
THE ROLE OF GREEN INTELLECTUAL CAPITAL MANAGEMENT IN ACQUIRING GREEN COMPETITIVE ADVANTAGE FOR COMPANIES

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ABSTRACT

The trends of the strict international environmental regulations and the rise of consumer environmentalism, has changed the patterns of competition all around the world. And the role of environmental management along with the novel construct of green intellectual capital has become very important. The purpose of this article is to explore the relationship between green intellectual capital and green competitive advantage by using a descriptive correlation research method focusing on the novel constructs of green innovation and environmental protection in delivering green products and green services. For this purpose, the data were collected from the managers of companies through questionnaire and, the impact of the components of green intellectual capital management (green human capital, green structural capital, and green relational capital) on green competitive advantage was determined by means of correlation, simple and multiple linear regression analysis. The findings showed that the components of green intellectual capital management has a meaningful relationship with green competitive advantage and affects it. Therefore the existing gap i.e. little attention to green intellectual capital, could be filled in by applying the new frameworks of green intellectual capital such as the model of green management and environmental management systems and the model of knowledge-based green intellectual capital and result in the excellence and dynamism of companies and acquiring green competitive advantage.

Key Words: Green Intellectual Capital, Green Competitive Advantage, Green Management, Sustainable Development.

INTRODUCTION

In 1990s with putting restrict emphasis on improving the environment, implemented strategies at companies tended to prevent from pollution and introduce reduction in environmental degradation. The emergence and development of the modern technology has increased the dynamism degree of competitiveness in emerging business contexts and in turn the pattern of competitive models has changed drastically during the last two decades. The Montreal Convention in 1987, Summit of the Rio Declaration in 1992, Kyoto Protocol in 1997 and the Announcement of the Universal Declaration on Sustainable Development in Johannesburg under the effect of the strict trends of the international environmental regulations and acquiring popular environmental consciousness of consumers, have led to very significant changes and had an influential impact on the existing competitive regulations and models in nowadays industrial world. Competition in global markets gives rise to the environmental issues and this in turn necessitates the need for social responsibility. Regarding such complexities in global context, if developed or under developed countries cannot recognize their natural and innate capabilities, they will always remain as dependent countries to the industrial ones. It is very important for companies to find appropriate approaches in this regard. Therefore, nowadays environmental management plays a very significant role for companies and corporations. In addition, pioneering companies in the case of Green innovation will enjoy the initial advantages and this will enable them to look forward higher prices for Green products and at the same time, will improve the company's images and develop the new markets and introduce new competitive advantages. Concerning their industrial and similar activities companies differ in their marketing skills, financial resources, facilities, place of production, technical knowledge, integration levels, managerial talent and alike activities .Provided that an appropriate approach is chosen each of these items can be regarded as an advantage for companies. Research in measuring the intellectual capital has focused on collecting, regulating and analyzing the non-financial information in measuring the company's invisible assets. Environmental trends have been directed towards green intellectual capital and therefore introduced competitive advantages. Such environmental trends are considered as barriers against future development of companies and so most of the companies are in disagreement or resist against these environmental trends (Chen, 2010). Competitive advantage is defined as the company's capability to deliver better performance than the industry in which it operates. Also, a company is known to benefit from competitive advantage which its interest rate is higher than the average interest rate of the related industry. Generally, the interest rate is clarified by attributes like return on sell and return on assets. The company enjoying competitive advantage will attract more customers than the other companies and try to preserve them against competitive forces. Nowadays competitive advantage lets the companies and organizations to gain more valuable advantages than the others in the same marketing environment. Therefore, competitive advantage is a distinct way through which a business or company proceeds to reach more competitiveness by detecting markets and placing in new positions. This provides a good ground for company to stand higher than the industrial average regarding the preservation of its sustainability levels. Therefore, the necessity of establishing and preserving the competitive advantage as a key element to achieve success in national and international arenas is inevitable. The requirement for such a success is to make use of company's all capabilities such as its human resources, strategies, current facilities and harnessing the competitive opportunities. Competitive advantage in an organization means the

implementation of a specific strategy by company that competitors are unable to simulate. Meanwhile competitors cannot occupy some specific positions and benefit from them. One of the basic necessary requirements to establish competitive advantage is to reduce previous restrictions in accordance with the global demands. In other words, it is essential for companies to learn how to think and habituate themselves to think beyond the limitations of traditional frameworks, and for their competitive advantage to have required sustain ability it should be unique and valuable. Meanwhile the competitive advantage of a company must be hard to copy and replace. So, achieving competitive advantage by manufacturing companies through presenting innovation in their products, paying sufficient attention to the points of market uptakes and customers and drawing attention on the needs of customers, are of great importance. So, organizational knowledge is known as the main factor in competitive advantage and value creation. Achieving competitive advantage for an organization and its survival depend on its ability to create, save, distribute and utilize organizational knowledge. Tending towards environmental management approaches which focus on the regular improvement and environmental systems to proportionate big organizations, outlining, consultants and researchers as an effective approach which pay attention to the active engagement with the environmental issues, along with another approach focusing on the sustainability of organization which emphasizes the problems beyond waste reduction and regular need for improvement to reach challenging goals, and also by observing standards of environmental protection ISO 14001, the organization turns into green organization with organic structure that its function is to provide green innovation. This requires stepping forward to produce compatible products with environment and minimizing its impact by green production, research and green development and green marketing which is called green management. Like the studies in intellectual capital, recently the phenomenon of company's environmental management has attracted the interest of researchers. According to previous research in this domain the intellectual capital has a positive impact on the companies' competitive advantages. It is clear that there is not much bulk of study in this regard, but research mostly have focused on explaining the intellectual capital ,and the intellectual capital of green innovation or environmental management have not been analyzed thoroughly. Therefore, this research is to fill in the existing gap and introduces new emerging concept of green intellectual capital concerning the explanation of the relationship between green intellectual capital or environmental management and competitive advantages of companies. The purpose of this study is to explain the relationship between green intellectual capital and green competitive advantage and to explain the impact of green human capital on green competitive advantage and explaining the impact of green structural capital on green competitive advantage and to clarify the relationship between the impacts of green relational capital on green competitive advantage. Therefore, paying attention to the green intellectual capital and green competitive advantage is of significant importance and innovative.

In this research we will study the relationship and impact of green intellectual capital management on green competitive advantage to explain and reveal their roles in companies' activities and clarify the change in tendencies of companies' values regarding their assets and visible capitals towards invisible assets and its impact on the present competitive situation of manufacturing and industrial companies. Totally, concerning the importance and necessity of the concepts of green intellectual capital management and green competitive advantage made the researchers to evaluate the impact of green intellectual capital management on achieving green competitive advantage for the first time in industrial estates especially in industrial estate in Urmia city. To do so and according to the related literature and theoretical

framework for variables of green intellectual capital management and green competitive advantage, the rate of each of the variables' impact was determined by means of questionnaire, collected data, simple and multiple linear regression analysis. Hence the results will be beneficial for managers and employees in companies in other industrial estates concerning the planning and adopting appropriate policies.

INTELLECTUAL CAPITAL MANAGEMENT MODELS

Models are abstract interpretations of real world. Model is the reconstruction and summarization of reality which including the main characteristics of reality, facilitates our recognition of reality. Intellectual capital management models are effective methodological trends in identification, evaluation, management and knowledge distribution. Based on the said issues we will introduce some Intellectual capital management models.

INTELLECTUAL CAPITAL MANAGEMENT CAPABILITY MODEL

Dynamic capabilities are related to the company's ability in merging, establishing and configuring the internal and external competence in demonstrating quickly changing environment. The concept of dynamic capabilities puts emphasis on the development of managerial abilities and recombination of technological, task-based and organizational skills in demonstrating quickly changing environment as those mechanisms which enables companies to achieve competitive advantage. Therefore, the concept of dynamic capabilities is the basis for analyzing intellectual capital management. In the Model of intellectual capital management capability, resource management includes; customer capital, relational capital, process capital, innovative capital and human capital. With a close look at the related literature to dynamic capability, it is assumed that three processes; integration / coordination, learning/ experience, and transfer/ reconfiguration are essential in intellectual capital management.

Integration / Coordination process; the purpose of integration or coordination, is the alignment of business strategies with composite manufacturing process and achieving effectiveness. The area of resources integration/ coordination indicates the internal and external integration with main business operations like; operation management processes (supply change management, product development, services and presenting goods), customer management processes (like; detecting customers, attracting and maintaining customers) and innovation management processes (like opportunity, goods and developing services management). The said activities and the integration/ coordination process, planning in line with integrated knowledge and the implementation of planned activities are coordinated with tasks and resources (human resources, knowledge, information technology, customers and relations).

Experience/ Learning process; the purpose of learning and experience process in the model of intellectual capital management capability is to motivate experiencing new knowledge and skills and improving and recreating continuous intellectual capital capabilities. The area of learning and experience in the model of intellectual capital management capability indicates learning and experiencing how to better utilize the intellectual capital before, during and after project implementation. Learning activities include; gaining and distributing knowledge and experiencing the business operation.

Transfer/ Reconfiguration process; Reconfiguration process enables managers to copy, transfer and reconfigure the resources at companies. Capability to reconfigure and transfer resources is a potential factor for competitive advantage in long term. Illustrating continuous changes in environment and related technologies, evaluating markets and competitors highlights the necessity of intellectual capital reconfiguration for companies and makes the need for internal and external complementary transfer against the evolutionary customer demands and competitors strategies more tangible. The purpose of reconfiguration process is to feel, plan and implement the changes. The area of reconfiguration in the model of intellectual capital management must include components of intellectual capital, business activities and organizational operations and policies. In order to realize reconfiguration process, organizations need to perform activities which meet the need to make changes in main operations and customer services and administering the changes along with intellectual capital components (complementary resources) all in all which have been previously reconfigured. The model of intellectual capital management capability helps the company to facilitate the improvement of continuous process by complementary steps. Repetitive acts help people to better understand the process and improve the unified affairs more effectively. The model of intellectual capital management also enables companies to learn from the most effective proceedings in planning stage. Therefore, guideline for improving developments in future regarding each of the components of intellectual capital in industries will be so valuable (Shang & Fang Lin, 2010). **Figure 1; repetitive process of intellectual capital management capabilities**

Source: (Shang & Fang Lin, 2010)

GREEN INTELLECTUAL CAPITAL KNOWLEDGE-BASED MODEL

Recent developments in information technology have decreased the costs of data management significantly. Such developments have introduced the concepts of learning organizations, knowledge organizations and knowledge management to the literature of management and companies. Companies by utilizing the strategies of knowledge management provide the ground for possible innovations in their related processes, activities, products and services and in turn improve their competitive position. Since the individual and collective knowledge and intellectuality are the main attributes of human development and the key element in development of societies, so companies must gain the needed knowledge for bringing about innovations in their products and improve concerning processes, promote it among their employees and make use of them in all routine activities (Alvani & etal, 2007). Knowledge management is a new approach considering the organizations, believing the importance of creativity and innovation, administering mental assets and sharing organizations' intellectual resources. Basically the knowledge management is a process which focuses on the strategies and tactics for managing human-based intellectual capitals. And its purpose is to use the existing knowledge in its optimal and effective sense to render it in products and services in order to improve organizations' basic competence (Hoseingholizadeh, 2008). On the other hand, environment management system provides an infrastructure for continuous improvement towards companies' sustainability and green strategy helps companies to make decisions which would have positive effects on the environment (Baharum & Pitt, 2009). Totally knowledge management is a planned requirement to facilitate and manage related activities to knowledge-based operations like creation, record, transfer and application. Meanwhile concerning the effectiveness of

intellectual capital management controlled by the company it is a necessary requirement for companies. Yung (1996) defines intellectual capital as the explanation of the implicit and explicit knowledge-based rules resulting from the combination of three elements of intellectual capital and finally development of motivating methods of value creation in these elements which support business strategies. Stewart (1997) defines intellectual capital as the total share of collaborative information knowledge, intellectual property rights, experience, learning and organizations' competence, team communication systems, customer relations and brand which are capable to create value for organizations. Therefore, it is emphasized that effective knowledge management is of great importance and concerning the process of intellectual capital management in an organization it is shown that the company's dynamic competitive value creation status provides transition from personnel knowledge to organizational knowledge and establishes the integration of knowledge which in turn results in company's innovation. Generally literature studies in the domain of knowledge management are related to the intellectual capital consisted of human capital, structural capital (market/ organizational) and customer capital (relational) as the knowledge components of organization.

Human capital; is the initial resource or innovative and competitive organizational resource. Edvinsson (2000) emphasized that human capital in an organization is the most important invisible asset. In other words green human capital encompasses knowledge and individual capabilities that provide some guidelines for customers and also the bases for green innovation and environmental protection. The fact is that the bulk of data collection unit about physical resources and their usage during time pass is preserved for certain organizations to bring about opportunities. Stewart (1997) declares that generally each of the individuals' implicit knowledge is very valuable for organization and is the wellspring of innovation. Employees believe that they need some specific capabilities to perform their tasks in organization. In addition they know that they have enough time to decide on how to do their jobs and utilize previous knowledge and experience during the fulfilment of their tasks. The lack of consciousness, implicit understanding and training is that of the knowledge gap which leads employees to be discontent about their jobs.

Identifying the importance of knowledge workers there are four items which stand at the spotlight;

- Possessing especial capabilities.
- Opportunities for official training.
- Functional independence.
- Using the initial experiences (Pathirage& etal, 2008).

In this way when the organization trains its employees, sharing the knowledge concerned with environmental protection (green knowledge) facilitates information exchange among them. So staff assessment may provide a competitive environment. Therefore, the value of green human capital is increased. Each of employees by themselves possesses the same information about green innovation which is accounted to be a valuable knowledge for organization. Any organization seeking for success must provide such situation in which individuals are able to express their implicit knowledge. So managers in knowledge-based green organizations demanding the development of individual capabilities to reach green relational learning and changes according to learnt items are to employ green human capital in order to acquire green knowledge capital. Naturally this involves a new approach called green human knowledge.

Structural capital; is considered as understanding the organizational and communication strategies interaction inside the different groups, organizational techniques, formal and informal meetings which encompasses four elements of;

- interaction with colleagues
- willingness and desire to share knowledge
- interaction with friends and
- Sharing experiences (Pathirage & et al, 2008).

In other words green structural capital defines the internal structure of an organization which always indicates a specific atmosphere. Therefore, it is a combination of green strategies, operational systems, physical resources, work processes and the organizational culture aiming at sharing related knowledge in order to provide environmental protection (green knowledge). Therefore, the organizations aiming to support and develop the ownership of green intellectual capital, choosing diverse external tools and/or using technological self-forms and utilizing green structural knowledge approach provide optimal situations in the new competitive environment in order to acquire its own green structural capital and lead to its valuable structural knowledge fund. **Figure 2; Organizational Knowledge Components**

Source; (Baharum & Pitt, 2009)

Customer capital; includes an organization's external invisible assets and this external force is the determinant part of the market and the strength of an organization. In this regard customers are the main determinant factors in this situation i.e. each of which is considered to be organization's internal credit. Gupal(2009) stresses out that we need to realize the final high integration level and the process of innovation must be understood as the chain supply. In this way knowledge management will help organization as an effective managerial tool to achieve its strategic and predefined goals (Baharum & Pitt, 2009). In other words, green customer capital basically encompasses green organizational processes, and focuses on problem solving between organizations and cooperative sectors. Also tries to include, utilize and enhance them and create an effective environment for organizations. This needs to share and retain related environmental protection knowledge (green knowledge). Sharing green knowledge is helpful to realize eliminating the existing gap via the concepts of green management, required skills for green organization managers, the role of environmental management, functional knowledge related to specific work contexts, understanding the feedback process, requirements of customer service and requirements of supply chain from customer capital prospective. Therefore, supporting the green customer capital by understanding the interactions of communicational channels between company and customers, any knowledge-based organization can improve the path of vital business networks for green organization, the green content of organizational beneficiaries and organization's certain characteristics in the form of green customer knowledge form to achieve green knowledge capital.

So the final goal of knowledge management is the exercise of knowledge in order to improve organizational performance both internally and externally. And this provides a valuable opportunity to outline three different areas of green human capital, green structural capital and green relational capital at companies and above all to explain present functions through these three elements. Therefore the framework of intellectual capital is known as an identifying tool for the variables of knowledge management at company. Establishment of green knowledge capital to create value for business inside the framework of green intellectual capital must be recognized and accepted. The principles gradual scaling in an organization is among the priorities. Therefore, in order to use green intellectual capital it is

needed that organization balances the activities related to green knowledge management. Figure (3) illustrates the knowledge based green intellectual capital model.

Figure 3; Green Intellectual Capital Knowledge-based Model Source; (Baharum & Pitt, 2009)

REVIEW OF THE RELATED LITERATURE

According to the bulk of the related literature to the subject of this research we can count out some of the studies in this field which investigate different dimensions and diverse issues in this regard and have revealed useful results. For example Chen (2009) investigating especial equity incentives of green brand studied the green brand image, green satisfaction and green trust about electronic and information products in Taiwan and investigated the positive impact of green brand image on green satisfaction, green trust and green brand equity. Since brand image plays an important role in markets, distinction between goods and services based on different forms of quality is very difficult. The study included five hypotheses which all of them were approved in the present study. In this study we found out that brand equity can provide competitive advantage for companies because brand force results in bigger share registration, sell in higher price and higher net profit. In this study we elaborated on green brand equity relating it to environment and showed that green brand image, green satisfaction and green trust are related to the green brand equity in a meaningful way. In another study (Haden, Peng & et al, 2008) adopting theoretical, chronological and scientific points of view on green management, tried to present a comprehensive definition of green management, development and conceptualization through an explanatory analysis. Meanwhile they tried to explain the way green organizations function by focusing on senior executive managers' green management and clarifying the significant role of this phenomenon in sustainable development. Then they discussed the movement of environmental authors, philosophers, historians and activists. Therefore, analyzing researchers' diverse approaches points out current paradigms in traditional management which eventually considering critical theory a comprehensive definition of green management is expressed in this study. Green management is the wide organizational process of implementing innovation in achieving sustainability, waste reduction, social responsibility and competitive advantage through continuous learning, development and encompassing environmental goals and strategies which are integrated fully by organizational goals and strategies. Hence, identifying some of the generalizations used by three-fold approach supports the presented definition and for any of the researchers and managers is a determining component regarding the fact that none of the especial factors should be overlooked during the analysis or utilization of green management. In this regard the comprehensive scale will have the capability of comparing the results in a meaningful way and outline the conclusions. In another study Fakhri & et al, (2009) using a descriptive analysis, field and comprehensive (sectional-survey) method in order to analyze the current situation of competitiveness of human capitals in Iran's automotive industry (a comparative study with Russia and China) attempted to compare the competitive situation of human capitals in Iran's automotive industry. This study included two main hypotheses and four minor hypotheses. Minor hypotheses were analyzed as four merged indices which none of the four main hypotheses and two minor hypotheses were approved. The population consisted of different groups of Iranian public automotive companies, automotive companies and private sector importers, related ministries and public organizations' managers and experts, natural

and legal persons like prominent academic people, forum officials and selective institutions. Results and outcomes of the present research showed that while all the compared indices were relatively weak in Iran in comparison to Russia and China, there is a less difference in comparison to Russia. It should be noted that the said two countries are among the most powerful competitive countries. In another study Bagheri & et al (2010) benefiting from competitive law policy and intellectual property law tried to understand the existence of interaction between these two seemingly contradictory policies. Competitive law must be based on some principles and regulations. The first principle of the intellectual property law is in accordance with market principles, the second principle recognizes the rights of intellectual innovators and the third principle manifests the role of competitive policies exercised in development, technical distribution and pricing of those goods used such policies in their production. Results and findings of this study indicate that it is possible that markets interact by themselves in an exclusive or competitive mode, but it is the competitive market situation which realizes optimal resource allocation and leads to customers' welfare. It is accepted by governments that competitive markets are not always established and destroyed automatically and there is a need for regulations that function as corrective forces against exclusive pricing. Also competitive rights and intellectual property rights are considered as socio-economic development means in society. Although they may seem contradictory, both try to provide customers' welfare.

Summing up the said issues and discussion above we will explain the selected theoretical framework and subjected hypotheses.

THEORETICAL FRAMEWORK AND EXPLANATION OF HYPOTHESES

Relying on the necessity and importance of the concept of green intellectual capital management and the key role of competitive advantage in establishment of a pioneering company or industry, green intellectual capital management (Chen, 2008) includes three dimensions; green human capital, green structural capital, and green relational capital. Theoretical framework of green competitive advantage presented by Porter & Van der Linde(1998) and Chen(2008) were chosen as the basis for formulating research hypothesis. This study aimed to answer this question; what is the green intellectual capital management level in the companies of industrial estate in Urmia city and what is its relationship with green competitive advantage? Therefore we introduced the concept of green intellectual capital management and investigated the impact of green intellectual capital management on acquiring green competitive advantage in the companies of industrial estate in Urmia city and based on green management framework proposed required suggestions to improve the green competitive advantage situation in companies.

GREEN INTELLECTUAL CAPITAL MANAGEMENT AND GREEN COMPETITIVE ADVANTAGE

Intellectual capital is defined as the set of invisible assets, knowledge, capabilities, relations and ... at the level of employees and organization inside the company and can be generally divided into three kinds of human capital, structural capital and relational capital. Harison & Solivan (2000) pointed out that intellectual capital management helps the organization to create values as well as increasing interests, strategic positioning, innovative needs and customer fidelity and improving the cost reduction and efficiency (Shang& Fang Lin 2010). Referring to previous body of related literature about intellectual capital the new

emerging structure of green intellectual capital in accordance with restrict international environmental regulations and general consciousness, the concept of consumer environmentalism can be proposed and considered as the overall supply of invisible assets, knowledge, capabilities, relations and So it can be defined as the element of protecting environment at the individual and organizational level inside the company (Chen, 2008). In this regard the main hypothesis of the study is as follow;

Main hypothesis; there is a relationship between green intellectual capital and green competitive advantage among the companies of industrial estate in Urmia city.

GREEN HUMAN CAPITAL MANAGEMENT AND GREEN COMPETITIVE ADVANTAGE

Human capital is defined as the set of knowledge, skills, employees' innovations and capabilities in achieving predefined goals. Human capital is the source of momentum and innovation for organizations, including employees' innovations, attitudes, intellectuality, experiences and capabilities. On the other hand, human capital has two determining elements; employees' capabilities and their commitment. Human capital is embedded in employees not in organization and would be lost by employees' renunciation. In fact previous studies and researches paid more attention to explain human capital and did not discuss about human capital in relation with green innovation or environmental management. So present study tried to fill in the existing gap and proposed the relationship between human capital and green innovation or environmental management and green competitive advantages. Therefore, we can refer to the definitions of human capital introduced by Stewart (1997), Edvinsson & Malon (1997) and Desinoski (200) as the basis in this regard and define human capital as the set of knowledge, skills, capabilities, experiences, attitudes, intellectuality, innovations and commitments and ... related to environmental protection or green innovation embedded in employees and not in organizations (Chen, 2010). In addition, companies involved in environmental management and green innovation not only are able to minimize production waste and increase efficiency, but also demand for fair prices for green goods. Therefore they improve company's mental image and cause strong positive impact on competitive advantages influenced by general consciousness trends on consumer environmentalism and strict international regulation for natural environment protection (Chen, 2008). In this regard the first research hypothesis is as follow;

First hypothesis (H1); green human capital has an impact on green competitive advantage of companies in industrial estate in Urmia city.

GREEN STRUCTURAL CAPITAL MANAGEMENT AND GREEN COMPETITIVE ADVANTAGE

Contrary to human capital, structural capital is possessed by the organization and cannot be taken over in any ways by the employees. This requires preserving competence through technologies, process description, guidance books, networks and alike and ensuring the rate of competence inside the organization at the time of employees' retirement or renunciation. Although previous studies paid more attention to the explanation of structural capital, they did not explain green structural innovation or environmental management. Therefore, this study fills in the existing gap and focuses on the emerging concept of green structural capital to explain the relationship between structural capital and green innovation

or environmental protection and companies' competitive advantages. We can use the definitions of structural capital proposed by Stewart(1997), Edvinsson & Malon(1997) and Johanson(1999) as the basis and define green structural capital as the existing organizational capabilities, organizational commitments, knowledge management systems, reward systems, information technology systems, databases, management mechanisms, operational processes, management philosophies, organizational culture, company's mental images, inventions, copy right and trade mark and ... related to the environmental protection or green innovation inside the company (Chen, 2008). In this regard the second hypothesis is as follow;

Second hypothesis (H2); green structural capital has an impact on green competitive advantage of companies in industrial estate in Urmia city.

GREEN RELATIONAL CAPITAL MANAGEMENT AND GREEN COMPETITIVE ADVANTAGE

Relational capital is the existing relations which the company can communicate via them by the other companies, institutions, research centers and customers and cooperate with them and is determined by intensified cooperation between the actors. On the other hand, relational capital is established on the bases of strong constitutive levels of understanding, trust, relations and cooperation between alliance partners, suppliers and channels. Although previous studies have paid more attention to explain relational capital, there is no explanation of relational capital relating to green innovation or environmental management. Therefore, present study fills in the existing gap and proposes the emerging structure of green relational capital in order to explain the relationship between green innovation or environmental management and company's competitive advantages. Increasing interactive relationships between companies and customers, suppliers and partners regarding environmental management and green innovation can help companies to acquire competitive advantages. In this regard the third hypothesis is as follow;

Third hypothesis (H3); green relational capital has an impact on green competitive advantage of companies in industrial estate in Urmia city.

Figure 4; conceptual model of the research.

METHODOLOGY

This study is an applied research and methodologically it places itself in the framework of survey research. The population consisted of companies in industrial estate in Urmia city (phase 1 and 2) which deal with intellectual capitals namely human capital, structural capital and relational capital and above all acquiring competitive advantage. Also researchers described the benefits of green intellectual capital management and green competitive advantage to explain the dimensions of green intellectual capital management and clarify its role in acquiring green competitive advantage for companies in industrial estate. In this research library research method (book, articles and internet texts) was used to explain the components of green intellectual capital management and green competitive advantage. On the other hand field research was utilized for companies in industrial estate in Urmia city by distributing questionnaire among 90 managers of active companies (accordingly 25 managers at active companies in phase 1 and 65 managers at active companies in phase 2). Research period was the first 6 months in 2012.

To evaluate green intellectual capital management a questionnaire (Chen, 2008) including three components of green human capital with 5 items, green structural capital with 9 items and green relational capital with 4 items i.e. 18 items was used. To evaluate green competitive advantage the proposed questionnaire of green competitive advantage by Porter & Van der Linde(1998) and Chen(2008) including 12 items was used. To determine the stability of questionnaires, Cronbach's alpha coefficient was calculated and the following data was achieved; for green intellectual capital management questionnaire 94% (green human capital 88%; green structural capital 92%; green relational capital 76%) and for green competitive advantage questionnaire 92% which all the five values revealed the stability of the said items and questionnaire's appropriateness. In order to analyze data for the main hypothesis Pearson's correlation analysis and multiple regression analysis, and for the first, second and third hypotheses simple linear regression analysis were used. In this way the intensity of the impact of three components of green intellectual capital management on green competitive advantage was specified.

RESEARCH FINDINGS

In order to analyze research questions, first every components of green intellectual capital management were investigated according to the population at hand. To do so first Kolmogorov–Smirnov test was applied and it was observed that the level of meaningfulness (i.e. 7%) was more than 5%. Therefore, normal distribution of data was approved. To test research hypotheses Pearson's correlation analysis and multiple and simple linear regression analysis were used.

In order to evaluate the main hypothesis a combination of 18 related items to green intellectual capital management and 12 related items to green competitive advantage (costs level of green innovation, quality level of green goods or services, the rate of attention paid to related research and development of natural environment, fitness level of natural environmental management, the profitability of green goods and services, the rate of companies growth by green good production and green services, the rate of company's progressiveness and company's position in comparison to the other companies, public image of the company, the amount and rate of imitation from green goods by the other companies, the amount and rate of imitating from new ideas adopted by the other companies, the possibility of substituting company's position, the rate of other companies' accessibility to competitive position of considered company) (Chen & Lai and Wen, 2006;Chen, 2008; Chen & Chang, 2011) was used and the results from regression analysis showed the level of meaningfulness equal to 0/000 which was less than the minimum level of meaningfulness (5%). The said test's confidence level was 95% and approved. According to presented findings in table 1 and based on the standardized Beta coefficients, for each unit of change in green intellectual capital management as independent variable, 86% units of change takes place in green competitive advantage.

Table 1; correlation and regression analysis test for green intellectual capital management and green competitive advantage

		Correlations ^a	
		Green Intellectual Capital Management (GICM)	Competitive Advantage (CA)
GICM	Pearson correlation	1	.884
	Sig. (2-tailed)		.000
	N	90	90
CA	Pearson correlation	.884	1
	Sig. (2-tailed)	.000	
	N	90	90

Correlation is significant at the 0.01 level

Coefficients						
Model		Unstandardized coefficients	Unstandardized coefficients			
		B	Std. Error	Beta	t	Sig
1	(constant)	.559	.188		2.979	.004
	GICM	.865	.049	.864	17.780	.000

Dependent variable: CA

Model Summary				
Model	R	R square	Adjusted R square	Std. Error of the Estimate
1	.884 ^a	.782	.780	.34837

a. Predictors: (constant) GICM

In order to evaluate the first hypothesis a combination of 5 related items to green human capital (the rate of employees' cooperation concerning the issues related to environment, employees' competence in environmental protection, the quality level of green goods and services proposed by employees, team work cooperation related to environmental protection, managers' support of their employees in their related tasks to environmental protection) (Chen & Lai and Wen, 2006);Chen, 2008; Chen & Chang, 2011) and 12 related items to green competitive advantage was used and the results from regression analysis were at level of meaningfulness equal to 0/000 which was less than the minimum level of meaningfulness i.e. 5%. The said test's confidence level was 95% and approved. According to presented findings in table 2 and based on the standardized Beta coefficients, for each unit of change in green intellectual capital as independent variable, 78% units of change takes place in green competitive advantage.

Table 2: regression test for green intellectual management and green competitive advantage Coefficients^a

Model		Unstandardized coefficients	Unstandardized coefficients			
		B	Std. Error	Beta	t	Sig
1	(constant)	.629	.311		2.024	.046
	H	.785	.075	.784	10.446	.000

a. Dependent variable: CA

Model Summary

Model	R	R square	Adjusted R square	Std. Error of the Estimate
1	.744 ^a	.554	.549	.49882

a. Predictors: (constant) H

In order to evaluate the second hypothesis a combination of 9 related items to green structural capital (the rate of environmental protection management system establishment, numerous innovations related to environmental protection, the amount of profitability gained from environmental activities, the ratio of investment at related environmental research and development to sell, the ratio of employees working in the domain of environmental issues to the total number of employees, the rate and the way of fulfilling the environmental protection issues, the rate of environmental knowledge management system's appropriateness with sharing related knowledge) (Chang & Chen, 2012; Chen, 2008) and 12 related items to green competitive advantage was used and the results from regression analysis was at the level of meaningfulness equal to 0/000 which was less than the minimum level of meaningfulness i.e. 5%. The said test's confidence level was 95% and approved. According to presented findings in table 3 and based on the standardized Beta coefficients, for each unit of change in green intellectual capital as independent variable, 68% units of change takes place in green competitive advantage.

Table 3: regression test for green structural capital management and green competitive advantage Coefficients^a

Model		Unstandardized coefficients	Unstandardized coefficients			
		B	Std. Error	Beta	t	Sig
1	(constant)	1.345	.178		7.671	.000
	S	.686	.047	.682	14.620	.000

Dependent variable: CA

Model Summary

Model	R	R square	Adjusted R square	Std. Error of the Estimate
1	.842 ^a	.708	.705	.40318

a. Predictors: (constant) S

In order to evaluate the third hypothesis a combination of 4 related items to green relational capital (the amount of paid attention to those customers who are interested in environmental protection in designing goods and services, the level of satisfaction concerning

the issues of environmental protection, the level of cooperation and collaboration between suppliers and consumers regarding environmental protection, the level of cooperative and collaborative relations between partners regarding environmental protection) (Chang & Chen, 2012;Chen,2008) and 12 related items to green competitive advantage was used and the results from regression analysis was at level of meaningfulness equal to 0/000 which was less than the minimum level of meaningfulness i.e. 5%. The said test's confidence level was 95% and approved. According to presented findings in table4 and based on the standardized Beta coefficients, for each unit of change in green relational capital as independent variable, 75% units of change takes place in green competitive advantage.

Figure 4: regression test for green relational capital management and green competitive advantage
Coefficients^a

Model	Unstandardized coefficients	Unstandardized coefficients			
			B	Std. Error	Beta
1 (constant)	.991	.226		4.378	.000
R	.756	.059	.751	12.824	.000

Dependent variable: CA

Model Summary

Model	R	R square	Adjusted R square	Std. Error of the Estimate
1	.807 ^a	.651	.647	.44077

a.Predictors: (constant) R

DISCUSSION

The purpose of this research was to investigate the level of green intellectual capital management and its impact on green competitive advantage. According to the results from the main hypothesis and based on the impact of green intellectual capital management on green competitive advantage and its congruence with the results of studies like what Haden, Peng & et al(2008) undertook, green innovation both in production and processes must be emphasized. In this regard it is suggested that by supporting long term performance companies would lead to the achievement of successful innovations and make it difficult for competitors to imitate and enable companies to sustain their green competitive advantage. Also by gaining consciousness and promoting competitive patterns, companies should sell their environmental technologies or green services to improve their public image and even by creating and establishing new markets prevent from new ideas' imitation and provide some new and distinct mechanisms to support and increase Company's profitability. Meanwhile there is a must to achieve well- defined environmental policies to facilitate the performance among different departments and solve environmental problems. On the other hand, by ensuring the quality of goods and services we can reduce the amount of wastes, human and process costs and financial resources. It should be noted that by combining green human capital, green structural knowledge and green customer knowledge as the motives for establishing and creating green knowledge capital we can cause the company to be pioneering and be different from its competitors.

According to the results from the first hypothesis and based on the impact of green intellectual capital on green competitive advantage and its congruence with the results of studies like what Fakhri & et al (2009) and Chen (2008) undertook, we must pay attention to human innovation and creativity in relation to environmental protection and such issues must be supported and motivated by managers. Therefore, it is suggested that the jobs' competence profile be provided to develop green human capital through employees' improvement programs like teaching related principles and regulation to environmental protection, and providing information of circulars and bylaws. Collaborative relation among employees must be enhanced by special team work concerning environmental protection to facilitate and generalize services and activating quality control groups of green human capital, in order to improve the quality of green goods and services. Also, employees' level of competence needs to be evaluated by means of all existing knowledge, attitudes, values and required characteristics for effective fulfillment of organizational tasks.

According to the results from the second hypothesis and based on the impact of green structural capital on green competitive advantage and its congruence with the results of studies like what Bagheri & et al(2010) undertook, investment in environmental activities must be considered essential. Therefore, it is suggested that by directing the development of processes towards numerous green processes in the range of new opportunities the continuous innovation must be achieved and by designing environmental management systems must enhance the efficiency of products and increase the restoration of competitive strategies. Also we need to allocate good financial resources to green research and development to acquire technical skills and prominent experiences of organizational learning in interaction with customers, suppliers and the members of environmental information networks in order to enter them into the internal processes of companies and promote green structural knowledge. According to the results from the third hypothesis and based on the impact of green relational capital management on green competitive advantage and its congruence with the results of studies like what Chen (2010) undertook the level of customer' expectancy must be observed. Therefore, it is suggested to provide the needs and inclinations of consumers about related issues to environmental protection like green goods production through informing and introducing new services (green services). Also by distributing advertisement brochures which introduce environmental services we must attract the interest of customers and in turn achieve green satisfaction which finally leads to costumers' repetitive purchase. The findings of the present research and results confirmed the relation between green intellectual capital management and green competitive advantage. Also it was observed that each of the components of green intellectual capital management (green human capital, green structural capital and green relational capital) has an impact on and meaningful relation with green competitive advantage and the impact of green human capital on green competitive advantage is more than the other two components.

CONCLUSION

Therefore, this research provided a new prospective on investigating the relationship between and the impact of green intellectual capital management on acquiring green competitive advantage for companies in industrial estate in Urmia city. It was observed that there exists an appropriate level of intellectual capitals at the said companies but less attention is paid to the subject and usage of green intellectual capitals in order to affect

acquiring competitive advantage and in future researches must pay more attention to the application of green intellectual capital frameworks in the other industrial units.

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