Impact of Corporate Social Responsibility, Green Intellectual Capital, and Green Innovation on Competitive Advantage:
Building Contingency Model

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ABSTRACT

The concept of green intellectual capital has gained substantial popularity in the context of pressures from competition, environmental forces, and mounting stakeholders' expectations for environmental protection. Scholars have investigated the antecedents and consequences of green intellectual capital. However, those investigations look inexhaustive in terms of the research frameworks and contexts employed therein. Based on the systematic literature review, this paper builds a better model involving both antecedents and consequences of green intellectual capital. The model proposes that corporate social responsibility is a factor leading to green intellectual capital. Additionally, green intellectual capital leads to green innovation resulting in competitive advantage for firms. Importantly, the model acknowledges contingency theory and suggests that the relationship between corporate social responsibility and green innovation could be moderated by the extent to which a firm is visible to the general public for its activities as well as the extent to which the firm is transparent.

KEYWORDS

Competitive Advantage, Corporate Social Responsibility, Green Innovation, Green Intellectual Capital

1. INTRODUCTION

In new world of business, green consumerism and green management have turned out to be momentous issues. Customers in developed economies in particular, support eco-friendly consumption driving companies to develop environmental concerns and produce eco-friendly products, thus making green management a profitable strategy (Saha, 2017; Solvalier, 2010). Under the institutional based view, companies operating in developed and fast paced developing countries need to conduct environmental protection activities for satisfying international regulations regarding environment protection, green products, and green consumerism (Chen, 2008). In those contexts, green management and social responsibility are universal concepts for all industries and sectors. In information and communications technology (ICT) sector as well, these concerns have gained momentum. IT professionals and developers are now expected to develop the devices that are energy efficient (Pattinson, Oram, & Ross, 2011). In this connection, a new area of Green information technology (GIT) has developed. GIT is about properly using information and communication technologies to address environmental issues and attain business sustainability (Przychodzen, Gómez-Bezares, & Przychodzen, 2018). It involves making green products and devices having optimum energy related performance as well

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as causing a change in other organizational activities. For instance, for former, the examples would include virtualization and desktop power management. For the later, it could be indicated through smart buildings and virtual conferencing activities (Pattinson et al., 2011). Experts suggest that various stages in the IT life cycle carry particular environmental concerns. Molla, Abareshi, and Cooper (2014) argue that such environmental concerns could be about CO_2 emissions, energy inefficiency, and electronic waste. They added that recycling, reusing, and increasing the lifetime of IT related equipment for lowering electronic waste, decreasing paper consumption, and conserving energy could be considered pro-environmental IT practices. Use of soft data for information dissemination, relying on compact discs instead of paper, powering off the computers in idle mode, and reducing screen brightness are some of green IT practices. Technically, these environmental concerns could be addressed by companies through possession of capable resources, assets, and competences potential enough to deliver value. Scholars claim that in the current era of knowledge economy, intangible assets like intellectual capital has become a source of competitive advantage for the companies (Chang & Chen, 2012; Chen, 2008; Gupta & Raman, 2021). Organizations have learnt that other than reducing costs and creating differentiation in their products, emphasis on the human capital is important to develop and sustain competitive advantage (Preve, 2012).

A substantial volume of empirical research is available on intellectual capital, its determinants, and consequences (Baima, Forliano, Santoro, & Vrontis, 2020; Bisogno, Dumay, Rossi, & Polcini, 2018; Gupta & Raman, 2021). Importantly, in the wake of dominant issues like corporate social responsibility, green management, and green consumerism, novel construct of "green intellectual capital" suggested by Chen (2008) is gaining popularity and attention of researchers. Chang and Chen (2012) suggested that corporate social responsibility and environmental consciousness serve as determinants of green intellectual capital. Technically, an organization possessing an environment conscious culture and having proper policies for addressing corporate social responsibility would build greater green intellectual capital. Similarly, the literature review about consequences of green intellectual capital indicates that it could result in green social capital and green innovation (Delgado-Verde, Amores-Salvado, Martín-deCastro, & Navas-Lopez, 2014). This could ultimately help companies produce strong competitive advantage and high business sustainability (Chen, 2008; Huang & Kung, 2011; Nanath & Pillai, 2017; Omar, Yusoff, & Zaman, 2017; Rezaei, Izadi, Jokar, & Rezaei, 2016; Yahya, Arshad, & Kamaluddin, 2015). These findings provide basis for developing serial mediation model for green intellectual capital.

Moreover, since corporate performance, competitive advantage, and business sustainability could be determined by several factors, therefore, keeping in view nature of variables related to green intellectual capital, this study relies on contingency theory to suggest the role of moderating variables on various relationships in the model. Scholars have suggested that certain variables like stringency of regulations, environment normative level, and environmental dynamism could be possible moderators between green innovation and competitive advantage or business performance (Aguilera-Caracuel & Ortiz-de-Mandojada, 2013; Chan, Yee, Dai, & Lim, 2016). Similarly, Wu, Liu, Chin, and Zhu (2018) recently suggested that public visibility and firm transparency could moderate the relationship between corporate social responsibility and green innovation. Overall, the literature review leads to the problem statement that no previous study regarding the analyses on green intellectual capital has covered the leading mediators and moderators all together in the same research framework. Therefore, this study has developed a better and enriched conceptual model for filling this research gap and studying green intellectual capital, and has contributed to the body of knowledge through that model. An empirical test of this model would add to the understanding on antecedents and consequences of green intellectual capital in much better way compared to those of past studies. The paper presents various propositions based on review of past studies and underlying theories and guides future empirical research on green intellectual capital.

2. THE METHODOLOGY

The methodology of this study is based on systematic literature review consisting of four stages. Since the objective of the study was to develop an enriched model on green intellectual capital, therefore, the first stage started with the *search* of research papers using key terms for 'green intellectual capital' along with other relevant terms such as 'antecedents of green intellectual capital', 'consequences of green intellectual capital', 'green innovation', 'corporate social responsibility', 'moderators' etc. This was done in different steps to make sure that all of the relevant papers were searched. In the second stage, the research papers were *grouped* as conceptual/review/qualitative research or quantitative research papers. Most of the papers were quantitative as they presented their findings through empirical model testing. In the third stage, the research papers were *categorized* into categories such as antecedents of green intellectual capital, consequences of green intellectual capital, and moderating variables affecting the concerned relationships. Finally, in the last stage, the findings and arguments from those papers were *synthesized* to develop the model. Overall, the purpose of the methodology has been conceptual and qualitative consolidation of the findings across a fragmented field.

The search of papers was spread across all years on search engines including 'Science Direct', 'Emerald', 'JSTOR', 'Willey', and 'Google Scholar'. Following other researchers (Crossan & Apaydin, 2010) and keeping in view the strength of data validation and arguments, we restricted ourselves to peer-reviewed journals only. Among all research papers identified, majority of them (97%) were published during or after 2008 since the presentation of Chen's work (2008) on green intellectual capital. Table 1 includes the detail about number of total and relevant papers obtained through search.

Table 1. Detail of research papers identified

S. No.	Search Engine	Total Papers Identified	Relevant Papers
1	Science Direct	11	11
2	Emerald	70	65
3	JSTOR	16	14
4	Wiley-Blackwell Journals(since 2017)	4	4
5	Google Scholar	612	195
	Total	713	289

The next section presents critical review of past research along with the research propositions.

3. LITERATURE REVIEW

3.1 Factors Affecting Green Intellectual Capital and the Consequences of Green Intellectual Capital

Competition around the world is being influenced by an upsurge in consumer awareness about environmentalism and stricter international regulations for environmental protection (Huang & Kung, 2011). Therefore, vigilant organizations need to make proactive strategies for operating successfully in the present era (Chang & Chen, 2012; Haden, Oyler, & Humphreys, 2009). The novel construct of green intellectual capital introduced by Chen (2008) is gaining fast popularity in context of environmental and green management (Rehman, Kraus, Shah, Khanin, & Mahto, 2021). According to Chen (2008), green intellectual capital could be divided into three dimensions as

green human capital, green structural capital, and green relational capital. *Green human capital* is conceptualized at individual level. It represents employees' knowledge, skills, attitudes, capabilities, and commitments etc. for green innovation or environmental protection (Yusliza et al., 2019). *Green structural capital* is contained at organizational level. It is represented through organization level issues like organizational capabilities, culture, human resource practices, knowledge management systems, intellectual property rights, databases, and information technology systems etc. for green innovation or environmental protection (Amores-Salvado, Cruz-Gonzalez, Delgado-Verde, & Gonzalez-Masip, 2021). *Green relational capital* is addressed through organizational relationships with stakeholders for green innovation or environmental protection. It is evident through certain systems, programs, or policies established along with stakeholders like suppliers, distributors, contractors, or outsourcers for developing green components, processes, waste management systems, consumer awareness etc. (Huang & Kung, 2011). In context of resource based view, it could be argued that green intellectual capital has evolved out to be a crucial intangible asset in the current scenario. Also, in context of dynamic capabilities perspective, it could be suggested that management of green intellectual capital has become an important capability for organizations to manage for improving and sustaining their business performance (Nivlouei & Khass, 2014; Rehman et al., 2021). A recent study of Gupta and Raman (2021) done for IT and pharmaceutical firms in India revealed positive influence of intellectual capital on performance of those firms. However, more research is required on the impact of green intellectual capital on organization outcomes in IT and other sectors.

3.1.1 Corporate Social Responsibility, Green Intellectual Capital, And Green Innovation

Empirical research has attempted to suggest various antecedents and consequences of green intellectual capital. Regarding the determinants, scholars have argued that companies adopting higher levels of corporate social responsibility would be more conscious to engage themselves in environment management programs. They would take better steps to develop green intellectual capital (Astuti & Datrini, 2021; Chang & Chen, 2012; Sudibyo & Sutanto, 2020). The European Commission conceptualized CSR as an organization's voluntary actions and programs for addressing environmental and social issues as well as maintaining requisite relationships with their stakeholders in this regard (European Commission, 2001). Contemporary discussions on CSR stress over the need to develop policies for addressing all stakeholders' ethical concerns (Zompras & Siakas, 2015). Rather, a collectively worked out strategy in collaboration with all stakeholders for protecting human rights, and addressing ethical, environmental, and social issues is desired. Papasolomou-Doukakis, Krambia-Kapardis, and Katsioloudes (2005) presented stakeholder approach to corporate social responsibility wherein issues while addressing employees, community, customers, suppliers, investors, and the environmental concerns were identified. Given the nature of CSR and green intellectual capital, it could be theoretically assumed that these concepts might have a relationship. Addressing both might have a multiplier effect in terms of generating strong competitive advantage for the enterprises (Gallardo-Vázquez, Valdez-Juárez, & Lizcano-Álvarez, 2019). CSR and green intellectual capital can contribute to better legitimacy on the part of organizations as well in terms of governance, morality, managing internal workforce and conducting other business activities. The study of Jain, Vyas, and Roy (2017) which is based on sample of 384 Indian firms supported the positive effect of corporate social responsibility on the intellectual capital in those firms. Based on analysis of Taiwanese companies, study of Chang and Cheng (2012) also reported a positive effect of CSR on green intellectual capital. Additionally, environmental consciousness partially mediated the relationship between CSR and the three aspects of green intellectual capital. Another study on Pakistan based manufacturing companies also reported positive influence of environmental consciousness on the green intellectual capital (Chaudhry, Bilal, Awan, & Bashir, 2016). Furthermore, based on the study of IT professionals belonging to the Australian Computer Society (ACS), the study of Molla et al. (2014) reported that environmental concerns among the IT professionals influenced specific environmentally related behaviors.

Furthermore, as the firms actively pursuing corporate social responsibility programs could better understand the environment and successfully develop requisite technologies, they would possess greater abilities for green innovation (Qiu, Jie, Wang, & Zhao, 2020; Song, Ren, & Yu, 2019). These companies could design their offerings in compliance with the environmental preferences of their buyers and would maintain better and collaborative relationships with their component suppliers and business partners. Because these companies would likely have high environmental consciousness, they would tempt to acquire their employees' confidence on such issues and would likely indulge in upgrading their staff capabilities for green innovation (Chang & Cheng, 2012). Zhou and Cao (2019) believe that CSR is a driving factor for a company's green strategy and green innovation. Their study reports that the forces behind green innovation in a company are inspired by its resources and capabilities, government regulations, supply chain integration, and any interaction among them. Research by Song et al. (2019) based on 150 Chinese companies supports these arguments. It suggests that new green product success is influenced by corporate social responsibility by firms wherein green organizational identity and green adaptive ability mediate the relationship.

3.1.2 Green Intellectual Capital, Green Innovation, And Competitive Advantage

Regarding consequences, several scholars have suggested that green intellectual capital impacts business performance and competitive advantage of firms (Chen, 2008; Rezaei et al., 2016; Nivlouei & Khass, 2014; Yahya et al., 2015). Their studies were conducted in various contexts such as Taiwan, Iran, and Malaysia. For instance, the study of Omar et al. (2017) suggests that green intellectual capital could impact business sustainability. Competitive advantage is available to a firm when it is able to provide products or services delivering higher value to buyers in relation to competitors as well as they are difficult to be imitated (Mehmood & Zafar, 2019). The higher value offered could be in form of lower price offered in relation to competitors or uniqueness and differentiation. A recent study by Cahyono and Hakim (2020) on the effect of green intellectual capital on competitive advantage of small and medium sized enterprises (SMEs) reported the positive influence.

Critical review of studies points that green intellectual capital leads to environmental product innovation which could as a result lead to creating competitive advantage for firms (Aguilera-Caracuel & Ortiz-de-Mandojada, 2013; Avagyan, Cesaroni, & Yildirim, 2011; Delgado-Verde et al., 2014; Huang & Kung, 2011). Technically, companies pioneering in green innovation achieve 'first mover advantages' which enable them to charge premium prices thus resulting in strong competitive advantage and better performance (Aguilera-Caracuel & Ortiz-de-Mandojada, 2013). The study of Nanath and Pillai (2017) based on Indian IT firms reported that green hardware and software innovations in form of product designing, energy saving, and recycling etc. resulted in stronger competitive advantage for those firms. Building green intellectual capital is part of firm's green strategy. Its development would enable successful execution of environmental strategy because it would lead towards greater environmental knowledge (Amores-Salvado et al., 2021). This all would result in addressing green innovation in effective ways. Focusing on green innovation would normally result in greater product heterogeneity as well which would result in approaching new markets and charging premium prices. Thus, greater diversification levels would bring greater market power to such firms as well as increased competitive advantage and business sustainability (Huang & Kung, 2011).

Further, past literature discusses the link between corporate social responsibility and firm outcomes as well. For instance, scholars have suggested that corporate social responsibility could lead to better business performance, innovation, and competitive advantage (Gallardo-Vázquez et al., 2019; Porter & Kramer, 2006; Saeed & Arshad, 2012). The research of Jin and Drozdenko (2010) done for IT professionals working in the United States reported that perceived ethical attitudes and corporate social responsibility were positively associated with performance of their firms. Without doubt, post-modern enterprises need to effectively handle social and environmental concerns for getting sustainable competitive advantage (Soewarno, Tjahjadi, & Fithrianti, 2019). Regarding CSR, firms are normally required to achieve a balance however. A firm that constantly offers environmental

friendly products and invests substantial money in doing that might threaten its own sustainability. Alternatively, a commercial firm that neglects social responsibility and loses focus on environmental issues might lose its buyers' confidence and fail to retain or attract new customers. Overall, firms that are competent enough to address social and environmental issues and achieve balance in that build better repute in environmental performance which is normally connected to strong competitive advantage (Huang & Kung, 2011). Implementation of CSR programs results into numerous benefits for firms. For instance, it could result into judicious use of raw material, inputs and components, waste reduction, reduced costs and high differentiation. All these would result into greater buyer value resulting in strong competitive advantage (Chuang & Huang, 2018). Several evidences exist about the positive impact of CSR on competitive advantage. For instance, the study of Jain et al. (2017) on Indian SMEs concluded that CSR positively influenced competitive advantage of those firms. Another study on Spanish firms reported that CSR contributed towards organizations' competitiveness through intellectual capital. A recent study by Nirino, Ferraris, Miglietta, and Invernizzi (2020) based on 345 European firms reported significant effect of corporate social responsibility on competitive advantage of those firms with partial mediation of intellectual capital. Hence, on the basis of above arguments a proposition for serial mediation of green intellectual capital is proposed as:

Proposition 1: Corporate social responsibility positively affects firms' competitive advantage through serial mediation effect of green intellectual capital and green innovation.

3.2 Moderating Effect of Public Visibility and Firm Transparency on the relationship between Corporate Social Responsibility and Green Innovation

The arguments concerning the relationships between green intellectual capital, CSR, green innovation, and competitive advantage as well as the proposition involving serial mediation effect have been presented in the previous section. This study acknowledges contingency theory of management. It adopts the point of view that the proposed serial mediation of green intellectual capital and green innovation between CSR and competitive advantage is not free of external factors' impacts. Certain moderators might play their roles in the relationships. Some previous scholars also adopted similar perspective (Cahyono & Hakim, 2020; Cao & Wang, 2015; Wu et al., 2018). For instance, Cao and Wang (2015) pointed that the moderating effect of environmental dynamism on the relationship between intellectual capital or innovation capabilities and performance had often been neglected. Therefore, based the on study of Chinese high tech firms, they performed the analysis and reported that environmental dynamism moderated the association between relational capital, structural capital, innovation capabilities and firms' operational performance. Additionally, it moderated the relationship between structural capital and firms' financial performance.

We conducted a systematic review of literature regarding possible moderating variables based on comprehensive search for such moderators or contingency variables. We filtered some of those variables and finally suggest certain moderators based on their relevancy, previous scholars' justifications, and the moderators' underlying logic concerning the link with the main variables and theories. This section talks about those moderating roles.

At first step, we propose that the relationship between corporate social responsibility and green innovation might be moderated by public visibility and firm transparency. Wu et al. (2018) also adopted a similar point of view. Greater public visibility would mean that firm's actions are more prominent and visible to all the stakeholders. Stakeholder theory (Freeman, 2001) acknowledges the importance, relationships and influence of different types of stakeholders for an organization. In context of stakeholder theory and conceptualization of public visibility, it could be safely assumed that organizations with higher public visibility could be in greater social pressure to be socially more responsible and make programs to bring green innovations. Campbell and Slack (2006) suggested that public visibility could be an important influence on certain corporate behaviors and outcomes.

In their study of large FTSE 100 firms over 1988-2002 time period, they revealed that companies with high public visibility gave higher charities compared to ones with low public visibility. Erfle and McMillan (1990) suggested that firms use differential pricing under different conditions of visibility. In their study of oil companies operating in US, they provided support for regulatory threat hypothesis in context of late 1970's oil crisis. They suggested that visible companies hold down price increases in more visible markets. For politically sensitive products, politically visible companies do not increase their prices compared to their counterparts. This seems understandable as visible companies are keen to maintain their brand repute and positive image being responsible corporate citizens among societal stakeholders. In their study of Chinese firms, Wu et al. (2018) have concluded that public visibility moderates the relationship between green corporate social responsibility and innovation performance. Previous scholars have suggested that under different levels of public visibility, one can expect different sort of corporate behavior and CSR efforts from companies (Campbell & Slack, 2006; Erfle & McMillan, 1990). Specifically, firms with high public visibility have greater exposure and opportunities to develop networks and relationships with multiple stakeholders to collect green knowledge, information, financial and political support. This in turn could convert CSR efforts into higher level of green innovation as well (Wu et al., 2018). Thus, this study puts forward following proposition:

Proposition 2: Public visibility moderates relationship between corporate social responsibility and green innovation.

Firm transparency is basically stakeholder perception about the degree to which an organization's operations and conduct is clear and its matters regarding stakeholders are undisguised (Dapko, 2012). It's about perceived quality of information shared by an organization at international level (Schnackenberg & Tomlinson, 2016). Transparency could actually be more critical and important to address for companies engaged in CSR. CSR efforts are intended to build positive corporate image and posture to provide an organization sustainable competitive advantage as well. An organization sincerely sharing its information about its activities, operations, policies, and processes might build higher public trust and confidence. Under this condition, its CSR efforts could get well noticed and mechanisms and conditions could be set for actually addressing green innovation through those CSR efforts.

Other than reporting for public visibility as moderator, the study of Wu et al. (2018) also tested for moderating effect of firm transparency and reported that it moderated the relationship between green corporate social responsibility and innovation performance. They also argued that a more transparent firm can effectively exchange knowledge, build trust and relationships with stakeholders. Therefore, the reduction of information gap between the organization and its stakeholders would bring green innovation as an effective outcome of its CSR initiatives. Dubbink, Graafland, and Van Liedekerke (2008) argued that transparency was a necessary condition for the implementation of CSR policy and stress that there is actually a need for CSR transparency. Importantly, they add that highly transparent firms could well explain and defend their standing on CSR against low transparent firms. This, in fact, provides them strong motivation and incentives to address product and process innovations. On the basis of these arguments, the following proposition is suggested:

Proposition 3: Firm transparency moderates relationship between corporate social responsibility and green innovation.

3.3 Moderating Effect of Environmental Dynamism and Stringency of Regulations on the relationship between Green Innovation and Competitive Advantage

It has been earlier argued that green product and process innovation would enable organizations attain strong competitive advantages and better performance (Aguilera-Caracuel & Ortiz-de-Mandojada, 2013; Huang & Li, 2017). However, the pressures to adopt environment strategy and address green innovations could be different for organizations operating in different environments. Compared to less competitive environments, organizations operating in environments characterized by tough competition and changing external forces need to struggle more in innovativeness and find new ways to create competitive advantages. Environmental dynamism is about unpredictability and speed of change in an organization's environment. It is normally characterized by rise and fall in product demand, supply of materials, changes in customer priorities, and technological changes and breakthroughs etc. (Chan et al., 2016; Eroglu & Hofer, 2014). Chan et al. (2016) argue that in dynamic environments, product life cycles could be short and processes depleted too early. Therefore, this dynamism could provide a motivation to maintain competitive advantages by constantly focusing on green innovation. Others argue that high level of turbulence in an organization's environment would drive innovation by providing the organization with more 'cues' for innovation (Rangus, Drnovšek, Di Minin, & Spithoven, 2017; Ting, Wang, & Wang, 2012). Scholars also argue that in highly turbulent environments, constant innovation by firms can result into creation of dynamic capabilities which could provide competitive advantage (Jiao, Alon, & Cui, 2011; Lawson & Samson, 2001). Chan et al. (2016), in their study on Chinese firms belonging to multiple sectors, provided empirical evidence on the moderating effect of environmental dynamism on the relationship between green product innovation and cost efficiency as well as firm profitability. The arguments therefore, support presentation of following proposition:

Proposition 4: Environmental dynamism moderates relationship between green innovation and competitive advantage.

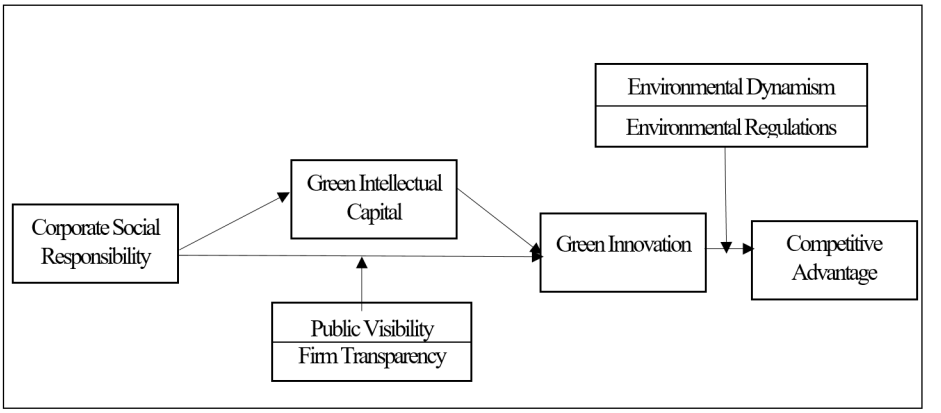
It has been argued earlier that the environmental concerns at the national levels (see Chen, 2008; Huang & Kung, 2011) have important implications for organizations. They have triggered a need for those in developed countries and fast paced developing economies to deliberate on environment strategies and CSR. Under the prevailing scenarios on green management, it is plausible to suggest that green innovation and competitive advantage relationship would be fostered under stricter regulations.

Previous scholars have argued that effect of environmental regulations must be acknowledged with reference to institutional theory. Further, under these regulations, organizations are motivated to go greener and industries are driven towards greater innovations for being more productive and efficient (Aguilera-Caracuel & Ortiz-de-Mandojada, 2013; Lim & Prakash, 2014). In their study of various companies belonging to Europe, North American, and Asia, Aguilera-Caracuel and Ortiz-de-Mandojada (2013) found that stringency of regulations played significant moderating role on the relationship between green innovation and financial performance. It could be argued that a firm's strategic choices, technological developments and innovations for creating competitive advantages would be influenced by environmental regulations (Lim & Prakash, 2014). Regarding information technology sector, Mishra, Akman, and Mishra (2014) suggested that pressure of regulations could be one of the main catalysts behind Green IT adoption. Hence, stricter would be the regulations on environment protection, a stronger relationship between green innovation and competitive advantage could develop. It is because green innovation could be seen more meaningful in those conditions. In light of these, following proposition is developed:

Proposition 5: Environmental regulation moderates relationship between green innovation and competitive advantage.

On the basis of the discussions made in section 3, following model of green intellectual capital is presented (figure 1).

Figure 1. The model for green intellectual capital



4. CONCLUSION AND RESEARCH IMPLICATIONS

This study has presented a model of green intellectual capital including its antecedents and consequences. Specifically, the model proposes that organizations working to develop their green intellectual capital would come up with higher level of green innovation that would result in stronger competitive advantage for them. Moreover, it suggests that organizations with higher level of corporate social responsibility would be able to create or develop higher levels of green intellectual capital. Hence, the model proposes that from the perspective of green management, corporate social responsibility affects competitive advantage of firms wherein green intellectual capital and green innovation act as serial mediators. Further, the systematic literature review enables this study to suggest contingency model regarding the effect of certain moderating variables. The model, therefore, proposes that public visibility and firm transparency could act as probable moderators on the relationship between corporate social responsibility and green innovation. Similarly, the model proposes that environmental dynamism and environmental regulations might act as possible moderators for the relationship between green innovation and competitive advantage of firms.

The model is principally inspired from the work of Chen (2008) and Chang and Chen (2012). The study also acknowledges the work of other scholars (Huang & Kung, 2011; Delgado-Verde et al., 2014) in related areas such as green innovation for improving the model. The model expresses better predictive power as it acknowledges the role of moderating variables for the relationships. A test of this model would add to theories on intellectual capital, corporate social responsibility, resource based view, dynamic capabilities perspective, and contingency theory; and particularly to the field of green management and green intellectual capital. Human capital is recognized as the most important resource in any organization (Sohrabi, Vanani, & Abedin, 2018). Therefore, a test of this model would add to the understanding on benefits of managing human capital of an enterprise under green strategy and from the lens of corporate social responsibility. A lot of research is available on CSR behaviors and attitudes of marketing professionals, but there is not much research on this topic with respect to IT professionals (Jin & Drozdenko, 2010). These professionals are indeed required to handle IT related environmental problems, develop solutions which could benefit humankind, as well as work for green initiatives taken by their organizations for environmental sustainability (Molla

et al., 2014). Since limited research is available on green IT (Asadi, Hussin, & Dahlan, 2017; Mishra et al., 2014), so testing this framework in context of ICT sector would provide insight about how IT professionals are playing their roles for their organizations' competitive advantage. It would provide better understandings about how corporate social responsibility programs implemented by ICT companies enable creation of green intellectual capital and human capital among IT professionals. Additionally, it would inform about the nature of green innovation in ICT firms as well as creation of competitive advantage by those firms by focusing on CSR and green intellectual capital.

Furthermore, the model could effectively be tested in context of developed countries and fast paced developing countries where sufficient stakeholder and corporate level awareness exists about CSR, green products, and green consumerism. Also, the model could be tested better in contexts where policies and regulations regarding ICT companies at the national level and industry level exist to drive corporate policy making towards considering these environmental issues. Cross country comparisons could also be conducted to contribute to country wise listing on the basis of green management and related concepts. This model testing would, however, encompass challenging steps. This might be in form of searching for the right context, approaching IT professionals, collection of primary or secondary nature of data for variables at the same time, and selection of valid instruments or proxies to measure the variables. The nature and type of data available across different countries could also be different. Notwithstanding, a test of this model would provide valuable information for the managers and strategists of companies concerned as well as it would provide useful information for policy makers at national levels regarding relevant issues.

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