The Relationship Between Green Intellectual Capital and Competitive Advantages

[1]Sohrab Rezaei, [2]Massoumeh Izadi, [3]Iman Jokar, [3]Sedigheh Rezaei
[1]Department of Accounting, Islamic Azad University, Marvdasht Branch, Fars, Iran
[2]Department of Financial Management, Islamic Azad University, Yazd Branch, Yazd, Iran
[3]Department of Business Administration Financial Trends, Islamic Azad University,
Marvdasht Branch, Fars, Iran

Abstract: Today, role and importance of green intellectual capitals in competitive advantages of companies has been applied more than financial capitals. In other words, at the current knowledge-oriented societies, role and importance of financial capitals has been significantly declined compared to intellectual capitals in regard with determining sustainable profitability and competitive advantage. The main purpose of this study is to determine the relationship between green intellectual capital (and its components) and competitive advantage of companies. Statistical population consists of environmental polluting companies of Fars Province to 27 companies. The study is conducted in fall of 2014. To test research hypotheses, regression method is applied using SPSS Software. Obtained results from testing hypotheses indicated that there is significant and positive correlation between green structural capital and competitive advantage of companies. Also, the correlation between green relational capital and competitive advantage of companies is insignificant and positive.

Key words: Green intellectual capital, competitive advantage, green human capital, green structural capital, green relational capital, polluting companies

INTRODUCTION

Today, the developing process of intellectual capital is an exciting issue for both scholars and organizational authorities (Roos and Roos, 1997). Intellectual capital is a knowledge-oriented process including applied experiments, organizational technology, customer relationship and professional skills. The process can enhance competitive ability of company and its future profitability (Edvinsson and Malone, 1997).

Intellectual capital includes all processes and assets which are not usually cleared in balance sheets of organizations and includes also all intangible assets considered in modern accounting. In the today's economy, knowledge has been changed into the most important alternative of financial and physical capitals (Ghelichli and Moshabaki, 2006).

Hence, some scholars believe that concept of intellectual capitals has colonial aspect and the studies introduce two general concepts of knowledge as source and knowledge as capital resulted from thoughts of industrial age. In knowledge-oriented economy, intellectual capital is used to create knowledge and to increase organizational value. In fact, the current feature of economy is globalization of market. Moreover, classical progressing forces of economic growth have been changed into production, utilization and use of knowledge and the key to gain sustainable competitive advantage is how to use knowledge of companies. For strategic survival, companies must consider competitive advantage and as markets, products, technologies, competitors and regulations are being changed at the society rapidly, improvement of knowledge and continuous innovation can enable them to preserve sustainable competitive advantage. Now a days, in order to improve performance and to ensure of commercial sustainability and success, organizations should take knowledge management into account (Sveiby, 1997). In general, utilization in companies is depended on intellectual capital and capabilities of the organization in field of using it as an asset. Commercial performance needs active management in field of intellectual capital and intangible resources to achieve sustainable efficiency of stockholders (Ballow et al., 2004).

Over the years, not only sensitivity is increased in the market but also its nature has been also changed. This is because; focus of companies to gain better performance and competitive advantage through investment in intangible capitals has been changed. Investment in intangible assets can refer to achievement to competitive advantage. Gaining competitive advantage can be regarded as an opportunity that can't be gained easily in

current competitive business environment. Knowledge is a competitive advantage considered in commercial strategy of organizations. Hence, knowledge creation can lead to continuous innovation and continuous innovation can lead to creation of competitive advantage. Therefore, it could be mentioned that the success key in global economy is having control on leverage of intellectual capital. Obtained advantages from these intangible assets are prior to tangible assets. Knowledge and intellectual capital have been determined as sustainable strategies to gain and maintain competitive advantage of the organizations (Barney, 1991; Deraker, 1998; Grant, 1991). Hence, knowledge assets and intellectual capital are being changed into strategic leverage to manage business performance and continuous innovation of company. Previous studies have indicated that intellectual capital can have positive impact on competitive advantages of companies (Edvinson and Malon, 1997; Jhonson and Stwart, 1999).

In knowledge-oriented economy, despite to industrial economy, intellectual capitals and especially human capitals are the most important capitals of organization and potential success of the organization is rooted in their intellectual capability. Therefore, management style of intellectual capital in organizations and their role in gaining competitive advantage can play key role in progress of organizational goals.

In regard with rapid development and growth of global economy, intellectual capital has been a vital stimulant to empower companies. The subject of this study is beyond intellectual capital and presents new concepts under the title of green intellectual capital. In fact, this study tries to fill the research gap properly and proposes a new structure under the title of green intellectual capital, so that it can take benefit of positive relationships between intellectual capital and green innovation or environmental management and competitive advantage can be preserved for companies through this. Companies which are active in field of environmental management and green innovations can not only minimize waste of products and enhance production capacity but also they ask relatively high prices for their green products and try to improve credit and status of company and hence, competitive advantages would be achieved by companies according to environment related to consumers and intense international regulations on environmental protection (Berry and Rondinelli; 1998; Chen *et al.*, 2006).

Through referring to previous studies in field of intellectual capital, this study proposes a new structure including green intellectual capital. The framework is a collection of all intangible assets, knowledge, capabilities

and relationships in relation with protection of environment or green innovations in individual and organizational level in a company (Dzinkowske, 2000; Edvinson and Malon, 1997; Stewart, 1994).

Theoretical framework and literature review: This study has mentioned attitudes by Chen (2008) and has considered green intellectual capital as total capital of types of tangible assets, knowledge, capabilities and relations in relation with environmental protection and green innovations in both individual and organizational levels of a company. Classification of green intellectual capital includes green human capital, green structural capital and green relational capital.

Human capital has been defined as a set including knowledge, skills, innovations and capabilities of employees to achieve goals (Dzinkowski, 2000). As environmental knowledge hidden in employees is an important issue for companies to develop green innovations and green management to be in adjustment with external environmental pressure, Chen (2008) has proposed a new framework under the title of green human capital ad has defined it as set of knowledge, skill, capability, experience, tendency, wisdom, creativity and commitment of employees to protect the environment or green innovation.

Despite to human capital, structural capital is hidden in organizations and can't be eliminated through elimination of employees. In fact, Chen (2008) has presented new principle of green structural capital and has introduced it as stock of organizational capitals, organizational commitments, corporate images, monopoly rights, copy rights and brands in relation with environmental protection or green innovations in a company.

Relational capital is a set of relationships between main companies and key stockholders such as customers, suppliers and partners (Johnson, 1999; Chen *et al.*, 2006). In this field, Chen (2008) has discussed on green relationship capital introduced as mutual relations of companies with consumers, suppliers, network members and partners in relation with corporate cooperative management and green innovations.

Companies should be able to apply active and preventive strategy in relation with effects of mentioned factors in field of environment. Through generalization of international environmental regulations and also environmental aspects of consumers, regulations and patterns of commercial competition in field of current environmental domain are different (Russo and Fouts, 1997; Dwyer, 2009). There are several environmental forces affecting corporate operations including
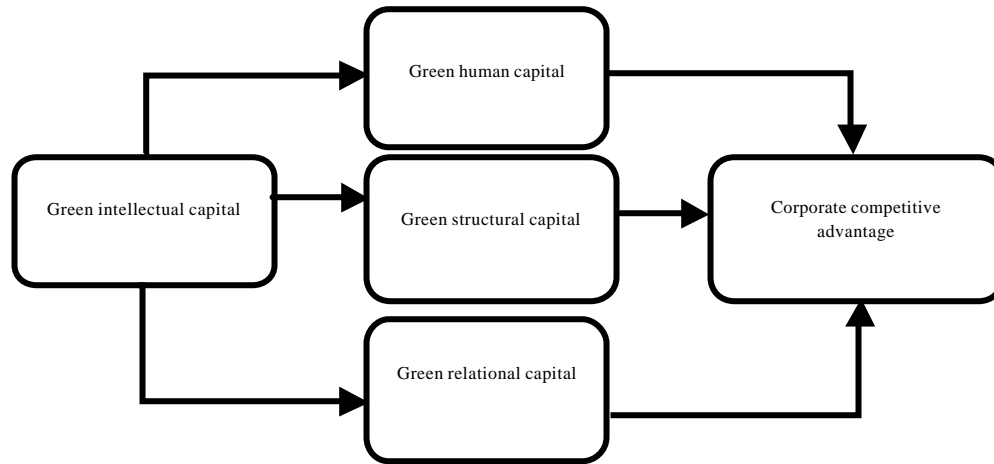
Fig. 1: Conceptual model

environmental attitudes of efficient people, competitive pressure and environmental regulations (Rugman and Verbeke, 1998). In fact, companies have no option other than using green management methods to cope with environmental forces (Berry and Rondinelli, 1998). Porter and van der Linde have mentioned that results of pollution resulted from inefficient use of resources is an important issue. In fact, companies can enhance their Production Capability through green innovations and some of them believe that environmental management is an inessential investment or may even limit development of companies.

Knowledge and intellectual capital have been defined as sustainable strategies to maintain competitive advantages of organization (Barney, 1991; Grant, 1991). Human capital that is also known as human capital is the basis of intellectual capital and basic element in regard with relevant tasks (Chen *et al.*, 2004). Structural capital is related to mechanism and structure of a commercial unit and can help employees to have optimal intellectual performance and hence, the organization would be able to improve its performance (Chen *et al.*, 2004). Customer capital is the most important component of intellectual capital to create value added and includes internal and external relationships with beneficiaries of the organization (Roos and Roos, 1997). It can make the company to make relationship with its customers and make companies compete with each other through this (Lu and Yang, 2004) (Fig. 1).

Literature review: Riahi-Belkaoui (2003) has studied the relationship between intellectual capital and efficiency of multinational American Compnaies duing 1992-1996. The study showed that there is significant correlation between efficiency and intellectual capital of multinational American Companies.

Dastgir and Mohammadi have investigated intellectual capital as an endless treasury. They have found that today, many companies at the world have found that measurement and management of intellectual capital can provide competitive advantage for them.

Setayesh and Kazemnejad have investigated effect of intellectual capital on performance of companies listed in Tehran Stock Exchange. They found that intellectual capital is one of the main derivers of organizational value and one of the most important and effective factors to gain competitive advantage and better financial performance of companies.

Hemmati *et al.* (1389) have conducted a study under the title of assessment of the relationship between intellectual capital and market value of financial performance of nonfinancial companies. Obtained results from this study showed that there is significant correlation between intellectual capital, its components and market value to book value ratio of studied companies. Moreover, it was found that there is significant correlation between intellectual capital and its components with criteria of financial performance of companies (ROE, ROA).

Shams and Khalili have investigated the relationship between intellectual capital and financial performance of companies listed in Tehran Stock Exchange and found that all 5 criteria of financial performance are in direct correlation with intellectual capital of listed companies. Moreover, the study found that there is significant and direct correlation between human capital and all 5 criteria.

Allameh and Zare' have also investigated the relationship between knowledge management, innovation and organizational performance. Obtained results showed that knowledge management and innovation are in direct correlation with each other and both of them can affect organizational performance directly and indirectly.

Bontis *et al.* (2000) have studied intellectual capital and Business performance in Malaysian Industries. Their results showed that intellectual capital can have average effect on commercial performance about 25-30%.

Firer and Williams (2003) have investigated the relationship between Intellectual Capital and Traditional Measures of corporate performance and human capital and structural capital with profitability, utilization and market value of listed companies in Johannesburg Stock Exchange of South Africa. Obtained results indicated that physical capital is the most important determinant structure of performance of companies in South Africa.

Lu and Yang (2004) has investigated the effect of customer relationship and social capital resources of business partner on efficiency of companies. Obtained results from the study showed that customer relationship, social capital and business partner can affect financial and strategic performance of company and customer relationship has more effect on performance of companies compared to other factors.

Wang and Chung have investigated the relationship of components of intellectual capital from causal perspective and effect of intellectual capital elements on commercial performance of Taiwan companies. Obtained results demonstrated that intellectual capital factors, except for human capital, can affect business performance directly.

Tseng have studied the relationship between human capital, innovation capital and organizational performance. Obtained results from this study showed that amount of use of research and development has significant effect on efficiency of companies.

Helnaz and Mihalik have conducted a study under the title of assessing effect of components of intellectual capital on financial performance of hoteling industry. Obtained results from this study demonstrated that firstly, there is significant correlation between components of intellectual capital and financial performance in this industry and this can indicate high impact of relational capital compared to other components of intellectual capital.

Tan has also investigated the relationship between intellectual capital and financial performance of listed companies in stock exchange. Obtained results showed that intellectual capital and corporate performance are interrelated positively.

MATERIALS AND METHODS

In terms of purpose, this study is an applied research and in terms of method, it is a descriptive study in kind of correlation. The study has investigated the relationship between green intellectual capital and competitive advantages of companies. Independent variable includes green intellectual capital (green human capital, green structural capital and green relational capital). Moreover, competitive advantages of companies have been considered as dependent variable.

Measurement and investigation of relevant items of independent and dependent variables in questionnaire has been done using Likert 5-point scale from 1-5 from main problems in field of achievement to strong agreement. The questionnaire includes 2 parts: the first part includes measurement of green intellectual capital (green human capital, green structural capital and green relational capital) and second part includes measurement of competitive advantages of companies.

Statistical population of the study consists of polluting companies affecting environment of Fars Province to 27 companies. The companies have paid tax to Department of Finance and Economic Affairs.

This study has emphasized previous studies to design items of the questionnaire. Before distribution of the questionnaire among respondents to determine reliability and Cronbach value, 7 experts and scholars revised the questionnaire in primary pretest. Hence, the questionnaire gained high content validity. Moreover, the reliability of the questionnaire has been tested using SPSS Software and Cronbach alpha value is obtained to 0.853 which refers to high reliability of the questionnaire.

According to research hypotheses in which existence or lack of existence of significant correlation between independent and dependent variables is measured, t-test and regression and Pearson correlation have been applied.

RESULTS AND DISCUSSION

Correlation analysis: To test correlation between variables, first the correlation matrix is estimated. The results in Table 1 show that in confidence level of 99%, there is significant correlation between green human capital, green structural capital and green relational capital with competitive advantage of companies.

Model summary: According to Table 2, the adjusted determinant coefficient in initial stage is equal to 0.710 and standard deviation is equal to 0.522. This indicates that green human capital, green structural capital and green relational capital can explain about 0.710 of variances of dependent variable. With the reduction of green relational capital, adjusted determinant coefficient has increased to 0.713 and SD is decreased to 0.520. Hence, in second model, determinant coefficient is able to present better prediction.

Table 1: Correlation matrix

Factors	Value	Green human capital	Green structural capital	Green relational capital	Competitive advantage of companies
Green human capital	Pearson value	1	0.845	0.746	0.798
	Sig.		0.000	0.000	0.000
	Number	33	33	33	33
Green structural capital	Pearson value	0.845	1	0.706	0.839
	Sig.	0.000		0.000	0.000
	Number	33	33	33	33
Green relational capital	Pearson value	0.746	0.706	1	0.688
	Sig.	0.000	0.000		0.000
	Number	33	33	33	33
Competitive advantage of companies	Pearson value	0.798	0.839	0.688	1
	Sig.	0.000	0.000	0.000	
	Number	33	33	33	33

Table 2: Model summary

Models	Correlation coefficient	Determinant coefficient	Adjusted determinant coefficient	Estimated SD
1	0.859a	0.737	0.710	0.522
2	0.855b	0.731	0.713	0.519

[a]Predictors: constant variable, green relational capital, green structural capital and green human capital; [b]Predictors: constant variable, green structural capital, green human capital

Table 3: Analysis of variance (ANOVA[c]) of second model

Regression equation	Sum of squares	df	Mean squares	F-value	Sig.
Regression	21.995	2	10.998	40.833	0.000[B]
Residual	8.080	30	0.269		
Total	30.075	32			

Table 4: Presenting optimized model based on model 2 (t-test)

Regression equation	Non-std. coefficient		Std. coefficient	t-values	Sig.
	Beta	SD	Beta		
Constant	8.09	0.090		0.000	1
Green human capital	0.320	0.180	0.313	1.771	0.087
Green structural capital	0.591	0.182	0.574	3.242	0.003

Table 5: Excluded variable from model

Model	Beta	t-value	Sig.	Partial correlation	Value
2-green relational capital	0.117[a]	0.796	0.432	0.146	0.423

Significance test of regression model (Fischer): In this section, significance of regression model is tested using variance analysis. According to Table 3, as significance level of F is below 0.5 for whole model, the regression model is significant. Therefore, the presented regression model is significant and has the capability to predict relations between variables.

According to relevant model of optimal model, significance level related to green structural capital is below sig level of 0.05 and its coefficient is positive and equal to 0.591. Therefore, it could be mentioned that there is significant and positive correlation between green human capital and competitive advantage of companies. However, there is no significant correlation between green relational capital and competitive advantage and between green human capital and competitive advantage of companies (Table 4 and 5)

CONCLUSION

Obtained results from the study show that there is significant and positive correlation between green structural capital and competitive advantage of companies and there is also positive but insignificant correlation between green relational capital and competitive advantage and between green human capital and competitive advantage of companies.

According to obtained results from hypotheses, it would be better for companies to emphasize green intellectual capitals (especially green structural capital) in addition to emphasizing physical capitals.

SUGGESTIONS

According to obtained results from hypotheses, components of green intellectual capital (green structural capital) can enhance competitive advantages of company. Hence, it is suggested to investors to pay attention to this issue while evaluation of companies. Hence, to inform users of effective factors to create corporate value, it is suggested to Stock Exchange to ask listed companies to disclose green intellectual capitals in their basic financial statements.

REFERENCES

Ballow, J.J., R. Burgman and M.J. Molnar, 2004. Managing for shareholder value: Intangibles, future value and investment decisions. J. Bus. Strategy, 25: 26-34.

Barney, J.B., 1991. Firm resources and sustained competitive advantage. J. Manage., 17: 99-120.

Berry, M.A. and D.A. Rondinelli, 1998. Proactive corporate environmental management: A new industrial revolution. Acad. Manage. Execut., 12: 38-50.

Bontis, N., W.C.C. Keow and S. Richardson, 2000. Intellectual capital and business performance in Malaysian industries. J. Intell. Capital, 1: 85-100.

Chen, J., Z. Zhu and H.Y. Xie, 2004. Measuring intellectual capital: A new model and empirical study. J. Intellectual Capital, 5: 195-212.

Chen, Y.S., 2008. The positive effect of green intellectual capital on competitive advantages of firms. J. Bus. Ethics, 77: 271-286.

Chen, Y.S., S.B. Lai and C.T. Wen, 2006. The influence of green innovation performance on corporate advantage in Taiwan. J. Bus. Ethics, 67: 331-339.

Dwyer, R.J., 2009. Keen to be green organizations: A focused rules approach to accountability. Manage. Decis., 47: 1200-1216.

Dzinkowske, R., 2000. The measurement and management of intellectual capital: An introduction. Manage. Accounting, 78: 32-36.

Dzinkowski, R., 2000. The value of intellectual capital. J. Bus. Strategy, 21: 3-3.

Edvinsson, L. and M.S. Malone, 1997. Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Roots. Harper Business, New York.

Firer, S. and S.M. Williams, 2003. Intellectual capital and traditional measures of corporate performance. J. Intellectual Capital, 4: 348-360.

Ghelichli, B. and A. Moshabaki, 2006. The role of social capital in the creation of intellectual capital. Manage. Knowl., 19: 125-147.

Hemmati, H., M. Moeinadin and S.M. Mozafari, 1389. Assessing the relationship between intellectual capital and market value of performance of non-financial companies. Manage. Financial Accounting J., 2010: 23-84.

Johnson, W.H., 1999. An integrative taxonomy of intellectual capital: measuring the stock and flow of intellectual capital components in the firm. IntL. J. Technol. Manage., 18: 562-575.

Lu, L.Y. and C. Yang, 2004. The R&D and marketing cooperation across new product development stages: An empirical study of Taiwan's IT industry. Ind. Marketing Manage., 33: 593-605.

Riahi-Belkaoui, A., 2003. Intellectual capital and firm performance of US multinational firms: A study of the resource-based and stakeholder views. J. Intell. Capital, 4: 215-226.

Roos, G. and J. Roos, 1997. Measuring your company's intellectual performance. Long Rang Plann., 30: 413-426.

Rugman, A.M. and A. Verbeke, 1998. Commentary on corporate strategies and environmental regulations: An organizing framework. Strategic Manage. J., 19: 377-387.

Russo, M.V. and P.A. Fouts, 1997. A resource-based perspective on corporate environmental performance and profitability. Acad. Manage. J., 40: 534-559.

Stewart, T.A., 1994. Your companys most valuable asset: Intellectual capital. Fortune, 130: 68-74.

Sveiby, K.E., 1997. The New Organization Wealth-Managing and Measuring Knowledge-Based Asses. 1st Edn., Berret-Koehler, San Francisco, USA., ISBN-13: 9781576750148, Pages: 275.