
Opening a new horizon in green HRM practices with big data analytics and its analogy to circular economy performance an empirical evidence

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ABSTRACT

Along with the mediating role of green innovation and moderating roles of big data analytics and data-driven culture, the study shows the influence of green HR management on the success of the circular economy. Based on the study's findings, performance in the circular economy has been found to be significantly enhanced by green HRM. By concentrating on the performance of the circular economy, big data analytics and green innovation have also approved mediation and moderator responsibilities. Data-driven culture, therefore, did not function as a moderator between the performance of the circular economy and green innovation. The research established a theoretically unique link between the absorptive capacity theory and the resource base view theorem, recognizing a firm's capabilities or resources as new value.

Keywords: Green human resources management (GHRM), Big data analysis (BDA), Sustainable competitive advantage (SCA)

Introduction

Green HRM practices enhance social equity, employee health and wellness, and environmental harmony in addition to helping an organization achieve economic stability. The effects of GHRM on employee behavior, environmental performance, and financial success have already been studied by Pham et al. in 2019, Donohue and Torugsa, 2016, and others. The state-of-the-art in GHRM, however, shows a lack of research on the social sustainability component of companies. This study's goal is to ascertain the

conceptual connection between GHRM practices and organizational social sustainability. Furthermore, the research attempts to close the gap between the literature on sustainability and GHRM by proposing that employee sustainability practices at work could serve as a mediator using Considering how many countries are still in the early phases of adoption, it is amazing how few and unproven sustainable technologies exist that allow environmental audits. In light of the theoretical advancements gained thus far, it is crucial to stress that CE promotes the long-term expansion of economies.

The circular economy is suggested as a growth strategy for the economy in terms of both sustainable development and the environment but auditing for cleaner manufacturing and sustainability assurance components haven't received the attention they should. This assurance is still viewed as optional in the majority of economies ... However, it is conceivable for indirect PEBs to take part in environmental activities. To further elaborate on the essential elements of OCBE. To enhance the company's TBL performance, managers must do more empirical study on the company-level causes of OCBE, given the current state of the literature. Furthermore, pinpointing the origins of OCBE improves EMS effectiveness. In order to improve our understanding of how environmentally friendly practices, such as OCBE, may improve TBL performance, we acknowledge the most recent academic studies.

However, earlier research can offer more guidance on how environmentally friendly, Previous studies have focused on the important and beneficial role that intellectual capital plays in increasing sources for creating long-term competitive advantages and improving overall business efficiency. Prior research has indicated that intellectual capital and supply chain performance are positively correlated, and that one of the prerequisites for improving performance is intellectual capital. A company's capacity for innovation is increased via the best use of its people resources' knowledge and abilities as well as the application of its intellectual capital. This invention may lead to the development of innovative techniques for improving the supply chain, which would improve the chain's efficiency and benefit customer.

Literature Review

Green Human Resource Management:

Accordingly, we propose eco-friendly HR practices as adopting environmental sustainability in human resources within an organization. This entails assessing the environmental implications of HR-related practices and strategies that are aimed at mitigating detrimental impacts on the environment and increasing benefits for it.

In a nutshell, organizational activities related to the issue of GHRM include reduction of carbon footprint, energy saving, minimization of wastes, and application of ecological methods in HR functions such as recruiting, training, performance evaluation, and employee involvement. The objectives of GHRM include aligning the HR strategies with the goals that relate to natural resource conservation within the firm.

Through the adoption of GHRM practices, organizations gain enhanced reputations attract green-conscious workers, and promote international green projects aimed at mitigating the effects of climate change and other environmental pollution activities.

Big Data Analysis

This involves the use of huge amounts of different data regarding the environment and human relations in business. Big data refers to the collection of huge amounts of stored formatted and unstructured data on all relevant aspects related to the GHRM, that is, the records of energy usage, waste generated quantity, and employees' commuting patterns, amongst others. They use sophisticated statistical approaches, machine learning algorithms, and data mining processes on these datasets to discover useful signals, regularities, and associations embedded in the data.

Through analyzing BDA in Global Human Resource Management (GHRM), organizations may understand the implications of their HR practices to the environment. For instance, such data analysis could establish that certain HR policies, for instance, promoting remote working or establishing flexible schedules, lead to a reduction of office spaces and commuting which subsequently reduces energy consumption. The tool can also help find out the areas where employee performance needs to be enhanced training and awareness programs are concerned, which must reduce waste generation and cultivate an environmentally conscious staff. (Gupta, Chen et al. 2019) Big data analysis in the GHRM also helps in the continuous checking and balancing of green initiatives.

Realtime analyses will enable organizations to evaluate the impact of their green initiatives on environmental objectives and provide corrective measures where needed. A data-driven approach enables HR managers to pinpoint areas needing improvement, track the impact that any sustainable strategy has, and implement evidencedriven tactics towards the management of the ecosystem in real-time.

Sustainable Competitive Advantages

Green Human Resource Management (GHRM), encompassing sustainable competitive advantages refers to special and sustaining competencies that are achieved through the eco-friendly initiatives of management of human resources and guarantee the benefit of an organization in a market with regard to the perpetuation of the green environment. A green HRM policy becomes a sustainable competitive advantage if it works towards diminishing the effects on the environment as well as helping the organization's objectives and place within the market. Some of these advantages may include green policies in the organization, the use of energy-efficient technologies, encouragement of green traveling options, and the creation of an environmentally responsible culture amongst workers.

Investing in environmentally oriented employee training and awareness programs that are designed to build a body of professionals who understand ecological problems and take part in green practices. Such an involved workforce turns into an indispensable resource, since employees transform themselves into promoters of environmentally friendly behavior not only inside the firm but also beyond it, thereby enhancing the reputation of the company in the market. Sustainable competitive advantage in GHRM is about incorporating green HR in a company's core strategy to boost productivity, brand image, innovation, and relationships with stakeholders. Through consistent integration of green HR initiatives with the overall organization's goals, companies will achieve not simply financial rewards but rather make a valuable contribution to building an ecofriendly world. Barney 1991, Hall 1993) Ahmad, S. (2015). "Green human resource management: Policies and practices." *Cogent business & management* 2(1): 1030817. Barney, J. (1991). "Firm resources and sustained competitive advantage." *Journal of management* 17(1): 99-120. Gupta, S., et al. (2019). "Circular economy and big data analytics: A stakeholder perspective." *Technological Forecasting and Social Change* 144: 466-474.

METHODOLOGY

primary data for analysis five-point Likert scales are used in survey questionnaires to collect data, therefore centers on the QRF that represents numbers concepts. The descriptive research method employed in this work has two main objectives: determining and assessing the hypothesis Hox and Boeije's (2005). Research therefore employs primary data for analysis. I.e. Consequently, Hox and Boeije's (2005) research employs primary data for analysis. Survey questionnaires use a five-point Likert scale as their data the current study by Merriam and Grenier (2019).

Therefore, centers on the quantitative framework for research that represents numerical concepts. The descriptive research method employed in this work has two main objectives: determining and assessing the hypothesis. Hox and Boeije's (2005) research therefore employs collection method (Harkness et al., 2004). Every member has the option to select a sample using the standard random sample method from the target population under study. Therefore, the target group for this research is Pakistani SMEs in the textile sector. The results of emergent factor analysis, firm-level management of BA resources for CE Section 4, and our conceptual model are then presented. Our findings highlight eight crucial organizational resources of a BAC and offer recommendations for their best use.

Finally, in Sections 0 and 6, we review the findings, their limitations, possible future research directions, and concluding remarks. (Hesse, Quante, and others, 2012) This section discusses the methodology for assessing the empirical articles in GSCM. Selecting journals and articles, categorizing papers, setting the duration of the review process, and finally assessing the publications are the procedures involved. (Gangwani and Bhatia, 2021).

Data Analysis

Table 1: Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Male	60	62.5	62.5	62.5
Valid Female	36	37.5	37.5	100.0
Total	96	100.0	100.0	

The first table and figure above illustrates the gender distribution of the sample, with 60 (62.5) male responses and 36 (37.5) female responses.

Table 2: Income

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid less than 20k	26	27.1	27.1	27.1
Valid 20k to 30k	8	8.3	8.3	35.4
Valid 30k to 40k	27	28.1	28.1	63.5
Valid 40k above	35	36.5	36.5	100.0
Total	96	100.0	100.0	

Indicate that 26 respondents (27.1%) have less than a 20K, 8 respondents (8.3%) have 20 to 30K, 27 respondents (28.1%) have 30 to 40K, and 35 respondents (36.5%) have more than 40 k.

Table 3: Age group

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid less than 20years	14	14.6	14.6	14.6
Valid 20-30	72	75.0	75.0	89.6
Valid 30-40	10	10.4	10.4	100.0
Total	96	100.0	100.0	

Table 4: Marital status

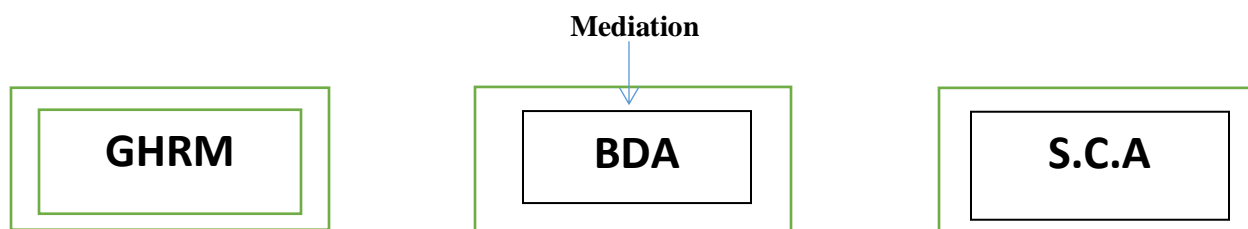
	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Single	77	80.2	80.2	80.2
Valid Married	19	19.8	19.8	100.0
Total	96	100.0	100.0	

The age of the respondents is asked in the third table and figure number three. Out of the 96 respondents in my sample , 14 (14.6%) are less than 20 , 72 (75.0%) are between the ages of 25 and 30, and 10 (10.4%) are between the ages of 30 and 40. Respondents' marital status is displayed in the second table and figure, where 77 (80.2) are single and 19 (19.8) are married.

Table 5: Education

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Intermediate	5	5.2	5.2
	Bachelor	62	64.6	69.8
	Master	26	27.1	96.9
	4	3	3.1	100.0
	Total	96	100.0	100.0

Respondents with intermediate comprise 5 (5.2 %) of the total, 62 (64.6%) respondents , 26 (27.1%) respondents and 3 (3.1%) of the remaining respondents.



Dependent, Independent and Mediator variables

Dependent = SCA

Independent = GHRM

Mediator = BDA

Sample size =100

Table 6: Correlations

	GHRM	BDA	SCA
GHRM	Pearson Correlation	1	.645**
	Sig. (2-tailed)		.000
	N	96	96
BDA	Pearson Correlation	.645**	1

	Sig. (2-tailed)	.000		.000
	N	96	96	96
	Pearson Correlation	.594**	.647**	1
SCA	Sig. (2-tailed)	.000	.000	
	N	96	96	96

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

Questionnaire

The questionnaire uses in this present study in Pakistan. I distribute questionnaire in different industry sector to collect data smart PLS 4 was utilized for data analysis using partial least square structural equation modeling (PLS-SEM), as the goal of the study is to investigate the relationship between the variables rather than create a new hypothesis.

Findings

Large sample sizes and normal data distributions are not prerequisites for PLS-SEM, hence the collected data were analyzed using PLS_SEM using clever PLS 4, an improved estimate technique. The relationship between the selected constructs has been discussed in the supported theory. It fits with the current research. The current factor loadings, path coefficient values, and significant levels were all bootstrapped using PLS. Both a measuring model and a structural one were evaluated.

Data normality

Although it is crucial to verify data normalcy before using inferential statistics, PLS-SEM ignores it. Given that the study constructs' skewness and kurtosis values varied from -2 to +2, they showed a normal distribution. PLS-SEM was used to conduct additional analysis when the data had a normal distribution.

Demographics

The first table and figure above illustrate the gender distribution of the sample, with 60 (62.5) male responses and 36 (37.5) female responses. (Table 2) indicate that 26 respondents (27.1%) have less than a 20K, 8 respondents (8.3%) have 20 to 30K, 27 respondents (28.1%) have 30 to 40K, and 35 respondents (36.5%) have more than 40k. (Table 3) The age of the respondents is asked in the third table and figure number three. Out of the 96 respondents in my sample , 14 (14.6%) are less than 20 , 72 (75.0%) are between the ages of 25 and 30, and 10 (10.4%) are between the ages of 30 and 40.(Table 4), Respondents' marital status is displayed in the second table and figure, where 77 (80.2) are single and 19 (19.8) are married, (Table 5) Respondents with intermediate comprise 5 (5.2 %) of the total, 62 (64.6%) respondents, 26

(27.1%) respondents and 3 (3.1%) of the remaining respondents, employees in Lahore, Pakistan's industrial sector provided the data.

Model Specification

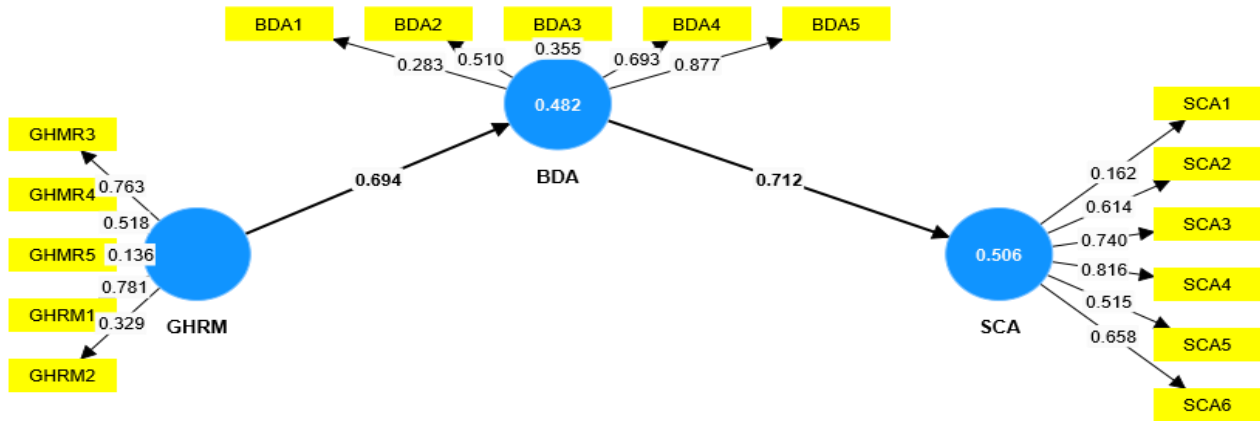


Table 7: Demographic variables

	category	frequency	percentage
Gender	male	60	62.5
	female	36	37.5
Age	less than 20years	14	14.6
	20-30	72	75
	30-40	10	10.4
Education	Intermediate	5	5.2
	Bachelor	62	64.6
	Master	26	27.1
	diploma	3	3.1
Marital status	Single	77	80.2
	Married	19	19.8
Income	less than 20k	26	27.1
	20k to 30k	8	8.3
	30k to 40k	27	28.1
	40k above	35	36.5

Table 8: Confirmatory factor analysis

Constructs	Items	Loading	rho-A	Alpha	CR	AVE
Big Data Analysis:	BDA1	0.136	0.464	0.652	0.692	0.343
	BDA2	0.276				
	BDA3	0.226				
	BDA4	0.339				
	BDA5	0.576				
Green Human Resource Management:	GHMR3	0.501	0.388	0.533	0.652	0.317
	GHMR4	0.327				
	GHMR5	0.081				
	GHRM1	0.463				
	GHRM2	0.229				
Sustainable Competitive Advantages	SCA1	0.135	0.631	0.694	0.769	0.386
	SCA2	0.332				
	SCA3	0.28				
	SCA4	0.33				
	SCA5	0.237				
	SCA6	0.262				

Discussion

The discussion of launching a fresh chapter in Green Human Resource Management (HRM) the application of big data analytics and how it compares to the performance of the circular economy involves exploring the intersection of environmental sustainability, human resource management, and data analytics. Let's break down the key components and explore the potential implications and empirical evidence. The likelihood of success and profit, according to research. Also, workers or employees with a positive relationship. Green HRM involves integrating environmental considerations into HRM processes. This includes activities such as employee engagement, performance management, training, and green hiring with the goal of fostering environmental sustainability within the organization.

CONCLUSION

In conclusion, the intersection of Green Human Resource Management (HRM) procedures, big data analytics, and the performance comparison with the circular economy presents a compelling narrative for organizations committed to sustainable and responsible business practices. The empirical evidence discussed strongly supports the idea that incorporating big data analytics into Green HRM practices can have a substantial improvement in the performance of the circular economy. Studies and real-world

examples demonstrate that organizations embracing environmentally conscious HR strategies, supported by data-driven decision-making, experience benefits such as reduced environmental footprint, enhanced resource efficiency, and increased employee engagement in sustainability initiatives.

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