Environmental Management and Firm Performance

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Abstract

This study aims to develop an original framework of Environmental Consciousness (EC) to explore the positive effect of environmental consciousness on financial performance through the partial mediator - green intellectual capital. A questionnaire survey on the environmental consciousness, intellectual capital, and financial performance of Iran's manufacturing firms was conducted, and 324 samples were analyzed. This study utilizes structural equation modeling to explore the direct and indirect influences of EC on financial performance. Research results reveal that environmental consciousness had an indirect impact on financial performance through investment in green intellectual capital. It was thus known that green intellectual capital is a mediator of the relationship between environmental consciousness and financial performance. This paper may serve as a reference for firms mapping out future environmental policies and provide an input of various perspectives and arguments into the discipline of green management.

Keywords: Environmental consciousness, Social responsibility, Green intellectual capital, financial performance, Iran.

1. Introduction

The World Commission on Environment and Development in late 1980s (WCED, 1987: 41) defines sustainability as "development which meets the needs of the present without compromising the ability of future generations to meet their own needs." This definition has been recognized as one of the greatest challenges facing the businesses (Na et al., 2012; Camino, 2007; Chan et al., 2012; Liu et al., 2012). According to Carter and Rogers (2008), the sustainable business must simultaneously generate acceptable levels of economic performance, social performance in its interaction with stakeholders, and environmental performance throughout the supply cycle from raw material procurement to post consumption disposal. They showed that these alternative aspects are not always compatible.

To obtain acceptable environment performance, firms began to accept the necessity of environmental management and started to implement environmental management programs (Lee et al., 2012). Businesses have been seeking to improve their environmental performance as a result of emergence of international standards for environmental management, such as the ISO 14000 series, and stakeholders pressure to companies for reduce negative impacts on society and natural environment (Azorin et al, 2009). Moreover, increased awareness of environmental issues during this period, prompting firms to examine the responsibilities placed on their shoulders. As a result, a growing number of firms have incorporated sustainability in their strategies and operations (Huang and Kung, 2011). In response to this pressure, environmental management is becoming an integral part of business activities and business managers' wants to create and maintain a fit between the environment and objectives and resources of the firm. Fit refers to the effort to understand how the environment both influences and is influenced by business.

Although scholars have been paying increased attention (both empirical and theoretical) to achieving environmental goals (Chen et al., 2006; Camino, 2007), most of these studies have focused mainly on supply chain management. Thus, they have provided little insight on the issue of green intellectual capital. Intellectual capital represents the intangible assets of a firm, including its knowledge, the capabilities of employees, technology, experience, and the ability to implement innovation to reach goals (Chen, 2008). As the era of the knowledge-based economy unfolds, firms are placing more emphasis on intellectual capital, for the financial performance it provides, which is the key to profitability (Kaplan and Norton, 2004).

Intellectual capital helps to direct a firm and mobilize employees in the attainment of goals (Rothenberg, 2003). Because effective environmental management incorporates both tacit and explicit knowledge (Boiral, 2002), green intellectual capital plays a key role in firms that have focused on sustainability, by transferring knowledge regarding regulations, technology, best practices, and initiatives to attain the sustainability goals assumed by the firm. This study offers an integrated approach to gain a better understanding of green intellectual capital and attempts to extend the theoretical and empirical evidence on the causal relationships among environmental awareness, behavioral process, and performance. Based on the abovementioned propositions, we formulate the research question as follows: Does green intellectual capital play a role in mediating the influence of a firm's environmental awareness on its financial performance? With respect to the challenges faced by firms in pursuing a strategy of sustainability, we must determine whether current green intellectual capital transcends environmental issues and the principles of market competition, thereby increasing marketing performance through the creation of new green opportunities. This study could serve as a reference for firms mapping out future environmental policies, adding various perspectives and arguments to the field of environmental management.

1.1. Literature review and hypothesis development

Although, the discussion about the relationship between business and society has been going on for decades, there is still no consensus on a commonly accepted definition of corporate social responsibilities (CSR) (McWilliams and Siegel, 2001). However, authors and organizations generally agree that CSR broadly cover legal, economic, ethical, social contribution, and environmental areas. More specifically, CSR emphasizes ethical and social aspects of corporate behavior such as corporate ethics, legal compliance, prevention of improprieties and corruption, labor and employment practices, human rights, safety and hygiene, consumer protection, social contribution, procurement standards, and overseas operations.

Since the 1990s, CSR has been used as 'the base point' or integrated as an element of other related concepts such as business ethics, corporate social responsiveness, environmental consciousness, and so on. Constructs of social responsibility, ethics and environmental consciousness in some of the studies are considered synonymous (e.g. Huang and Kung, 2011; Lamond, 2007 and 2008; Azorin et al, 2009) while these constructs are somewhat different. For example, Cheng and Chen (2012) distinguished between three concepts of social responsibility (SR), environmental consciousness (EC), and ethics and classified the manufacturing companies into three groups according to the levels of SR and EC as shown in Figure 1. The first group is named "Highly ethic companies" whose SR and EC are high; the second group is named "Medially ethic companies" and either their SR or EC is high; the third group is named "Lowly ethic companies" whose SR and EC are low.

According to Weyandt et al. (2012), Ethics is the underlying concept of social responsibility and it is impossible to implement CSR without business ethics. They define ethics as the set of moral principles that govern human behavior for personal or professional issues and actions.

In this study, social responsibility concept is considered as the general concept and environmental consciousness as the part of this concept is examined.

Environmental consciousness is defined as the total perception of an organization or an individual about environmental concepts, such as environmental protection, environmental policy, environmental management, environmentalism, and etc (Ahmed et al., 1998). Firms with highly environmental consciousness tend to base their operations on stockholder and stakeholder interests, and exhibit more progressive environmental strategies, engaging more resources in green management (Huang and Kung, 2011). Moreover, proactive green management may lead to financial performance of company nowadays (Azorin et al., 2009). Companies with active environmental consciousness, gain a financial performance that simply cannot be imitated by competitors (Barney, 1991).
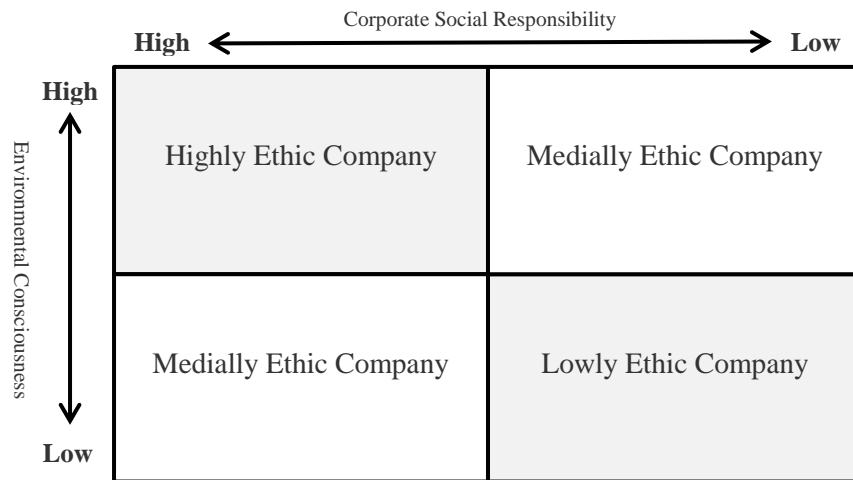

Fig.1 The classification of companies (Cheng and Chen, 2012)

Intellectual capital is defined as the total stock of collective knowledge, information, technologies, intellectual property right, experience, organization learning and competence, team communication systems, customer relations, and brands that create value for firms (Stewart, 1997). Environmental consciousness is viewed as one kind of superior corporate culture to attain green management. RBV regards superior corporate culture as one of key resources to generate financial performances because superior corporate culture is typically valuable, rare, inimitable, and non-substitutable (Barney, 1986). The rise of international environmental regulations and popular environmentalism would bring significant impacts to enterprises throughout the world (Chen et al., 2006). Environmental consciousness is a trigger for organizational and technological change, which would force companies to change the way they think about products, technologies, process, and business models (Nidumolu et al., 2009). Companies should change their strategies and operations in harmony with the environmental trends. Previous research argues that environmental consciousness of companies has a positive influence on human capital, structural capital, and relationship capital respectively (Ferrell et al., 1997; Greeno and Robinson, 1992;

Schlegelmilch et al., 1996). This study argues environmental consciousness positively affects three types of green intellectual capital as follows.

First, the prevalence of environmentalism drives businesses to develop their employees' capability to manufacture products that meet and exceed strict environmental regulations. Companies with high level of environmental consciousness would let their employees know their environmental policies and are prone to enhance their employees' competence about environmental management and green innovation. There is a positive relationship between employees' perceptions of environmentalism and their proactive environmental behaviors (Ferrell et al., 1997). Therefore, this study asserts that environmental consciousness is positively associated with green human capital of companies. Second, companies that adopt proactive strategies of environmental management could integrate the objectives of environmental protections among different departments to solve environmental problems by utilizing innovative environmental technology (Greeno and Robinson, 1992). In addition, companies can reduce the environmental pollution by redesigning their production processes and by increasing their green productivity (Porter and van der Linde, 1995). Environmental consciousness would increase firms' innovative capability of environmental technology and business operations (Greeno and Robinson, 1992; Schlegelmilch et al., 1996). Hence, this study argues that environmental consciousness is positively associated with green structural capital of companies. Third, companies with high level of environmental consciousness would extend their environmental concerns to their stakeholders such as societal groups, customers, employees, suppliers, partners, and local communities. Schlegelmilch et al. (1996) find out that the environmentalism of customers may impact their purchase decisions, and point out companies should increase environmental concerns for their customers such that they can enhance the relationships with their customers. Several famous companies with high level of environmental consciousness, such as Sony and Dell, implement environmental policies that increase the environmental linkages with their network members, suppliers, channels, and partners. Thus, this study postulates that environmental consciousness positively relates to green relationship capital. According to the mention above, this study implies the following hypothesis:

H$_1$. Environmental consciousness is positively associated with green intellectual capital.

Some of the research on social responsibility has used stock market valuation as an indicator of financial performance. Evidence of poor social responsibility has been associated with negative impact on stock prices reflecting the market's assessment of future earnings (Jarrel and Petzman, 1985; Shane and Spencer, 1993). On the other hand, some studies have found that disclosure of being proactive in environmental management strategies has caused negative market reaction, while low expected expenditure on environmental measures had little market reaction (Stevens, 1984). It appears that stock price alone may not be a good indicator of performance. Also, as some of the firms in our study were not publicly held, we have decided to use a combination of self-reported performance measures for the study. Firm success can be characterized in many ways. Thompson and Strickland (1994) have identified the types of goals that firms usually establish against which to measure their success. The performance outcomes that are typically of importance to a firm fall into several categories. These goal areas relate to markets, products, economic outcomes, and employees. More specifically, these overall goals can be broken down as follows:

• Market: Market share; sales volume;

• Product: Product quality; new and improved product introduction; productivity; ability to improve;

• Economics: Annual earnings; profitability; return on investment;

• Employees: Improvement in employee skills; employee flexibility.

This categorization represents an attempt to capture a broad range of outcomes that are important to firms. As mentioned earlier, firms were asked to indicate whether their performance had improved, remained the same or decreased on these 11 items over the last three years. This study used financial performance construct for measure firm performance and evaluates environmental consciousness and intellectual capital impacts on it. Thus, this paper presents our second and third hypotheses:

H₂. Environmental consciousness is positively associated with Financial Performance.

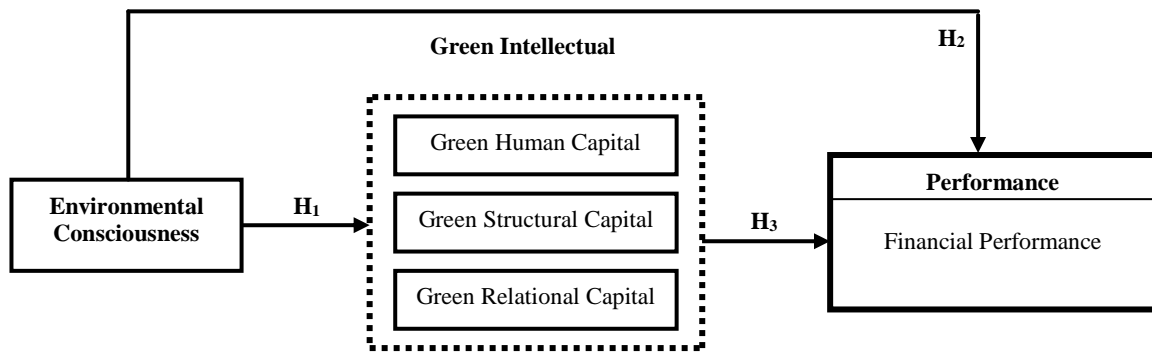**H₃.** Green intellectual capital is positively associated with Financial Performance.

Fig.2 The conceptual model

1.2. Method

1.2.1. Sample and data collection

The data for this study was obtained from a questionnaire survey directed at manufacturers in Iran. The manufacturing industry has a tremendous impact on ecology and the environment (Sarkis, 1995). To ensure the content validity of the measurement instrument, the questionnaire was developed in two-stages. First, an initial questionnaire was designed based on a review of the literature followed by a discussion with three experts in environmental management. The experts assessed the wording, logic, and content appropriateness of the draft. Second, the revised version was then modified by accommodating the comments and suggestions of seven environmental directors to ensure that each item was suited to the manufacturing industry and was interpreted as expected.

Samples were selected from the 400 Manufacturers in east AZARBAYJAN in Iran. The questionnaires were addressed to the directors of the Industrial Safety and Environmental Protection departments. If the names of the directors were unavailable, the message "Please

forward this letter to the director in charge of environmental management" was written on the envelope. A total of 400 postal questionnaires were mailed out to the headquarters of each manufacturer in June 2015. Respondents were given a two-month deadline to return the questionnaires. A total of 237 questionnaires were returned. Of these respondents, ten unusable questionnaires were excluded. The descriptive characteristics of the sample firms are detailed in Table 1.

Variable	Description	Percentage
Establishment	Less than 15 years	32.6
	From 15 to 30 years	33.1
	More than 30 years	34.3
Size: number of employees	Less than 200 employees	30.4
	From 200 to 1,000 employees	44.5
	More than 1,000 employees	25.1
Size: revenue (in US dollars)	Less than $1 Million	32.5
	From $1 to $3 Million	32.7
	More than $3 Million	34.8
Size: capital (in US dollars)	Less than $1 Million	44.4
	From $1 to $3 million	37.0
	More than $3 Million	18.6
ISO-14001 certification		62.1
Green labels		22.0

Note: Percentages calculated based on the number of responses obtained for each variable

Table 1. Description of the sample

Because we used a questionnaire survey, one limitation of this study was the fact that the results may have suffered from respondent bias. Participants may have modified their responses to make them socially acceptable or to appear rational. Moreover, the study was unable to maintain complete control over the collection of questionnaires. As a result, the data collected might have centered on particular samples with similar characteristics, thereby leading to erroneous results. Another limitation of this study is the fact that face-to-face surveys conducted at environmental events may suffer from acquiescence and social desirability bias (Schuman and Presser, 1981; McFarlane and Garland, 1994).

1.2.2. Measures of constructs

The constructs outlined in the present research framework included environmental consciousness, green intellectual capital, and financial performance. Measures of each construct were developed based on related literature. Environmental consciousness was based on the PRESOR scale (Singhapakdi et al., 1996), drawing reference from Axinn et al.'s (2004) two major aspects of thirteen items on views related to stockholder versus stakeholder. The questionnaire defined the statement "PRESOR from a stockholder's point of view" as stockholders representing the highest priority of firms. Firms are responsible for satisfying

stockholder needs, while social responsibility and ethics are emphasized to a lesser degree. "PRESOR from a stakeholder's point of view," was defined as a firm considering social and environmental responsibilities as its operational goals, basing its operations on the interests of stakeholders to meet public expectations. The scale consisted of 13 questions, with five questions on stockholder views and eight questions on stakeholder views.

Based on Menguc and Ozanne (2005), this paper made a number of modifications to Chen's (2008) questionnaire on green structural capital, to bring it in line with the implications of green structural capital. Green intellectual capital comprised three parts: green human capital, green structural capital, and green relational capital (Bontis, 1999; Johnson, 1999). The questionnaire included a total of 19 items consisting of five items on green human capital, nine on green structural capital, and five on green relational capital.

Financial performance was measured in terms of ROI, profit, and profit growth over the prior three-year period relative to the industry average (Miller, 1991). Measurement within the primary industry accounts for industry munificence and across three years accounts for random events affecting unit reporting periods.

1.2.3. Data Analysis Method

The properties of the three research constructs in the proposed model were tested using a LISREL procedure of structural equation modeling (SEM). The conceptual model proposed in this study was designed to measure causal relationships among hypothetical constructs established according to prior literature (Davies et al., 1999; Turner and Reisinger, 2001). The SEM procedure was an appropriate solution for this proposed hypothetical model. SEM involves two important models, namely, the measurement model and the structural model. Observed variables within each model are confirmed prior to assessing the interrelationships between different models; therefore, confirmatory factor analysis was used to verify the reliability and validity of the variables. Finally, nine common indicators for the goodness of fit of SEM are generally observed.

2. Results

This paper eliminated items with poor reliability and validity prior to conducting more in-depth analysis and discussion. Following analysis and assessment, one variable was deleted from the subject "PRESOR from a stockholder's point of view," and another from "Financial performance." The following describes the reliability and validity of this paper.

Cronbach's Alpha was used to measure the internal consistency of various constructs of the questionnaire (Nunnally, 1978). Reliability of "environmental consciousness", "green intellectual capital" and "financial performance" are illustrated in Table 2. All but one item ("PRESOR from a stockholder's point of view" had a Cronbach's a less than 0.9) obtained a Cronbach's a greater than 0.9, indicating a high level of reliability (Hair et al., 2009). Furthermore, the composite reliability of all variables exceeded 0.9, indicating good composite reliability. Finally, average variance extracted (AVE) of all variables was above 0.5. Overall, the scale employed by this paper demonstrated considerably high internal consistency.

This study employed confirmatory factor analysis to assess individual item reliability (Fornell and Larcker, 1981). Significant factor loading illustrates good indicators of the

measurement enabling it to effectively reflect the construct it measures (Anderson and Gerbing, 1988). In that case, the measure had good convergent validity. Furthermore, Chin (1998) suggested that a standardized path coefficient of variables should exceed 0.7. However, when other variables within the same measurement model exhibited greater factor loadings, a factor loading between 0.5 and 0.6 was considered acceptable.

Constructs	Variables	Number of items	Cronbach's alpha	Composite reliability	Average variance extracted
Environmental consciousness	PRESOR: stockholder view	4	0.90	0.90	0.70
	PRESOR: stakeholder view	8	0.93	0.92	0.59
Green intellectual capital	Green human capital	5	0.94	0.94	0.75
	Green structural capital	8	0.92	0.92	0.58
	Green relational capital	5	0.93	0.93	0.73
Financial performance	Financial performance	4	0.92	0.92	0.52

Table 2. Reliability analysis of constructs

Table 3. Reveals that the factor loading of the measured items all achieved the level of significance. Although a minority of the factor loadings fell short of the 0.7, they remained above 0.6. In terms of measuring model fit, all but two were close to meeting the standards and were therefore considered to be within the desirable range. The two that failed to meet the standards were "PRESOR from a stakeholder's point of view" with RMSEA = 0:095 (greater than 0.08) and "Financial performance" with RMR = 0:062 (higher than 0.05). Based on the results, all three constructs demonstrated a reasonable individual item reliability and goodness of fit.

Items	Factors loadings
Environmental consciousness	
PRESOR: Stockholder view	
The most important concern for a firm is making a profit, even if it means bending or breaking the rules	0.97 *
To remain competitive in a global environment, business firms will have to disregard ethics and social responsibility	0.92 *
If the survival of a business enterprise is at stake, then you must forget about ethics and social responsibility	0.91 *
Efficiency is much more important to a firm than whether or not the firm is seen as ethical or socially responsible	0.72 *
chi square = 2.453; chi square/df = 2.453; p = 0.117; RMR = 0.021; GFI = 0.995; AGFI = 0.946 RMSEA = 0.080; NFI = 0.996; CFI = 0.998; IFI = 0.998	
PRESOR: stakeholder view	
Being ethical and social responsible is the most important thing a firm can do	0.69 *
The ethics and social responsibility of a firm is essential to its long term profitability	0.80 *

The overall effectiveness of a business can be determined, to a great extent, by the degree to which it is ethical and socially responsible	0.83 *
Business ethics and social responsibility are critical to the survival of a business enterprise	0.92 *
A firm's first priority should be employee morale	0.64 *
A business has a social responsibility beyond making a profit	0.82 *
Social responsibility and profitability can be compatible	0.72 *
Good ethics are often good business	0.71 *

chi square = 14.320; chi square/df = 1.023; p = 0.426; RMR = 0.032; GFI = 0.948; AGFI = 0.960; RMSEA = 0.095; NFI = 0.989; CFI = 1.000; IFI = 1.000

Green intellectual capital

Green human capital

The employees in the firm involve a positive productivity and contribution to environmental protection	0.92 *
The employees of the firm have an adequate competence of environmental protection	0.93 *
The employees of the firm provides high product and service qualities of environmental protection	0.88 *
The cooperative degree of team-work about environmental protection is performed at high levels in the firm	0.82 *
Managers can fully support their employees to achieve their jobs of environmental protection	0.78 *

chi square = 2.026; chi square/df = 0.675; p = 0.567; RMR = 0.010; GFI = 0.996; AGFI = 0.982; RMSEA = 0.000; NFI = 0.998; CFI = 1.000; IFI = 1.000

Green structural capital

The firm has a superior management system of environmental protection	0.67 *
The firm has formed a committee to progress on key issues in environment protection	0.64 *
The firm has established detailed rules and regulations of environment protection	0.72 *
The firm makes an adequate investment in environmental protection facilities	0.87 *
The firm has a high ratio of employees about environmental management to total employees	0.66 *
The overall operation processes about environmental protection in the firm work smoothly 0.82 *	
The knowledge management system in the firm is favorable for the accumulation and sharing of knowledge of environmental management	0.91 *
The firm has established a reward system for accomplishing environmental tasks	0.78 *

chi square = 12.482; chi square/df = 0.960; p = 0.489; RMR = 0.038; GFI = 0.986; AGFI = 0.962; RMSEA = 0.072; NFI = 0.990; CFI = 1.000; IFI = 1.000

Green relational capital

The firm designs its products or services in compliance with the environmental desires of its customers	0.71 *
Customers are satisfied about the environmental protection of the firm	0.82 *
The cooperative relationships about environmental protection of the firm with its upstream suppliers are stable	0.93 *
The cooperative relationships about environmental protection of the firm with its downstream clients or channels are stable	0.90 *
The firm has stable and well cooperation relationships about environmental protection with its partners	0.92 *

chi square = 6.424; chi square/df = 2.141; p = 0.093; RMR = 0.017; GFI = 0.989; AGFI = 0.947; RMSEA = 0.071; NFI = 0.994; CFI = 0.997; IFI = 0.997

Financial performance

Average return on investment over the past three years	0.91 *
Average profit over the past three years	0.95 *
Profit growth over the past three years	0.92 *

chi square = 6.424; chi square/df = 2.141; p = 0.093; RMR = 0.062; GFI = 0.879; AGFI = 0.937; RMSEA = 0.061; NFI = 0.983; CFI = 0.988; IFI = 0.929

Notes: * p ≤0.001; chi square = chi-square; chi square/df = normed chi-square; RMR = root mean squares residual; GFI = goodness-of-fit index; AGFI = adjusted GFI; RMSEA = root mean square error of approximation; NFI = normed fit index; CFI = comparative fit index; IFI = incremental fit index

Table 3. Validity analysis and goodness of fit of the individual item

Table 4. Shows the correlations among constructs. As for discriminant validity, Kline (2011) suggested that when a correlation coefficient between a pair of constructs does not exceed 0.85, a certain degree of discriminant validity can be claimed. The correlation coefficients of all constructs were lower than 0.8, indicating good discriminant validity.

	PRESOR: stockholder perspective	PRESOR: stakeholder perspective	Green human capital	Green structural capital	Green relational capital	Financial performance
PRESOR: Stockholder view	1					
PRESOR: Stakeholder view	-0.61 *	1				
Green Human capital	-0.53 *	0.60 *	1			
Green Structural capital	-0.51 *	0.61 *	0.77 *	1		
Green Relational Capital	-0.45 *	0.59 *	0.76 *	0.79 *	1	
Financial performance	-0.27 *	0.39 *	0.43 *	0.41 *	0.48 *	1

Note: * $p \leq 0.001$

Table 4. Correlation coefficients

According to Kline (2011): "if the absolute values of any of the correlations exceed 0.85, then the two variables may be redundant" However, "green human capital vs. green structural capital," and "green human capital vs. green relational capital" exhibited higher correlation coefficients (close to 0.8). For the purpose of maintaining good discriminant validity, this study took another step, conducting a chi-square difference test. In Table 5. The test result indicated significant differences between the three variables; therefore, it could be concluded that the variables were different. The items of "PRESOR from a stockholder's point of view" were reverse coded; therefore, they were negatively correlated with the other variables. The items of"PRESOR from a stakeholder's point of view" and "financial performance" were not highly correlated. However, "green human capital", "green structural capital" and "green relational capital", shared a correlation coefficient close to 0.8, which is indicative of serious collinearity. We then performed multi-collinearity diagnostics on the problematic aspects.

Constructs	Chi-square	Degree of freedom	p-value
Green human capital – green structural capital	1912.36	1075	0.000
Green structural capital – green relational capital	1941.15	1118	0.000
Green human capital – green relational capital	1224.15	650	0.000

Table 5. Chi-square difference test

Based on the results illustrated in Table 6, "green human capital", "green structural capital" and "green relational capital" all had a TOL greater than 0.10 and a VIF less than 10; thereby eliminating the problem of multi-collinearity (Hair et al., 2009).

	Multicollinearity Financial Performance	
Green intellectual capital	TOL	VIF
Green human capital	0.32	3.11
Green structural capital	0.30	3.38
Green relational capital	0.31	3.19

Table 6. Multi-collinearity diagnostics

The mean and standard deviation of constructs are listed in Table 7. Items regarding "PRESOR from a stockholder's point of view" were reverse scored items; therefore, they had a lower mean of 2.36. On the other hand, items on "PRESOR from a stakeholder's point of view" were positive questions and had a mean score of 5.31.

Constructs	Variables	Mean	Standard deviation
Environmental consciousness	PRESOR: stockholder view	2.36	1.42
	PRESOR: stakeholder view	5.31	1.11
Green intellectual capital	Green human capital	5.13	1.16
	Green structural capital	4.63	1.25
	Green relational Capital	5.13	1.17
Financial Performance	Financial Performance	5.09	0.98

Table 7. Descriptive statistics

However, firms cannot consider environmental consciousness based on a stakeholder's interest without compromising a stockholder's interest. As a result, the scores for each item demonstrated a negative correlation, meaning that as the value of one side leaned towards the higher end, the value of the other leaned towards the lower end. It is evident that more firms are considering interests of the wider community instead of profit-before-everything. This reflects how environmental consciousness has become an issue of considerable importance. In relation to green intellectual capital, green human capital had the highest score of 5.13, followed by green structural capital with the lowest score of 4.63. It can be inferred from the scores that employees are the most logical starting point for firms building green intellectual capital. It can also be promoted in a top-down fashion to ensure full implementation. As for green structural capital, firms need to establish and enforce environmental policies. Unlike green human capital and green relational capital, which fall

under the category of intangible environmental competence of personnel, green structural capital involves concrete measures, and thus, received a lower mean score. Finally, the mean for financial performance was 5.09, indicating slightly higher competitiveness for the firm in question over that of its rivals. It also indicates that firms had better quality products and services, and a better corporate image, highlighting its competitiveness and value.

The hypothesized structural causal model was tested using SEM, including a test of the overall model as well as individual tests of the relationships among constructs. This study adopted green intellectual capital as a mediator to gain insight into the means by which environmental consciousness indirectly influences competitive advantage. Prior to SEM analysis, we reverse scored the questions regarding "PRESOR from a stockholder's point of view" to converse and measure the items of "PRESOR from a stakeholder's point of view". Following the analysis, the overall SEM in presented in Figure 2, and the analysis is presented in Table VIII.
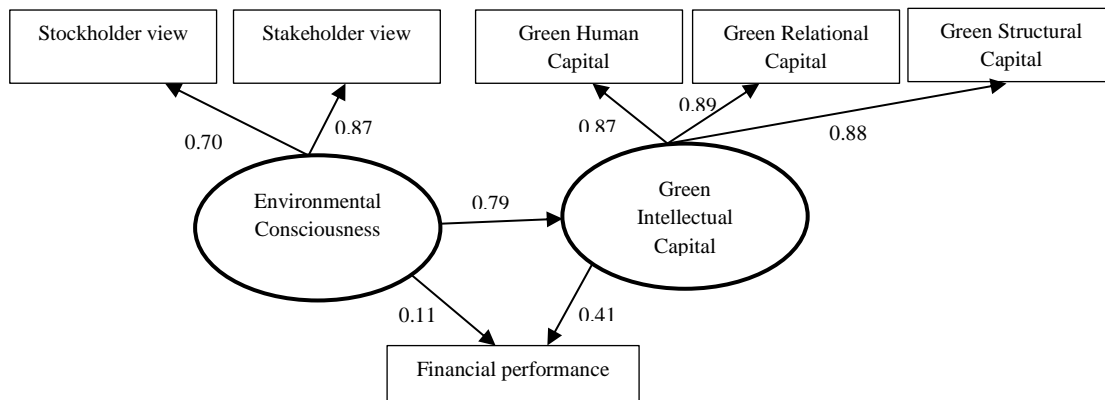

Figure 2. Standardized estimates model

Note: $P \leq 0.001$

First, we conducted a goodness-of-fit test on the overall model. The overall model fit was assessed using the following measures: absolute, incremental, and parsimonious fit measures (Hair et al., 2009). The results illustrate that the overall model fit indicator in Table 8 is within the standard range (chi square=df = 1:643, RMR = 0:031, GFI = 0:983, AGFI = 0:950, RMSEA = 0:053, NFI = 0:985, CFI = 0:994, IFI = 0:994), indicating a good fit of the theoretical model adopted in this study (Bagozzi and Yi, 1988). It is worth mentioning Rigdon's (1995) argument about practical works in which the value chi square is easily influenced by estimated parameters and sample size. The greater the number of estimated parameters is, the larger the number of variables influencing the hypothesis model will be; the greater the sample size is, the greater the chi-square value will be, and thus, the poorer the fit of the model. Based on the previously-mentioned phenomenon, this paper replaced the chi-square indicators with chi square/df indicators as the standard measurement.

Hypotheses Path	Path coefficient	Standard deviation	t-value	p-value
H₁: Environmental consciousness to Green intellectual capital	0.79	0.09	9.23	0.000 *
H₂: Environmental consciousness to Financial performance	0.11	0.13	0.87	0.385
H₃: Green intellectual Capital to Financial performance	0.41	0.12	3.29	0.000 *
RMR = 0.031; GFI = 0.983; AGFI = 0.950; RMSEA = 0.053; NFI = 0.985; CFI = 0.994; IFI = 0.994				
Note: * $p \leq 0.001$				

Table 8. Structural equation modeling analysis

Further testing of the hypotheses and the framework revealed that environmental consciousness has a positive influence on green intellectual capital (b = 0:79, t = 9:23). The greater value a firm places on social and environmental responsibility, the more green intellectual capital it will invest in, thereby verifying hypothesis H1. Meanwhile, green intellectual capital has a positive influence on financial performance (b = 0:41, t = 3:29). Firms engaged in developing green intellectual capital should see an increase in financial performance, sustaining hypothesis H3. Regarding the research hypothesis H2, environmental consciousness has a positive influence on financial performance. However, the influencing effect is not statistically significant (b = 0:11, t = 0:87). The role of environmental consciousness in influencing financial performance does not appear to be significant.

2.1. Discussion

The focus of the study was to gain insight into the role played by intellectual capital in firms that have adopted a focus on attaining sustainable environmental and economic goals. The empirical results of this study provide evidence supporting the proposed equation model designed to consider environmental consciousness, green intellectual capital, and financial performance simultaneously.

Based on the research findings, a significant positive correlation was found between the constructs "PRESOR from a stakeholder's point of view" and "green intellectual capital"; and between "green intellectual capital" and "financial performance". The results showed that environmental consciousness of firms was positively correlated to green intellectual capital, indicating that when the environmental issues were perceived in a positive light, firms tend to engaging more resources in green intellectual capital (Klein and Prusak, 1994; Ramus and Steger, 2000). Moreover, the results also found that green intellectual capital has a positive influence on financial performance. It implied that firms engaged in investing and developing green intellectual capital should see an increase in financial performance (Chen et al., 2006; Chen, 2008).

Conversely, "PRESOR from a stockholder's point of view" did not illustrate a direct impact on "financial performance". Instead, it had an indirect impact on financial performance through investment in green intellectual capital. Therefore, we can determine that green intellectual capital is a significant mediator of the relationship between environmental consciousness and financial performance. The way that firms perceive environmental issues is crucial. Environmental consciousness leads to improved behavior and practices (Jiang and Bansal, 2003; Menguc and Ozanne, 2005). Indeed, the environmental consciousness of a firm is at the level of psychological awareness and the expected outcome can only be achieved through the implementation of certain policies or strategies. However, awareness of environmental issues

is not enough; it must also be congruent with intellectual capital. In other words, firms should accumulate green intellectual capital prior to attempting to fulfill their social and environmental responsibilities, to boost their financial performance (Lepak and Snell, 1999; Chen, 2008).

The world is entering a green era. Firms will inevitably be subject to government environmental regulations or face pressure from the public. Firms with heightened environmental consciousness tend to consider the interests of stakeholders as a business priority, increasing their willingness to consider opinions from all sides (Buysse and Verbeke, 2003; Huang and Kung, 2010). In addition, because environmental issues often evolve into public affairs, firms that value social and environmental responsibility naturally adopt a greater number of environmental measures. The major findings of this study have significant managerial implications. First, the information in this study provides firms direction and understanding with which to guide green management. In addition to improving environmental knowledge and the competence of employees, it is equally important to increase their commitment to environmental activities (Ramus and Steger, 2000; Rothenberg, 2003). Once management has opted for sustainability as an area of focus or a core value, the firm can create a strong, value-driven culture. On the contrary, a lack of senior management support, insufficient resources, an inability to obtain commitment from employees, and insufficient collaboration among environmental consciousness and green intellectual capital all lead to failure in attaining environmental goals. All in all, a firm that values green intellectual capital will achieve environmental compliance and leverage the resources of the firm, the results of which are increased financial performance to thrive amid economic hardship in striding towards becoming a sustainable business.

Meanwhile, intangible assets have become ever more important to firms. This study recommends that firms consider green intangible assets, i.e. green intellectual capital, as a key element in their goals for sustainability. This suggestion is in line with the outcome of the study. Moreover, this study found that firms have incorporated a sustainability focus, based on the observation that the greater corporate emphasis on social and environmental responsibility is, the greater green intellectual capital a company will invest, thereby facilitating the implementation of sustainability strategies.

Because green intellectual capital is the mediator of the relationship between environmental consciousness and financial performance, managers who only enforce environmental initiatives will only achieve a limited success in boosting the competitiveness of their firm. Therefore, it should be noted that a firm's green intellectual capital can play a role in facilitating its advantage, allowing the firm to enhance financial performance.

To meet the challenges posed by the transition from a regional operation to a global operation, proactive firms have had to develop their own environmental strategies in the absence of national standards in Iran or harmonized regulations in Europe.

Iran's manufacturers must devise new strategies to deal with more stringent environmental standards in the international markets. Many Iran's manufacturers are convinced that the more environment-friendly they become, the more business opportunities they can create. They believe that by making operations sustainable and developing green products, they will not only be adhering to the increasingly stringent international environmental regulations, but also obtain financial performance. This will be particularly helpful, as Iran's manufacturers are desperate to extend their market into countries with rigorous environmental regulations. Our study, therefore, has the potential to extend the literature and provide managerial implications to firms in Iran, as well as those in other emerging economies.

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