
Residual	83.938	80	1.049		
Total	99.733	83			

* Significant at p < 0.10 ** Significant at p < 0.05 *** Significant at p < 0.01

a. Predictors: (Constant), VAIC, VACA, STVA

b. Dependent Variable: MR

Table 3: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.398	.158	.127	1.02432

a. Predictors: (Constant), VAIC, VACA, STVA

Table 4: Coefficients

Model	Un standardized Coefficients		Standardized Coefficients	t	SIG
	B	Std. Error	Beta		
1					
(Constant)	2.116	.273		7.753	.000
CEE	-15.037	8.875	-.185	-1.694	.094
SCE	1.015	.322	.428	3.152	.002
VAIC	-.037	.149	-.035	-.250	.804

Table 5: Excluded variable

Model	Beta In	t	SIG	Partial Correlation	Co linearity Statistics
					Tolerance
1	HCE				.000

a. Predictors in the Model: (Constant), VAIC, VACA, STVA

b. Dependent Variable: MR

Stepwise Regression Results

Further, stepwise regression has been shown in order to find out which one of the three components influences the investors while taking investment decision. Table (6) shows the result of the analysis. At this stage, SCE (sign F-test 11.631 $p < .001$ at sign level 1% and $R^2 .124$) is found to be significantly related with M/B, while the rest two (HCE, CEE&VAIC) fail to be considered. It implies the investors still considers the structural capital of a bank while making their investment decision.

However, the recent trend in the banking sector of Jordanian shows the use of internet banking, debit card, receiving bank statement through e-mail, Tele-banking etc. which some how shows the further improvement of the productivity of the human capital and as such the contribution of structural capital in achieving better intellectual efficiency.

Table 6: Stepwise regression analysis of market value and independent variables (CEE/HCE/SCE/VAIC) in year from 2002 to 2007

		DEP V: MB
year	Index	STEP WISE IND V : SCE
2002 TO 2007	R	.352
	R ²	.124
	Adj- R ²	.114
	F- test	11.631
	SIG	.001***
	Constant (B)	1.722
	Constant (SE)	.157

* Significant at p <0.10 ** Significant at p< 0.05 *** Significant at p< 0.01

Multivariate Regression Results

Table (7) used a model (2) of the study and the multivariate regression results analysis indicate a relationship between the dependent variables financial performance, which considers return on assets, return on equity, employee productivity and every independent variables and show there are no significant relationship between the capital employed efficiency, human capital efficiency and value added Intellectual Coefficient and financial performance. It suggests assuming that the traditional measures of the financial and accounting world do not represent the intellectual capability of the banks; rather structural capital efficiency a better model to predict the future earnings feasibility of the banks. The results analysis indicates there is a positive significant relationship between the banks financial performance and SCE, with F- test 8.125, p< 0.006 at highly sign level 1%, and the R² .090..

Table 7: Multivariate regression analysis of return on assets, return on equity and employee productivity as dependent variables and every independent variables {CEE/ HCE/ SCE/ VAIC} in overall years from 2002 to 2007

		DEP V: ROA,ROE,EP	DEP V: OA,ROE,EP	DEP V: ROA,ROE,EP	DEP V: ROA,ROE,EP
year	Index	IND V : CEE	IND V :HCE	IND V : SCE	IND V : VAIC
2002 TO 2007	R ²	.023	.019	.090	.001
	F- test	1.931	1.550	8.125	.085
	SIG	.168	.217	.006***	.771
Parameter Estimates	Constant	10.299	13.931	10.482	12.300
	B1	84.215	-1.287	4.871	.238

* Significant at p <0.10 ** Significant at p< 0.05 *** Significant at p< 0.01

Conclusion

In recent years, financial institutions, especially those in the banking industry, have experienced a dynamic and competitive environment. Competition at a cross-border scale make local banks adjust their competitive position to sustain their financial performance. The banking industry is one of the most knowledge-intensive industries. Intellectual Capital (IC) generally represents the critical resource in the value creation process.

The purpose of this paper is to investigate the association between efficiency of value added of the major components of banks resources and three traditional dimensions of corporate performance. Data is drawn from a sample of 14 Jordanian banks in Amman stock exchange from the period 2002 to 2007. The method of analysis used was the one introduced by Pulic (1998, 2001) to measure intellectual capital efficiency and panel data analysis to see the relationship between VAIC and HC, SC and CA over the 6 years.

The Jordanian financial sectors banks market value have been created more by structural employed rather human, capital and value added intellectual coefficient efficiency, Model one used multiple regression and results indicate that, overall intellectual capital has positive and significant relationships with market value at sign $F = .003$ at 1% sign level. Intellectual capital is recognized as a major corporate asset capable of generating sustainable competitive advantages and superior financial performance (Barney, 1991). This investigation has shown the potency of corporate intellectual capital in order to generate capital gain on shares and, as a result, attract investors in the market. Thus a firm can formulate its business strategies to increase the efficiency of its resources and achieve competitive advantages over its rivals. Stepwise regression has been shown in order to find out which one of the three components influences the investors while taking investment decision and show there is a positive significant to structural employed and market value at sign $.001$ at 1% sign level.

The model two in the study used the regression analysis and show there is a significant relationship between financial performance (ROA, ROE, EP) and SCE at sign $.006$ at 1%. It means the efficiency of structural capital (SCE) plays a major role in enhancing the returns and quality of the tools that they use. But no significant relationship between financial performance and independent variables CEE, HCE and Proxies for the efficiency of value added by banks major resource components are measured using the VAIC methodology

The following recommendations should result in a movement towards a greater acknowledgment and incorporation of intellectual capital factors of production in the Jordanian economy. The first priority for politicians and business executives should be the recognition, identification, measurement, benchmarking, development and harvesting of the country's and its banks intellectual capital. Human capital is the

preeminent antecedent for the intellectual wealth of a country. It should be the ultimate aim of politicians and business executives in Jordanian banks to make better decisions regarding resource allocation. The accounting profession in the emergence of intellectual capital as a primary business resource, the accounting profession has the opportunity to concentrate its best talents and experience on an issue that will fundamentally affect business in future. New performance measures are needed and new valuation methods will have to be devised. Banks should adopt an intellectual capital strategy, through identification and evaluation of the role of knowledge in the company and management should match the banks revenues with the knowledge assets that produce the revenue and should develop a strategy for investing in and exploiting the banks intellectual capital assets. In addition, management should improve the efficiency and productivity of its workforce. Finally, the performance of any country or organization, whether small or large, is directly related to the quality of its leadership.

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