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# EMPIRICAL EVIDENCE ON INFLUENCE OF GREEN INTELLECTUAL CAPITAL UPON ENVIRONMENTAL PERFORMANCE OF EDUCATIONAL INSTITUTIONS AND HEALTH ORGANIZATIONS


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**KEYWORDS**

Green Intellectual Capital, Environmental Performance, Green Human, Structural Capital, and Relational Capital & Intellectual Capital Based View Theory

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**ABSTRACT**

Nowadays, organizations are taking keen interest to implement the green objectives and for this purpose organizations have initiated green activities because of continuous pressure from stakeholders. Harm to environment is the result of negligence of human behavior in organizations. Consumers are more interested in those services which are eco-friendly and have less harm to the environment. There are three dimensions reported in literature about green intellectual capital. The existing study has investigated the role green intellectual capital upon environmental performance, convenience sampling was used and primary cross-sectional data from 372 professionals and educational staff was collected. SPSS and AMOS-SEM was used for the data analysis. Results of EFA and CAF confirm the reliability and validity of the scales while hypotheses were tested using simple linear regression and structural model. All four hypotheses were accepted. Highest beta value is recorded for green structural capital. This implies that corporate image and trademark could bring more environmental performance. It is suggested that this model could be tested in other sector by adding mediators such environmental corporate social responsibility.





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## INTRODUCTION

In management, there was a new terminology and paradigm was introduced in 1969 which was called intellectual capital. Adding values in employees' cognitive skills is called intellectual capital (Omar, Yusoff, Zaman, 2017). It has three dimensions human, relational and structural capital. These three attributes are related with knowledge, capabilities and potential (Chen, 2008). Later on, in 2008 green intellectual capital term was introduced by Chen (2008). It is affiliated with environmental management and getting competitive advantage and sustainable environmental performance. The importance and significance of the green objectives get focus and attention

by Brundtland report to raise awareness about environmental issues and how to solve these issues (WCED, 1987). After that several new terminologies were introduced and green intellectual capital (GIC) was one of those paradigms. Knowledge is present in different forms, types, kinds in the firms such as in the database of organizations, information systems. Sustainable performance got attention to solve new challenges faced by organizations, communities and societies due to neglect of human behavior (Allameh, 2018). Due to customers increased concerns, consumers and stakeholdersof particular organizations are taking keen interest to reduce the issues related with environment. In this connection, the main reason behind is to take care of environment is primary objective of firms under green objectives (Yusliza, Yong, Tanveer, Faezah & Muhammad, 2020).

Previously the firms focused more on products we can say that firms were product oriented now a days the firms are consumers oriented (Wang, Chang, Huang, Wang, 2011). That is the reason organizations want to hire those employees who have knowledge and awareness of how to reduce the issues of environment and cope with these new challenges effectively (Anwar, Mahmood, Yusliza, Ramayah, Faezah, Khalid, 2020). Therefore, current study has explored the GIC and environmental performance through the lens of intellectual capital based view theory (ICBV). Human resources and human capital are the assets of organizations and these assets cannot be imitated by the competitors. Thus, organization needs to carefully handle resources as they help organizations to attain competitive advantage and sustainability. The environmental issues are growing day by day and due to human negligence lot of issues are raised in societies and human health is getting affected. Environmental performance includes falling emission of dangerous gases such as carbon dioxide, waste of water, clean drinking water, and waste of energy, power, paper and natural resources (Wagner, 2011). Organizations were anxious about performance, due to gravity from stakeholders i.e. customers, consumers, suppliers, supply chain partners, employees, organizations are concerned with eco friendly products. They focus on those products that can be recycle so that resources could be saved for future generations (Yusoff, Omar, Zaman, Samad, 2019).

For this purpose, the organizations need to hire those workforces which have awareness about green initiatives and environmental issues. They must also show interest to help organizations to reduce these issues and for this purpose green intellectual capital is selected as predictor of environmental performance (Jabbour, Santos & Nagano, 2010). Green human capital is the skill of an employee which gave advantage to employee to get better performance while having good relations with supply chain partners and stakeholder also help firms to get sustainable environmental performance (Mas, 2019; Mtutu, 2016). Furthermore, structural capital means image of the firm, logo, and reputation can also play important role in attaining the sustainable environmental performance. The main problem in current study is environmental performance, organizations must take steps to protect environment for future generations for this purpose there is gap exists in intellectual capital based view theory (Malik, Cao, Mughal, Kundi, Mughal, Ramayah, 2020). To fill this gap this study has investigated the impact of green intellectual capital and its facets in environmental performance through lens of intellectual capital based view theory. Consequently, the following research questions were tried to answer in this current study:

1. Is there any association between green intellectual capital & environmental performance?
2. Secondly, does, the green intellectual capital influence on the environmental performance?

## LITERATURE REVIEW

The existing literature on the issues have been offered through theoretical background where intellectual capital based view theory (ICBV) stated that using knowledge of employees to improve the environmental performance is crucial. RBV theory explained significance of green human capital.

### Green Human Capital

This is asset of employee not organizations which help employee to get competitive advantage instead of the organizations. These skills might be communication, drafting, knowledge about environment and its issues and how to solve them, creative and novel ideas fulfilling promises and commitment are called human capital. Employees are measured as assets of organizations and these assets have no substitutes/replacement (Tonial, Cassol, Selig, Giugliani, 2019). Thus, organizations need to retain such employees. Otherwise if employees quit the job such kind of capital and knowledge will also go. GHC increase loyalty, satisfaction, quality of life, motivation, quality of work, and environmental performance (Gimenez, Sierra, Rodon, Rodriguez, 2015). It can be enhanced by arranging different training programs. GHC push firms to remember those assets which intangible. Organizations can initiate green objectives in their green shared vision and get advantage over their competitor. Having such workers who have knowledge and alertness about environment makes firms bigger green organizations. Thus, environmental sustainable performance and GHC are related with each other significantly and positively since employee with GHC increase the triple bottom line performance of the firms. Also there is some direct connection among employee behavior and knowledge about environment (Rayner & Morgan, 2018).

H1: GHC influences environmental performance.

### Green Relational Capital

In this World no firm is self sufficient and no individual is self sufficient. We have to depend upon other whether firms or individuals. The firms have to keep best relationships with their suppliers, creditors, stakeholders, societies and communities, employees, i.e. inside and outside stakeholders (Jardon & Martos, 2012). This will help to get advantage over competitors. This relationship among GRC and environmental performance is explained by stakeholder theory. Sustainable wealth could be achieved by having good relations with stakeholders. This will lead to sustainable environmental performance (Jabbour, 2018). Luthra, Garg and Haleem (2016) argued to have good linking with customers and consumers. Previously, firms were interested in focusing on packaging pricing and promotions of products and services now customers have shown concern about environment. Having green relationship also helps the both parties firms to share the information, expertise, knowledge and other important things to keep a long term relationship (Huan & Kung, 2011).Organizations want to give the feedback to their stakeholder and consumers focused on environment. This has given them to attain sustainable environment performance. These concepts are supported by knowledge and intellectual capital based view theories.

H2: GRC influences environmental performance

### Green Structural Capital

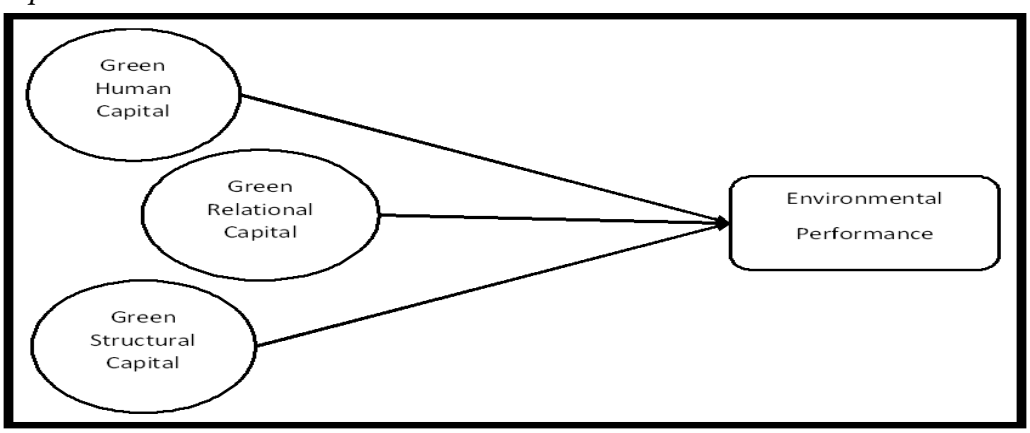
The trademark, logo, brand image, culture of the organizations, traditions, values, information management system and knowledge management system, reward system of organizations are non human assets which help firms to attain competitive advantage and sustainable environment performance (Ainin, Naqshbandi & Dezdar, 2016). It was claimed that human and relational

capital are not sufficient to gain competitive advantage and sustainability in the organizations it is crucial to have structural capital. The green supply chain management and information technology could play important part in getting and obtaining sustainability (Yusliza, Othman & Jabbour 2017). Environmental HRM and green IT have positive impact upon environmental objectives, performance and policies. By initiating the green objectives, it is possible that the organizations can reduce, cost, emission of carbon gases and increase the performance. GSC can improvise image of corporation, market share and environmental performance. Consequently, there is direct linkage among GSC and environmental performance (Jabbour, Santos & Nagano, 2010).
H3: GSC influences environmental performance.

**Environmental Performance**
Brundtland (1987) introduced idea of sustainability it is also called triple bottom line principle (TBP). It has three dimensions and in the current study environmental dimensions was chosen. The environmental dimension deals with ecological system, challenges faced by environment due to negligence of human behavior (Longoni, 2018). Increase in emission of CO2 gases, waste of hospitals and their mis management, degradation of natural resources such as waste of water, energy, power, paper also causes environmental issues (Wang, Chang, Huang & Wang, 2011). Thus, this study has chosen environmental performance (Gimenez, Sierra, Rodon, & Rodriguez, 2015) as criterion variable while in this connection, green intellectual capital as predictor since GIC significantly predicted environmental performance (Malik, Mughal, Kundi, Mughal, Ramayah, 2020).

H4: Green intellectual capital significantly predicts environmental performance

**Figure 1**
*Conceptual Framework*




**RESEARCH METHODOLOGY**
Cross-sectional data i.e. data collected at one time is called cross-sectional was used in study. It is primary data i.e. first hand data collected from education institutions i.e. Qassim University, college of public health and health informatics and health organizations such as primary health care centers in the Qassim region. In this drive, those organizations were included who initiated green initiatives. The data was collected from doctors, nurses, chief executive officers, medical

technical staff, professors, lecturers. Convenience sampling was used. Development of knowledge in this study got support from the positivism philosophy. Thus, the questionnaire of the green intellectual capital was adopted from Malik et al. (2020). Green intellectual capital has 18 items and six items for each construct. Environmental performance was adopted from Yusliza et al. (2020) it has five items. Thus, all items were measured on 7 scale 1 stringle disagree to 7 strongly agree.

**Data Analysis**

SPSS 25 was used for data analysis. Descriptive and inferential statistics were used for reliability, validity of scales and testing of hypotheses. In this connection, reliability was checked through Cronbach alpha, validity through the EFA and hypotheses testing via correlation and regression analysis. All ethical steps were taken into account while collecting data. In this connection, it was made assured that the data would be kept confidential and would be used for the academic purpose only. Consequently, reputation of organization and individuals/professionals would be harmed.

**Table 1**

*Reliability and Validity*

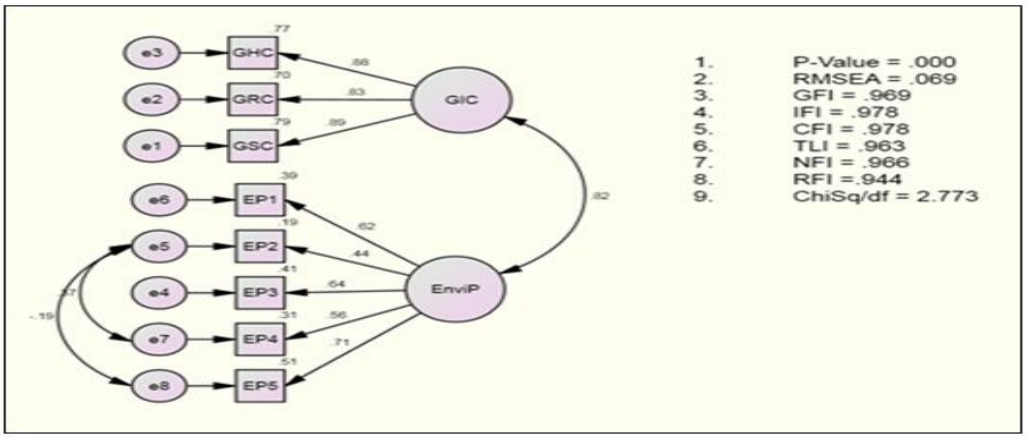
| Variables | Items | Loadings | CA |
|---|---|---|---|
| Green Human Capital | GHC1 | 0.703 | |
| | GHC2 | 0.578 | |
| | GHC3 | 0.447 | |
| | GHC4 | 0.545 | 0.821 |
| | GHC5 | 0.652 | |
| | GHC6 | 0.561 | |
| Green Relational Capital | GRC1 | 0.627 | |
| | GRC2 | 0.551 | |
| | GRC3 | 0.461 | |
| | GRC4 | 0.591 | 0.805 |
| | GRC5 | 0.483 | |
| | GRC6 | 0.553 | |
| Green Structural Capital | GSC1 | 0.445 | |
| | GSC2 | 0.557 | |
| | GSC3 | 0.525 | 0.765 |
| | GSC4 | 0.446 | |
| | GSC5 | 0.719 | |
| KMO | 0.933 | | |
| BTS | 2862.995, p<0.01 | | |
| Environmental Performance | ENVP1 | 0.414 | |
| | ENVP2 | 0.373 | |
| | ENVP3 | 0.535 | 0.738 |
| | ENVP4 | 0.570 | |
| | ENVP5 | 0.565 | |
| KMO | 0.722 | | |
| BTS | 409.945, p<0.01 | | |

CA> Cronbach Alpha

As per criteria for EFA loadings given by Field (2013) is 0.4 for each item and KMO >0.5 and BTS must be significant, in addition, for CA criteria is 0.7 and above. In this connection, table 1 results revealed that all the items of GHC, GRC and GSC are above 0.4 and CA alpha for GHC is 0.821, for GRC is 0.805, for GSC 0.765, but one item of environmental performance loading I less than 0.4 remaining all items have loadings above 0.4 and CA is 0.738, In this drive, KMO for GIC is 0.933, BTS=2862.995, p<0.05, while for EP KMO=0.722, BTS=409.945, p<0.05 respectively.

**Figure 2**

*Measurement Model Confirmatory Factor Analysis*




Confirmatory factor analysis was run in AMOS-SEM, it is evident from figure 3 measurement model that loadings of GHC=0.88, GRC =0.83 and GSC=0.89, while loadings of EP are 0.71, 0.56, 0.64, 0.44 and 0.62 respectively only one loadings is less than 0.5 criteria given by Hair, Hollingsworth, Randolph and Chong (2017). Thus, remaining model is found fit all values of GFI,=0.969, IFI and CFI=0.978, TLI=0.963, NFI=0.966, RFI=0.944, Chi square=2.773 less than 3 and RMSEA=0.069 less than 0.08 (Hair et al., 2017). Hence researchers concluded from the results of EFA and CFA that scales used in current study are reliable and validbased upon results.

**Table 2**

*Regression Analysis*

| DV | IV | R | R2 | F | β | p | Support |
|---|---|---|---|---|---|---|---|
| H1 EP | Constant | 0.595 | 0.354 | 202.782 | | 0.000 | Yes |
| | GHC | | | | 0.595 | 0.000 | |
| H 2 EP | Constant | 0.568 | 0.323 | 176.252 | | 0.000 | Yes |
| | GRC | | | | 0.568 | 0.000 | |
| H3 EP | Constant | 0.667 | 0.445 | 297.124 | | 0.000 | Yes |
| | GSC | | | | 0.667 | 0.000 | |

Three hypotheses were developed to test impact of predictors on criterion. In first hypotheses green human capital shows variance upon environmental performance (EP), R2=0.354, 35.4% variance is explained by GHC on EP, model fitness F= 202.782, β=0.595, p<0.01, it means that one percent change in green human capital through training could bring 59.5% change in the environmental performance. in addition second hypotheses was developed to investigate GRC on EP, the R2= 0.323, 32.3% variance is explained by green relational capital while goodness of fit F= 176.252, β=0.568, and in this connection, one percent increase or decrease in relationship could change environmental performance upto 56.8% similarly green structural capital shows R2= 0.445, 44.5% variance upon EP, F=297.124, β= 0.667, p<0.01 66.7% change is possible in EP due to the green structural capital and hence, in this connection, all three hypotheses are accepted.

**Figure 3**
*Structural Model*

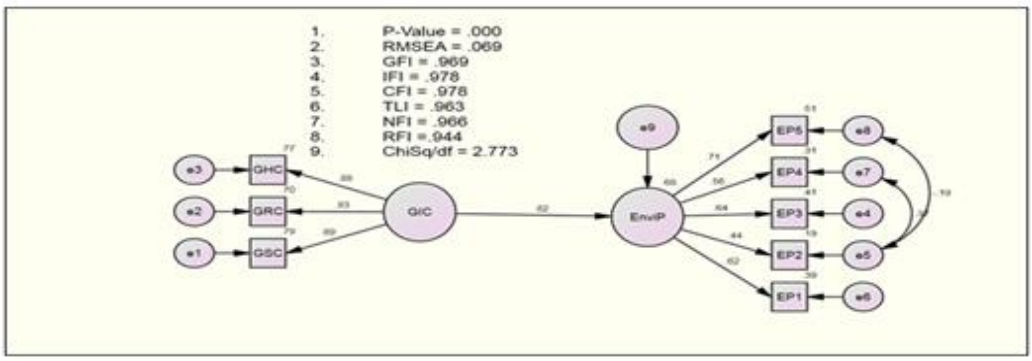



**Table 3**
Structural Model

| Hypotheses 4 | β | S.E | Critical Ratio | p | Support |
|---|---|---|---|---|---|
| GIC→EP | 0.803 | 0.071 | 11.366 | 0.000 | Yes |

A hypothesis 4 was investigated in AMOS-SEM, structural model was developed and direct impact of GIC on EP was determined. It is evident that R2=0.68, 68% variance is explained by green human, relational and structural capital upon environmental performance, β=0.803, it means one unit change in the green intellectual capital could bring 80.3% change in the environmental performance, critical ratio is 11.366 and p<0.01 and thus H4 is also accepted as true and thus substantiated.

## DISCUSSION AND CONCLUSION

Main aim of the study is to investigate impact of green intellectual capital upon environmental performance. Organizations who have initiated green objectives reflects this in their vision and mission statements on basis of this criteria firms and organizations were selected. The results explained that all three dimensions have significant impact upon environmental performance of firms. Green intellectual capital provide competitive advantage (Zaid, Jaaron & Bon, 2018) to employees as well as organization and this capital could be enhanced over training, seminars,

colloquiums and conferences so that the employees get added the value sin their skills and got awareness about the issues related with the environment and help firms to reduce cost, waste of natural resources and help to attain sustainable environment performance so that degradation natural resources could be reduced. The results of the current study are in line with the results of Malik et al. (2020), Anwar et al. (2020) and Yusliza et al. (2020) also reported that positive and significant impact of GIC (Human, relational & structural capital) on sustainable environment performance.

Organizations can have better relationship with their suppliers and creditors and stakeholders to achieve sustainable wealth as well as they could increase sustainable environment performance through the good image of their brand, trademark, and logo (Huselid & Becker, 1997). Human resources and human capital are assets of organizations and these assets cannot be imitated by the competitors. Consequently, organization needs to carefully handle resources as they help organizations to attain competitive advantage and sustainability. Previously organizations were product and profit oriented now due to pressure from the consumers, stakeholders and strict national and the international environmental policies organizations are now adding the green objectives in the green shared vision. The consumers, patients creditors, suppliers' communities are ready to pay for those services which have less harm to environment and are eco-friendly. Green intellectual capital helps organizations to achieve competitive advantage and improve environmental performance. It is concluded that GIC is best way to improve the environmental performance. The current study has filled the gap in the intellectual capital based view theory (ICBV).

**Limitations & Future Research**

The study has few contributions as well as few limitations which could be addressed in future studies. This study has used small sample size 372, it is recommended that big sample size such as more than 500 could be used in future studies. Cross-sectional data creates biasness because it is single method of data collection for this purpose future studies may use longitudinal or mix methods data to reduce biasness (Taylor & Vachon, 2018). In this linking, third it is strongly recommended that some mediators could be added in current model to investigate the more complex model to better understand the subject matter such as green environmental corporate social responsibility. For the educational and health organizations it is recommended that more awareness about benefits of green initiatives should be given to faculty members and students of educational institutions and medical staff and patients of health organizations so that more economic, social and the environmental performance could be achieved it would help firms to obtain competitive advantage and sustainable environmental performance. Moreover, at initial step green initiatives need venture on other hand it help to reduce cost, as well as environmental issues which result in attracting more investors and better reputation of firms in eyes of all stakeholders.

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