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RESEARCH ARTICLE

Intellectual capital, financial resources, and green supply chain management as predictors of financial and environmental performance

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Abstract

This research examines the influence of intellectual capital on financial and environmental performance with a mediating role of green supply chain management and a moderating role of financial resources. Structural model estimation was conducted on the data set of 324 Pakistani manufacturing SMEs and showed that intellectual capital significantly encourages green supply chain management as well as significantly contributes to financial and environmental performance. Green supply chain management partially mediates the relationship between intellectual capital and performance both the financial and environmental. Financial resources significantly strengthen the relationship between intellectual capital and green supply chain management. In light of the results, we suggest that firms should encourage intellectuality among their managers and employees to adopt green practices that can improve their financial and environmental performance. In addition, it is also suggested for managers and CEOs to effectively manage financial resources that are necessary for green practices.

Keywords Intellectual capital · Financial resources · Green supply chain management · Financial performance · Environmental performance · SMEs

Introduction

Green supply chain management (GSCM) has become a central focus of businesses either small, medium, or large due to institutional pressure and environmental regulations (Dias et al. 2019; Knight et al. 2019). GSCM does not only improve the environmental performance of firms but also significantly enhances financial performance (Longoni and Cagliano 2018). These dual benefits of the GSCM make it an important strategy for the organization, and thus, all the firms irrespective of their business have emphasized the adoption of GSCM (Ahmed and Najmi 2018). However, SMEs seem to be reluctant to participate in green initiatives, due to many reasons (Santoro et al. 2018). Literature has introduced several reasons for the lack of interest of SMEs in GSCM such as lack of financial resources (Aigbedo 2019), poor assistance (Saade et al. 2019), and lack of their impact on the overall environment such as their small sizes (Teixeira et al. 2016). In general, due to scarce resources, SMEs prefer less costly means to perform their operational activities. For this mission, management intellectuality significantly matters to effectively utilize resources for maximum benefits. However, it is still not acknowledged how top managers' intellectual capital stimulates GSCM that in turn can contribute to the environmental and financial performance of the firms. It is also evident from the existing literature that for the green management practices to be more effective, they need sufficient resources (Aigbedo 2019), but still very rare studies have been conducted to

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examine the causal linkages between the financial resources and the green management practices initiated by the firms. This research fills the gap and examines the influence of intellectual capital on GSCM with a moderating role of financial resources and mediating role of GSCM between intellectual capital and financial performance as well as between intellectual capital and environmental performance.

There is a great desire seen in SMEs for green management practices in addition to conventional practices, which can be attributed to several reasons. For instance, Seok et al. (2012) argued that industries focus on environmental, sustainability, and green practices because certain practices are very crucial for high performance and competitiveness (Ahmed and Najmi 2018). The natural tendency of the organizations to adopt certain practices is the results of their ultimate objectives, i.e., survival and growth. Firms mimic other successful firms in the industry, which they consider to be successful in their domain, in order to be successful. The small firms' decision-making and the rationalization of their decision are different from the large firms; therefore, it is hard to generalize the rationalities behind the decisions to adopt green management practices from the large firms to the small firms. Their objectives are different from large firms and tend to adopt green management practices due to the increasing environmental and competitive pressure (Seok et al. 2012). This move has been caused for gaining sustainable competitive advantage and a long-term survival (Sellitto and Hermann 2019). For instance, studies such as Longoni and Cagliano (2018) argued that sustainability practices and CSR practices are very essential for high environmental and financial performance. Hence, our research is a useful attempt to unleash how SMEs can configure green practices to sustain their performance. It motivates SMEs to use resources (intellectual capital and finance) for the adoption of lean practices.

The objective of this research is to examine the importance of intellectual capital in persuading firms to adopt GSCM that in turn builds financial and environmental performance. In addition, we also examine the boundary conditions for the relationships between intellectual capital and GSCM in the context of financial resources. The findings of this research are imperative for managers/owners of SMEs by unearthing the association between the GSCM and the financial performance of the firms, which is the main objective of the firms. This research encourages them to adopt green initiatives and CSR practices by utilizing finance efficiently. The implications of this research are very important for practicing managers and responsible authorities who aim to improve environmental and financial performance. Considering the theoretical importance of the research, this research draws on the Resource-Based View (RBV) theory that prioritizes and highlights the importance of both the tangible and intangible resources in competitiveness and high performance (Barney 1991). RBV theory is the relevant theoretical framework that identifies CSR and environmental practices as important precursors of the competitive advantage of the firms (Jaffar Abbas et al. 2019; Chege and Wang 2020). In this research, intellectual capital being an intangible resource and financial resource as tangible resources can configure environmental and green practices. This research validates the arguments of RBV theory through empirical evidence collected from the SMEs sector of one of the emerging economies, such as Pakistan.

Literature review

Intellectual capital and firm performance

According to Stewart (2010), intellectual capital is the bunch of knowledge, experience, and information that can be possessed by individuals and institutions, thereby making it a source of competitive advantage over the competitors. There are several dimensions associated with intellectual capital such as relational capital, structural capital, organization capital, social capital, customer capital, and human capital (Farhadi et al. 2009; Liu 2017). However, the majority of the studies favor the three important dimensions: customer capital, human capital, and relational capital. Nevertheless, intellectual capital is one of the most important activities of enterprises that influence internal process and reporting systems of an organization that is aligned with cost-effectiveness (De Villiers and Sharma 2017b). According to the RBV of the firms, intellectual capital is considered a crucial factor for creating a competitive advantage for firms.

Intellectual capital is considered to be very crucial for the firms which can influence the financial as well as the non-financial performance of the firm. In the first step, the intellectual capital affects the internal processes and the financial reporting system of the firm, which are connected to the profitability and competitiveness of firms (De Villiers and Sharma 2017a, 2017b). As argued in the RBV theory, intellectual capital has been considered one of the most important intangible resources of firms that makes the firms more competitive vis-a-vis its competitors (Barney 1991). In a competitive atmosphere, ventures face tough competition and external pressures and respond to these pressures; they respond by developing intellectual capital in the form of human capital, structural capital, and relational capital which facilitate the integration of other resources to holistically give the firms a competitive advantage over their competitors (Sharabati et al. 2010a; Sharabati et al. 2010b).

Considering the current competitive business world where every firm is competing for scarce resources, intellectual capital is of utmost importance for the firms to achieve and maintain sustainability. Most of the organizations invest money in sustainability practices as they intend to send a positive

message to the stakeholders and public; it can also help them in gaining their social and profitable objectives (Golicic and Smith 2013) (Podsakoff et al. 1997). However, SMEs face a shortage of resources which hinders their participation in environmentally friendly activities (Chege and Wang 2020; Khattak 2020). Therefore, most of the SMEs prefer intellectual capital to perform environmental and sustainability practices as it requires less investment and has been considered less costly (Khan et al. 2019b). For instance, Tonial et al. (2019) argued that intellectual capital management significantly facilitates sustainability practices. Similarly, Yong et al. (2019) also revealed that each dimension of green intellectual capital is significantly related to sustainability environmental and sustainability practices. They further stated that organizations need to emphasize green intellectual capital as it enables them in gaining sustainable competitive advantage and also helps them achieve their environmental objectives as part of the CSR activities, which are the important predictor of the financial performance of the firms. To summarize, intellectual capital has been considered one of the best strategies of gaining financial and environmental performance in SMEs (Jardon and Dasilva 2017; G. Li et al. 2020). Drawing on these arguments in the light of the resource base view theory, we hypothesize our first hypothesis as follows:

H_1: Intellectual capital significantly affects the financial performance of SMEs in Pakistan.
H_2: Intellectual capital significantly affects the environmental performance of SMEs in Pakistan.

Intellectual capital, GSCM, and firm performance

The RBV of the firms also emphasizes the social capital of the firms, which are in the form of the social contribution of the firms. The environmentally friendly management practices are also considered an important factor of social capital. Considering the significant importance of environmentally friendly management practices, many industries have started to regularize green activities to achieve their larger goals (Ilyas et al. 2020; Yusmani Mohd Yusoff et al. 2018). Specifically, intangible abilities are used to perform sustainable practices concerning product and process ((Bontis et al. 2009). Intellectual capital exists in all organizations in one form or the other, such as stock of knowledge, information, relationship, and capability that are used to create values (Y. Li et al. 2019). The knowledge, skills, and experience possessed by the individuals are different forms of intellectual capital. The organizational capabilities are really important in the internalization of these intellectual resources which are possessed by the individuals both in the tacit as well as explicit forms. Firms develop different knowledge management and knowledge retention programs to retain knowledge within the firm when an individual leaves the organization. Once achieved, it is a major source of organizational competitiveness. It also encompasses several groups of interconnected knowledge and information that facilitate green and CSR activities to predict high performance. It also spurs CSR and environmental initiatives to achieve organizational objectives (Jardon and Dasilva 2017; Ullah et al. 2017). According to Barney (1991), firms should have both tangible and intangible resources to compete in the market and gain superior performance. However, recent studies have claimed that intangible resources are more appropriate and beneficial for business ventures as compared to tangible when they come to practice environmental processes (Memon et al. 2020). Green activities and CSR can be accessed through external knowledge management (e.g., IC) (Jawad Abbas and Sağsan 2019) that results high performance, corporate reputation, and sustainable objectives (Musibah and Alfattani 2014). Favoring the notion, studies have mentioned that intellectual capital plays an important role in spurring green activities and CSR that result in performance (Barnett 2007; McWilliams et al. 2006). Frey et al. (2009) examined the relationship between intellectual capital and CSR. They revealed that different dimensions of intellectual capital are very crucial for CSR activities in the current era that also provide benefits of profitability. Additionally, Razafindrambinina and Kariodimedjo (2011) favored the notion by examining the role of each dimension of intellectual capital in CSR. Indeed in the SME sector, the dimensions of intellectual capital are very vital for GSCM (Akhtar et al. 2015; Yusmazida Mohd Yusoff et al. 2019) because they contribute to financial and environmental performance. Similarly, other studies have also favored that the different dimensions of intellectual capital lead to green activities (Yong et al. 2019; Yusliza et al. 2020) resulting in high performance.

Intellectual capital enables enterprises to achieve economic growth and a competitive position in the market by practicing social and economic activities while contributing back to society (Huang et al. 2014). An enterprise that emphasizes intellectual capital can easily create green products and can perform green activities effectively. This in turn contributes to their reputation, competitive advantage and performance (Koonmee et al. 2010). The relationship between intellectual capital and sustainability is not so complex nowadays. Because of the high interest and desire of managers in intellectual capital, there have been logical results displaying significant consequences (Massaro et al. (2018). It is also argued that the interaction of intellectual capital and sustainability develops the customer reputation, image, and trust and can help firms in developing markets (Pedrini 2007). Intellectual capital supports sustainable innovation and environmental initiatives that contribute to a sustainable competitive advantage (Chang and Chen 2012). Additionally, intellectual capital assists firms in the adoption of environmental technology,

environmental programs, and initiatives that can boost the environmental process (López-Gamero et al. 2011). Intellectual capital motivates stakeholders and employees towards green initiative, green practices, and green processes that help in solving environmental problems and gaining organizational objectives (Claver-Cortés et al. 2007; Seow et al. 2006). Jardon and Dasilva (2017) revealed that in the context of SMEs, the dimensions of intellectual capital indirectly contribute to performance and environmental outcomes through promoting CSR and green concerns. Torugsa et al. (2012) and González-Rodríguez et al. (2015) also argued that intellectual capital is significantly related to corporate social responsibility and green practices that are performed to gain high performance and environmental goals; therefore, our next hypothesis is as follow:

- H_3: *Intellectual capital contributes to GSCM practices in SMEs in Pakistan.*
- H_4: *GSCM practices mediate the relationship between intellectual capital and the financial performance of the SMEs in Pakistan.*
- H_5: *GSCM practices mediate the relationship between intellectual capital and environmental performance of SMEs in Pakistan.*

GSCM and firm performance

Even though several studies have shown a great interest in assessing the relationship between environment and sustainability practices and profitability, the connection is not consistent, claiming no clear direction, e.g., positive, significant, direct, or indirect (Golicic and Smith 2013). Given these contradictory results about these practices and profitability, it is generally argued that GSCM practices improve the environmental performance of organizations. These practices do not need to improve the financial performance of a firm (Green et al. 2012). Most of the recent studies have demonstrated that green activities significantly contribute to the financial performance of firms (Jawaad and Zafar 2020; Namagembe et al. 2019). For instance, Zhang and Wang (2014) showed that green practices have a positive association with cost reduction by reducing different types of costs and purchase expenditure. These cost reductions are reflected in the high performance of these firms. Additionally, a meta-analysis of 20 years of research conducted by Golicic and Smith (2013) reveals that GSCM practices are significantly related to market and operational performance. Similarly, Cucciella et al. (2012) also empirically showed that green and environmental practices improve the efficiency of management, create knowledge, and configure internal processes that in turn enhance sustainable competitive and financial performance. These results are also supported by studies conducted in other organizational settings, particularly the positive relationship between environmental activities and financial and environmental performance of firms (Rao and Holt 2005; Yang et al. 2013; Zhu et al. 2013). The studies also showed that enterprises use GSCM practices improve their financial as well as environmental performance (Khan et al. 2019a; Micheli et al. 2020; Wong et al. 2020). It is argued that managers use GSCM strategy to enhance their position in the markets over other firms in terms of profitability and performance (Hansmann and Claudia 2001). GSCM has been considered one of the significant drivers of performance and success of firms (Green et al. 2012; Zailani et al. 2012).To summarize, the implementation of GSCM practices helps organizations to achieve the dual objectives of environmental and financial performance in the organizations (Green et al. 2012). Drawing on these results exhibited by the existing studies, it is also expected that the firms in Pakistan also achieve high levels of financial and environmental performance through these GSCM practices; therefore, we hypothesize our next hypothesis as follows:

H_6: GSCM practices contribute to the financial performance of SMEs in Pakistan.
H_7: GSCM practices contribute to the environmental performance of SMEs in Pakistan.

Financial resources as a moderator

The results of the previous studies showed contradictory results concerning the association between green management practices and organizational performance, which are partially attributed to the organizational willingness to internalize these green management practices. The willingness of the firms to adopt these practices largely depends on the availability of the financial resources to implement green management practices. Similarly, intellectual capital is also a significant driver of green practices and environmental activities. However, in addition to IC, financial resources are very crucial for environmental and green activities (Marín-Vinuesa et al. 2020; Memon et al. 2020). Green and environmentally friendly management practices need sufficient finance. Ventures with a lack of finances are unable to implement green management activities (Ruggiero and Cupertino 2018). Firms compare cost and benefit while practicing green practices and remanufacturing (Peng et al. 2020; Xu et al. 2020).

It is also argued that most SMEs are reluctant to adopt and participate in GSCM activities due to their poor financial resources (Tong et al. 2020). It reveals that financial resources are very vital for environmental and green initiatives. Firms need sufficient financial resources and strength to gain high performance in environmental and green activities (Artiach et al. 2010). Studies such as Clarkson et al. (2011) and

Cormier and Magnan (1999) empirically demonstrated that the financial conditions of a firm have a significant relationship between CSR involvement and green practices. It encourages managers to promote and participate in green activities considering the long-term positive outcomes of these management practices. Managers with intellectual capital prefer to participate in green activities. However, adequate financial resources further motivate them towards environmental and green activities (Milgrom 2002; Reverte 2009). In the case of SMEs, it is indeed logical that intellectual capital improves green activities but mere intellectual capital is not sufficient. Managers need adequate finance to effectively perform green practices (Hasan and Habib 2017; Jan et al. 2019). Managers use their competencies and skills to reduce different types of social and environmental costs, and it reveals that financial sufficiency is the key to environmental initiatives (Venieris et al. 2015). To summarize, we argue that the dimensions of intellectual capital are indeed vital for GSCM practices, but in fact, financial resources are needed to configure the relationship and efficiently perform green activities. We also expect that the firms with strong financial status are more likely to participate and capitalize on the green management activities as compared to the firms with weak financial status. Therefore, we hypothesize as follows:

> *H_8: Firms with strong financial status are more likely to participate and capitalize (the role of intellectual capital) on the GSCM as compared to the firms with weak financial status.*

Figure 1 displays the research model.

Methodology

Sample and data

This research followed a deductive approach to test the existing theory of RBV quantitatively. To do so, we used a cross-sectional data set collected from SMEs operating in the major cities of Pakistan, namely, Islamabad, Rawalpindi, and Peshawar. We obtained lists of registered firms from the relevant chambers of commerce and industry, such as we approached Islamabad chamber of commerce and industry (ICCI), Rawalpindi chamber of commerce and industry (RCCI), and *Sarhad* chamber of commerce and industry (SCCI). The lists contain firms from different domains, such as manufacturing, trading, and services sectors. However, we emphasized those firms who are engaged in manufacturing processes, because of their interest and motivation in green activities. Moreover, we selected SMEs because of two major reasons. First, there is little evidence concerning green and environmental practices in SMEs, especially in Pakistan. Similarly, we are motivated by the current trend of research and society's demand for persuading green and environmental activities in business industries. Second, as mentioned earlier that scarce resources hinder SMEs from practicing environmental and social activities. We aim to attribute factors that help SMEs in building environmental and green culture.

We used a hard copy approach for collecting data as an email survey provides a lower response rate. We requested top managers to participate in the survey as they are more aware of their business activities, strategic planning, and performance. Since SMEs do not want to disclose their financial information to the general public, we ensured in the cover letter of the questionnaire that the data of this survey are used only for research purposes and the firms' information will be kept confidential. The ethical committee of the Hamdard Institute of Management approved the questionnaire for data collection. It was mentioned in the survey for the respondents that the survey is volunteers, rather than obligatory. After the distribution of 900 questionnaires (300 questionnaires in Islamabad, 300 in Rawalpindi, and 300 in Peshawar), we received 351 questionnaires after 2 months. After exclusion of the incomplete and inappropriate responses, we got a total of 324 useable responses with a response rate of 36%. The description of the firms that participated in this study are given in Table 1:

Measurement of variables

Intellectual capital indicates the intangible capabilities of a firm such as knowledge, information, and relationship that are used to create values. To measure this construct, we

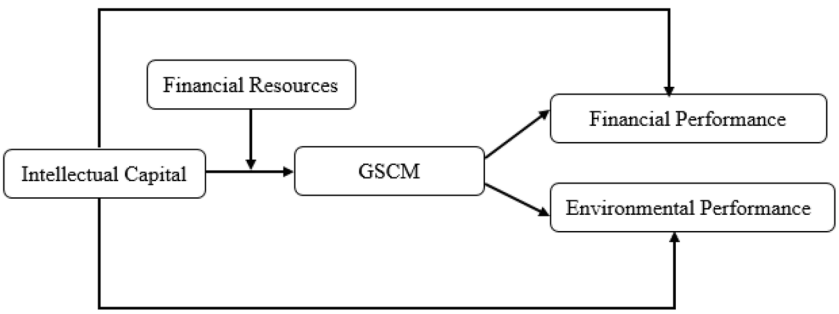

Fig. 1 Research model

Table 1 Frequency

Description	Frequency	Percentage
Industry		
1. Steel firms	111	34.3
2. Marble firms	143	44.1
3. Plastic firms	70	21.6
Size of firms		
1. 20–50 employees	69	21.3
2. 51–100	55	17.0
3. 101–150	84	25.9
4. 151–200	71	21.9
5. 201–250	45	13.9
Age of firms		
1. 10 years and less	105	32.4
2. 11–20 years	93	28.7
3. 21 and above years	126	38.9
Educational status		
1. Intermediate and below	74	22.8
2. Bachelor	97	29.9
3. Master	119	36.7
4. PhD etc.	34	10.5
Total	324	100

adopted 6 items tool from the study conducted by Khan et al. (2019a). *Financial resources* are conceptualized as the financial strengths and capacity of a firm that should be used for operational activities. We adopted a 6 items tool to measure the financial resources of the firms (G. Li et al. 2020). *GSCM* is conceptualized by several dimensions of GSCM practices such as eco-innovation, eco-design, and green products. However, to avoid elusive paths and fragmented results, we used GSCM as a single measure and used 7-item tool adopted from Chu et al. (2017). The *financial performance* of the SMEs was measured through the self-reported items because the objective data about the financial performance of the firms were not available. We used 6 items where managers/owners were asked to rate their venture performance based on return on equity, return on assets, return on investment, etc. as compared to their major competitors. In the present study, 6 items were used to measure financial performance, validated by Anwar (2018). Five options are given showing strongly declined (1) and strongly improved (5). *Environmental performance* was also measured through self-reported items where SMEs were asked about their environmental progress, contribution, and safety. We used 5 items taken from the previous study (Memon et al. 2020). All these variables (except financial performance) were measured using 5 points Likert scale ranging from *strongly disagree* = 1 to *strongly agree* = 5.

Descriptive statistics

The descriptive statistics are provided in the Table 2, which shows the mean, standard deviation, and normality statistics of the data. We confirmed the normality of the data as skewness, and kurtosis values were in the threshold values of $\pm$ 2 (George 2011).

Correlation

The results of the correlation matrix are provided in the Table 3 below. We found a significant positive relationship between intellectual capital and financial performance ($r = 0.335$, $p < 0.01$), between intellectual capital and environmental performance ($r = 0.330$, $p < 0.01$), and between intellectual capital and GSCM ($r = 0.373$, $p < 0.01$). GSCM has a significant positive relationship with financial performance ($r = 0.460$, $p < 0.01$) and with environmental performance ($r = 0.320$, $p < 0.01$). The results show no multicollinearity issue as the correlation coefficients were less than 0.80.

A cross-sectional data set can be affected by common method bias (Podsakoff and Organ 1986); therefore, we applied Harmon's one-factor test in SPSS using principal components as an extraction method to see the presence of the common method bias. The results extracted 5 factors based on the eigenvalues, and out of these five factors, the first factor exhibited only 25.050% variation which is less than 50%. Hence, we confirmed the absence of common method bias in the data set used in this research.

Confirmatory factor analysis

Standardized factor loadings of the items, convergent validity, and discriminant validity were tested in the measurement model using AMOS (Table 4). The measurement model showed acceptable values of the model fits as CMIN/DF = 0.007, GFI = 0.87, AGFI = 0.94, NFI = 0.88, TLI = 0.93, RMR = 0.017, and RMSEA = 0.056 as per the recommendation of Hair (2010) and Hu and Bentler (1999). Convergent validity requires the AVEs to be greater than 0.50, and for all the constructs used in this study, the AVEs are greater than this threshold value, which provides acceptable results as suggested by Hu and Bentler (1999), and we achieved this cutoff. Discriminant validity is established if the square root of the construct's AVE is greater than its correlation with other constructs. In addition, composite reliability was tested that provided a value greater than 0.70 which confirmed the reliability of the factors (Nunnally and Bernstein 1994).

Table 2 Descriptive statistics

Variables	Mean	Std. deviation	Skewness	Kurtosis
Intellectual capital	2.5277	0.30527	− 0.155	1.336
Financial resource	3.5747	0.51529	− 0.565	0.135
GSCM	3.8730	0.44259	− 0.167	− 0.509
Financial performance	3.3328	0.42127	− 0.407	1.978
Environmental performance	2.2693	0.29799	− 1.083	1.399

Structural model

In structural model 1 (see Fig. 2), we tested the mediating role of GSCM between intellectual capital and financial performance as well as intellectual capital and environmental performance. The results show that intellectual capital has a significant influence on financial performance ($\beta = 0.180$, $p < 0.05$) and environmental performance ($\beta = 0.219$, $p < 0.05$); therefore, the results supported H_1 and H_2 of the study. Intellectual capital also significantly contributes to GSCM ($\beta = 0.373$, $p < 0.05$) which favored H_3. The indirect effects of intellectual capital on financial performance ($\beta = 0.133$, $p < 0.05$) and environmental performance ($\beta = 0.070$, $p < 0.05$) are significant, and the direct effects of intellectual capital on financial and environmental are also significant that partially supported H4 and H5. Additionally, GSCM significantly influences financial performance ($\beta = 0.356$, $p < 0.05$) and environmental performance ($\beta = 0.187$, $p < 0.05$) which supported H_6 and H_7. In the control variables, only size has a significant effect on financial performance, while age and size have a significant effect on the environmental performance of the firms. R square values of these models show that the variables explain 24% variation in financial performance and 19% variation in environmental performance (Table 5).

Structural model 2 (moderation)

We tested the moderation in the second structural model (see Fig. 3). In this step, we also conducted the SEM, and the corresponding structural model is provided in the figure below. We tested the moderating role of financial resources between intellectual capital and GSCM. The results showed that financial resources significantly moderate the relationship between intellectual capital and GSCM ($\beta = 0.080$, $p < 0.05$) that supported H_8. R square shows that 16% variation is explained in GSCM after the inclusion of the financial resources as a moderating variable (Table 6).

Discussion

The objectives of this study were to examine the association between the intellectual capital, financial resources, GSCM, and the performance of the firm in the context of the RBV theory of the firms. To test the theory, this research evaluated the importance of intellectual capital and financial resources in GSCM and the performance (financial and environmental) in SMEs. Previous studies have attempted the importance of intellectual capital in a firm's performance, but attention is given to developed economies and large firms (Bayraktaroglu et al. 2019; Clarke et al. 2011), while SMEs from emerging economies have rarely been debated in this perspective. Moreover, considering the RBV theory, the majority of the studies have tested the role of intellectual capital and financial resources in organization outcomes and performance (Khan et al. 2019b; (Memon et al. 2020), while rare attention is given to the environmental and green practices. Our research endorses the recent studies which have described

Table 3 Correlations

Variables	1	2	3	4	5	6	7	8
1. Size	1							
2. Age	0.104	1						
3. Education	0.179**	0.022	1					
4. Intellectual Capital	0.116*	0.174**	0.111*	1				
5. Financial Resources	0.107	− 0.060	0.089	− 0.080	1			
6. GSCM	0.191**	0.168**	0.171**	0.373**	0.224**	1		
7. Financial per	0.279**	0.122*	0.170**	0.335**	0.038	0.460**	1	
8.Environmental per	0.201**	0.261**	0.109	0.330**	−0.038	0.320**	0.199**	1

*Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed)

Table 4 Factor Loadings, validity, and reliability

Factors and items	Estimate	AVE	√AVE	C.R
Intellectual capital		0.52	0.72	0.86
ic6	0.57***			
ic5	0.87***			
ic4	0.63***			
ic3	0.61***			
ic2	0.79***			
ic1	0.80***			
GSCM		0.52	0.72	0.88
gscm7	0.89***			
gscm6	0.80***			
gscm5	0.62***			
gscm4	0.69***			
gscm3	0.61***			
gscm2	0.61***			
gscm1	0.77***			
Financial resources		0.65	0.81	0.92
fr6	0.90***			
fr5	0.87***			
fr4	0.86***			
fr3	0.76***			
fr2	0.71***			
fr1	0.73***			
Financial performance		0.57	0.75	0.89
fp6	0.74***			
fp5	0.76***			
fp4	0.72***			
fp3	0.65***			
fp2	0.82***			
fp1	0.81***			
Environmental performance		0.63	0.80	0.89
env5	0.55***			
env4	0.89***			
env3	0.83***			
env2	0.85***			
env1	0.81***			

AVE average variance extracted, *C.R.* composite reliability. ***Significant ($p < 0.001$)

the theme of RBV theory in environmental activities (Betts et al. 2018; Lucas and Noordewier 2016). Our research advances the existing knowledge concerning intellectual capital and financial resources in green practices in the context of the RBV theory. To summarize, our research supports the RBV theory and suggests that intellectual capital and financial resources are important predictors of green practices—resulting in financial and environmental performance.

The results showed that intellectual capital significantly improves financial and environmental performance. Our finding match Yong et al. (2019) who scrutinized that managers utilize intellectual capital to configure and practice environmental activities. Moreover, Jardon and Dasilva (2017) also stated that in the current era, managers need intellectual capital to boost their sustainability performance and environmental initiatives. Similarly, our findings favor Khan et al. (2019b) who demonstrated that intellectual capital is one of the significant, less risky, less expensive, and convenient strategies of SMEs to achieve superior performance, particularly in emerging markets where the SMEs are facing financial hardships. It is also evident in the results that those firms having high intellectual capital enjoy higher performance as compared to those firms having poor IC.

The results also suggest that intellectual capital significantly improved GSCM practices in SMEs which supported the proposed hypothesized relationship. As stated earlier that SMEs use intellectual capital to perform environmental and green activities (Yusmazida Mohd Yusoff et al. 2019), our findings support the recent study of Yusliza et al. (2020) who described that SMEs in emerging economies prefer intellectual capital to adopt green practices instead of emphasizing other means and resources. Furthermore, the results also revealed that GSCM practices partially mediate the path between intellectual capital and financial-environmental performance. These findings are related to Ilyas et al. (2020) who scrutinized a partial mediating role of GSCM practices between top management support and environmental activities in emerging SMEs. However, our findings are not fully aligned with Agarwal et al. (2018) who claimed that internal imputes of an organization first configure GSCM practices which in turn enhance organization outcomes. Additionally our findings also slightly favor Zaid et al. (2018) who resulted in GSCM as a mediator between green human resources management and sustainable performance.

It is also shown in these results that financial resources significantly strengthened the path between intellectual capital and GSCM practices in SMEs. Indeed, due to a lack of financial strength, many SMEs are reluctant to take part in environmental activities (Massoud et al. 2010). On the other hand, ventures with sufficient financial resources are more likely to adopt environmental initiatives. Our findings are consistent with Marín-Vinuesa et al. (2020) who revealed that ventures with sufficient financial resources prefer to invest in eco-innovation and green practices. Our findings also favor Memon et al. (2020) who claimed that financial availability enables SMEs to find useful opportunities that may result in high environmental performance.

Implications for practice

This research has come up with several significant implications to encourage and facilitate policymakers, practitioners,

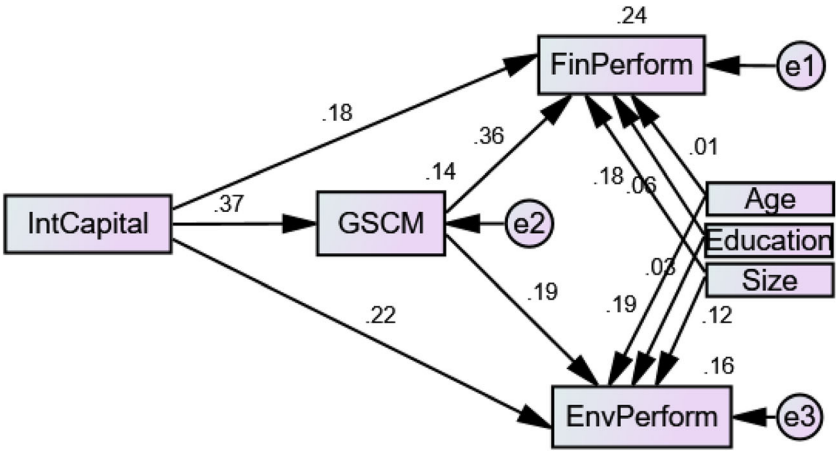

Fig. 2 Structural model (mediation)

and top managers of business organizations operating in emerging and developing economies. This research confirmed that intellectual capital is a significant factor of high financial performance and environmental practices. Managers with high intellectual capabilities practice GSCM that in turn limbs financial and environmental performance. Institutional pressure and environmental issues have compelled firms to adopt GSCM practices. Managers need to understand the importance of GSCM in the current business era, particularly where there is more competition for the available resources in the market. The insights of this research give a new way to the managers in the adoption of GSCM and the improvement of financial and environmental performance. For instance, IC—being a less expensive and less costly resource—can facilitate managers to encourage and promote GSCM that in turn can configure performance. Indeed, intellectual managers will be able to practice green, but they need adequate finance for environmental and green initiatives. As pointed out by Ruggiero and Cupertino (2018) that environmental practices need adequate finance and support, SMEs often do not actively engage in environmental practices due to lack of finance. Therefore, managers should carefully establish their financial strategy to support GSCM. This research confirms that GSCM practices partially mediate the relationship between intellectual capital and financial performance as well as between intellectual capital and environmental performance. Managers should keep one eye on GSCM and one on financial and environmental practices. However, they need to build an effective strategy for financial resources as the resources significantly strengthen the relationship between intellectual capital and GSCM. The insights of this research are not only limited to SMEs, but large and listed firms in emerging as well as in developed economies can get equal benefits. Besides, policymakers and governments also need to support (financially) the industrial sector in minimizing carbon costs and maximizing green and lean practices (Xu et al. 2018).

Conclusion

Nowadays, green and environmental practices can be traced in every organization irrespective of their size and nature of operational activities. Steered by current research trends and society's demand of practicing green

Table 5 Hypotheses testing (mediation)

Hypotheses	Direct effects (*p*)	Indirect effects (*p*)	Total effects (*p*)
Fin performance ←IC	0.180 (0.005)	0.133(0.000)	0.313 (0.001)
Env performance ←IC	0.219 (0.001)	0.070(0.001)	0.289 (0.001)
GSCM ←IC	0.373 (0.001)	–	0.373 (0.001)
Fin performance ←GSCM	0.356 (0.001)	–	0.356 (0.001)
Env performance ←GSCM	0.187 (0.002)	–	0.187 (0.002)
Fin performance ←age	0.014 (0.778)	–	0.014 (0.778)
Fin performance ←education	0.060 (0.217)	–	0.060 (0.217)
Fin performance ←size	0.185 (0.002)	–	0.185 (0.002)
Fin performance ←age	0.185 (0.001)	–	0.185 (0.001)
Fin performance ←education	0.029 (0.526)	–	0.029 (0.526)
Fin performance ←size	0.121 (0.028)	–	0.121 (0.028)

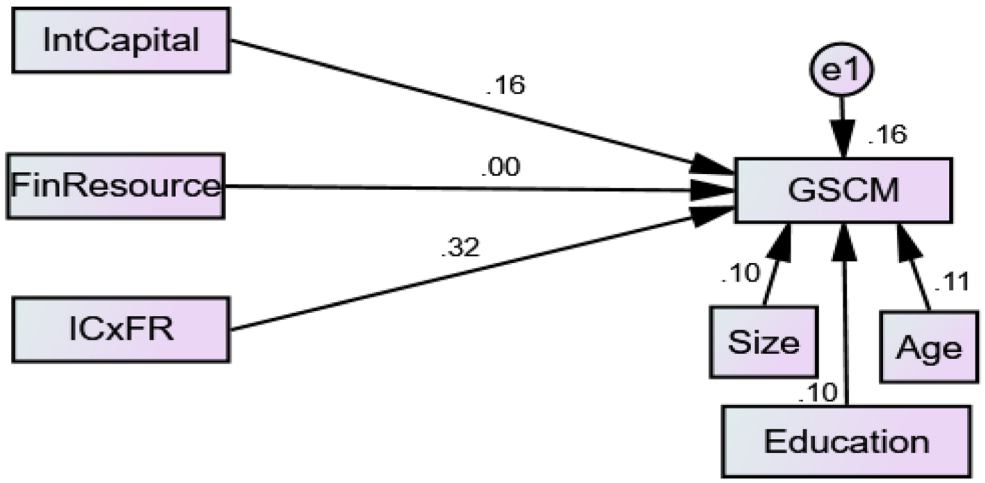

Fig. 3 Structural model 2 (moderation)

activities in the business sector, this research focused on SMEs to unleash how intellectual capital contributes to their performance (financial and environmental) with the mediating role of GSCM and the moderating role of financial resources. We used survey data of 324 Pakistani SMEs from the manufacturing sector. We found that intellectual capital significantly contributes to GSCM as well as significantly affected the financial and environmental performance of SMEs in Pakistan. GSCM partially mediates the relationship between intellectual capital and performance both financial as well as environmental. Financial resources significantly strengthen the relationship between intellectual capital and GSCM. This research endorses that enterprises should embolden intellectuality among their managers/employees to adopt green practices that can constitute a financial and environmental performance.

Limitations and future suggestions

This research has discussed several significant implications for business organizations to implement GSCM that in turn can improve financial and environmental performance. However, the research is not free of a few limitations that can be overcome by future researchers. The first limitation of this research lies in data. For instance, cross-sectional data are criticized for being lack of validity due to common method bias. However, our data collection design claimed a pseudo causality, by collecting the data on the independent variables before the data collected about the dependent variable. This temporal precedence of the independent variables over the dependent variables suggests that the higher the value of the independent variable would be reflected in the high value of the dependent variable. However, this is not the replacement of the true causality between the variables. Therefore, future researchers are advised to use longitudinal data to generate useful insights. Additionally, interviews with a few managers and entrepreneurs can provide unexplored evidence. Second, this research relied on the emerging market of Pakistan that may not be an effective representative of other emerging and developed economies. Future researchers can conduct a comparative study between other emerging and developed to enhance the validity of the model. Fourth, this research tested the importance of intellectual capital in GSCM and financial and environmental performance. However, other features of top managers can also help in the adoption of GSCM that have not been considered in this research. For instance, Yong et al. (2019) argued that intellectual capital promotes green human resource management practices. It will be better to test the mediating role of green human resource management in the existing model to explore how intellectual managers enhance performance through green human practices. We tested the influence of intellectual capital instead of considering each dimension of intellectual capital such as human capital, structural capital, and relational capital. Future researchers are advised to include these dimensions to unleash a clear picture. Other factors such as psychological, supportive, and pressure aspects can be considered if they can encourage or promote GSCM towards high performance.

Table 6 Hypothesis testing (moderation)

Hypothesis			Estimate	S.E.	C.R.	*p*
GSCM	<---	Intellectual capital	0.221	0.070	3.132	0.002
GSCM	<---	Financial Resource	0.002	0.042	0.039	0.969
GSCM	<---	IC × FR	0.080	0.013	6.173	0.000
GSCM	<---	Size	0.032	0.016	1.989	0.047
GSCM	<---	Age	0.056	0.025	2.200	0.028
GSCM	<---	Education	0.043	0.023	1.912	0.056

IC intellectual capital, *FR* financial resources

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Authors' contributions Najib Ullah Khan worked on the model and literature. Muhammad Anwar has written a theoretical framework and methodology and analyzed the data. Li Shuangjie revised the draft. Muhammad Sualeh Khattak has done the data collection and data entry.

Data availability Some restrictions are applied to the data used in the results (tables and figures). Hence, it can be gained by sending a request to the email address: anwar.msfin@iiu.edu.pk.

Compliance with ethical standards

Competing interests The authors declare that they have no competing interests.

Ethics approval and consent to participate The ethical committee of the Hamdard Institute of Management approved the questionnaire for data collection. It was mentioned in the survey for the respondents that the survey is volunteers, rather than obligatory.

Consent for publication Not applicable.

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