



Green Product Introduction: The Ultimate Challenge for Sustainable Business

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ABSTRACT The promotion of green products in organizations is essential for corporate sustainability. The review indicates introducing green practices results in multifarious benefits. Thus, the objective of the study was to investigate the influence of green product introduction on environmental performance and the mediating role of green product introduction between CSR and environmental performance. A survey was conducted among employees and 527 clean responses were analyzed. The model fit indices, composite reliability, discriminant validity and average variance extracted was calculated to establish the robustness of the model. The results indicated the presence of significant positive relationship among the three study variables. Also it was found that green product introduction partially mediates the relationship between CSR and environmental performance. The study highlighted the important role played by green products along with Corporate Social Responsibility (CSR) in improving the environmental performance. A longitudinal study can be undertaken for future research.

INTRODUCTION

Green products are defined as those that are energy efficient, durable with low maintenance requirements. They are often made of recycled materials, and/or using renewable energy for sustainability. Deciding on sustainable green products is a conscious decision, organization need to take since unwarranted consumption exerts pressure on the environment (Laureti and Benedetti 2018). Of course, choosing such green products has its own challenges. It calls for a change in the mindset and lifestyle of people. Baskentli et al. (2019) have studied the role of CSR from consumer point of view using moral foundations theory. They have empirically established that consumer company identification plays a dominant role in pro-company behaviors. This indicates that consumer's identify themselves very strongly with the company implementing CSR initiatives.

Conversely, corporate social responsibility is what businesses take in hand to ensure their commitment to society by undertaking philanthropic activities. Arena et al. (2019) have analyzed the dynamic consequences of implementing CSR strategies in organizations using data collected from three organizations in Italy. In the initial days, it was voluntary. Over the years, it is expected of organizations to contribute to society and share their expertise and it has moved from a voluntary to a legal nature in some countries. The stakeholder's theory of CSR state that CSR is taken up to fulfill their intangible needs (Sweeney 2009) while social contract theory highlights its need from an ethical and political standpoint (Mordi et al. 2012). This highlights the importance of organizations in contributing to societal development which will, in turn, is expected to compel organizations to adopt green technology (Dunne et al. 2016) through its eco-friendly production and products. Hence this presumption leads to the first research question: will such adoption of CSR initiatives in the organization have a relation on the introduction of green products by the organization?

Researchers have established that the adoption of CSR initiatives in the organization will lead to performance. In today's context, environmental performance is what is most important from a sustainable business view point (Boiral and Paille 2012). Hence the research question raised is: will

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the adoption of CSR initiatives in the organization have a relation on the environmental performance?

The development of green products and successful marketing of the same is a challenge being faced by many organizations. Introduction of green products calls for a different marketing style and investment. Does this extra effort result in additional outcome for the organization is what business is scratching their head for? This has led to the third research question: Will green products mediate the relationship between the adoption of CSR initiatives in the organization and environmental performance?

Objectives

The objectives of this research work were to examine the relationship between the adoption of CSR initiatives in the organization with green product introduction and environmental performance and to determine the mediating role of green product introduction between the two study variables namely the adoption of CSR initiatives and environmental performance.

Literature Review

A detailed review of the literature was carried out on the relationship existing between the three study variables namely CSR, green products and environmental performance to arrive at a conceptual model.

CSR and Green Products

Most of the studies focusing on factors internal to the organization ignore how the firm's voluntary initiatives contribute to the introduction of green products within the organization. Will the adoption of CSR initiatives by the organization cause any ripple within the organization because of the stakeholder's impalpable pressure on one hand and employees' righteous nature on the other hand to follow green practices in the workplace? From the review of literature, it was found that researchers (Gordon et al. 2012; McDonald and Young 2012) have highlighted how CSR activities such as community engagement, accountability towards stakeholders, contribution to community development and wellbeing in plantation management helps in creating environment

concern within the organization and adoption of emission abatement strategies.

Furthermore, Thiel (2016) states that for sustainable business it is essential to adopt CSR. Rousseau and Vranken (2013) investigate how the objective information about labelling in organic food products influence customers' willingness-to-pay. The findings indicate that organizations have a critical role in providing correct information about green production processes. Stakeholders' are critically watching the organization and its functioning. They are very supportive if businesses are environment-friendly.

Lagoudis and Shakri (2015) have developed a model to measure the carbon emissions across transportation and distribution network in an organization. They have highlighted how CSR initiatives taken up by the organization influences the reduction in carbon emissions within the organization. This indicates the influencing role of stakeholders in making organizations to adopt the best practices. This impels one to expect that the adoption of CSR initiatives by the organization will influence the introduction of green products within the organization.

To substantiate this argument, Hens et al. (2018) have stated that it is necessary for post-modern companies involved in community development to provide for a greener environment at the workplace. They stress that CSR initiatives will lead to cleaner production within the organization. This indicates that there could be a relationship existing between the adoption of CSR initiatives by the organization and the introduction of green products. This resulted in hypothesizing that

H₁: The adoption of CSR initiatives will have a positive relationship with introduction of green products

Green Products and Environmental Performance

The review of the literature indicated exhaustive research has been carried out between green product, green business and environmental performance.

Porter and van der Linde (1995) stated that firms can become more competitive through innovations and environmental management practices. Organizations can bring in innovation within

the organization through its green practices. Chen and Burns (2006) have empirically tested and found that regulations put in pressure to achieve environmental performance while innovation converts such pressure in a positive manner to achieve environmental performance. It is hence inferred that introducing green practices can be a positive strategy, organizations can adopt which will result in better environmental performance. To substantiate this argument, research carried out by Chan et al. (2016) indicated the presence of a positive relationship between green product innovation, environmental regulations' pressure and firm performance (in terms of cost efficiency and firm profitability). This led to the conjecture that since green product innovation has led to the firm's performance, similarly, green product introduction may have a positive relationship with environmental performance.

Caniato et al. (2012) present the results of case-based research aimed at three factors: drivers that push companies to adopt green practices, practices that improve environmental sustainability and environmental key performance indicators (KPI) in fashion supply chains while Guoyou et al. (2013) consider green innovation is one principle that can be used to improve a firms' environment management thus reducing the environmental burdens using technological, societal, institutional or organizational mechanisms. Laosirihongthong et al. (2013) have found that green purchasing is related to environmental performance. In all the three studies, it is found that green practices contribute to environmental performance. Green practices involve green processes and products. It is hence expected that introduction of green products in the organization may lead to higher environmental performance.

Though all the above research indicates there is scope for a positive relationship to exist between the introduction of green products and environmental performance, results to the contrary were also found in the literature. Carvalho et al. (2017) state that there are some management practices categorized as green or lean that result in negative effects on the environmental and economic performance of the companies. They have hence proposed a strategic framework to support the design of eco-efficient supply chains. Though many researchers have indicated a positive relationship to exist between green practices, green

innovation, and environmental management, yet the existence of the relationship seems debatable. To confirm the relationship, it led to the formulation of the following hypothesis

H₂: The introduction of green products will have a positive relationship with environmental performance

CSR and Environmental Performance

Though extensive research has been carried out on investigating the relationship between CSR and firm performance as well as between CSR and financial performance, the review of the literature indicated scant research investigating the relationship between CSR and environmental performance, especially among the business sector. The research work carried out in this domain is presented.

Wang et al. (2018) have examined the relationship between CSR practices and CSR performance and financial performance in China. Similarly Phillips et al. (2019) have investigated the relationship between CSR and various other dimensions namely leadership, culture, satisfaction and CSR performance and financial performance. They have highlighted the importance of promoting CSR initiatives both externally and internally for improving the performance in terms of both CSR performance and financial performance. Gallardo-Vázquez and Sanchez-Hernandez (2014) have found the relationship between the various dimensions of CSR – social, economic and environmental with performance and competitive success. The mediating effect of firm's performance was examined between the two variables. A positive relationship was found between the environmental dimension of CSR and organizational performance. Khojastehpour and Shams (2019) have examined the role of CSR in environmental context. The study posits that there is pressure from the society when multiple stakeholders are involved which leads to increased value parameters within organizational context especially from an ecological point of view. Bucur et al. (2019) have found a positive relationship between CSR and environmental protection. The research by Sidhoum and Serra (2017) investigated the relationship between CSR with various dimensions of performance-environment, social, economic and governance among US electric utilities. They

found a positive relationship between CSR and environmental performance. This confirmed the hypothesis which was being proposed in this research. To the contrary, Sila and Cek (2017) in their research while examining the relationship between the dimensions of CSR and performance found a weak relationship to exist between CSR and environmental performance. To confirm the relationship between the adoption of CSR initiatives in the organization and its environmental performance the following hypothesis was posited.

H₃: The adoption of CSR initiatives in the organization will have a positive relationship with environmental performance

Mediating Role Green Products between CSR and Environmental Performance

The review of the literature indicated that very scant research has been carried out to investigate the mediating role of green products. However mediation role of green supply chain management practices has been carried out by a few researchers (Hajmohammad et al. 2013; Zhu et al. 2012). To address this research gap, it was proposed to study the mediating role of green products between CSR and environmental performance. This led to the hypothesis

H₄: Green products mediate the relationship between the adoption of CSR initiatives in the organization and environmental performance

METHODOLOGY

The conceptual model used to test the above mentioned hypotheses are given in Figure 1.

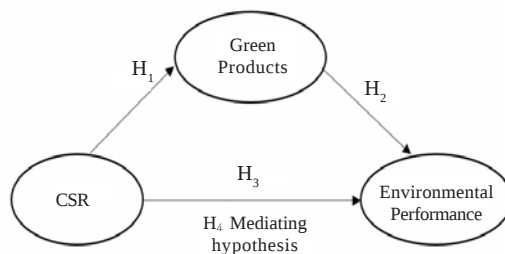


Fig. 1. Conceptual model

Scale

The scale used to measure the three study variables are : CSR - 12 item scale from Tian and Robertson (2019) with 3 dimensions to measure social and non-social stakeholders, customers and government; Green products - 4 item scale from González-Benito and González-Benito (2005, 2006); Environmental performance - 5 item scale from Zhu et al. (2007).

Sample and Data Collection

A questionnaire comprising of 21 items (Appendix 1) along with demographic details was prepared. Face validity and content validity was carried out on the questionnaire. A pilot study was conducted among 20 employees to check if there was ease in understanding and answering the questions. Permission was obtained from organizations across India to distribute the questionnaire to their employees. The respondents were assured of the confidentiality of their response. A total of 1000 questionnaires were distributed. 545 responses were received. Some of the responses had missing values and had to be discarded. 527 clean responses were obtained. These were used for further analysis.

Data Analysis

The demographic profile of the respondents were found. The descriptive statistics were found. A t-test and ANOVA was carried out to find if there was any significant difference in the study variables against the demographic data using SPSS. The measurement model was used to find the model fit indices in AMOS. Also composite reliability, average variance extracted and discriminant validity was calculated to validate the model. The model fit indices were also calculated for the structural model in AMOS. The hypotheses were then tested.

RESULTS

Descriptive Statistics

The demographic profile of the respondents is given in Table 1. It is found a majority of respondents are male members. Also a significant number of respondents belong to the 26 to 30 age category. When it comes to education, it is found

that 65 percent of respondents are graduates while the remaining are post graduates and above. A significant percentage of respondents belong to medium income category. Three types of organization have been covered with 59.2 percent of respondents belonging to the IT sector. From the demographic profile of the respondents, it is found that the sample collected is almost representative of the population with regard to the proportion in terms of age, education and the type of organization considered for the study.

Table 1: Demographic profile

	Nos.	Percentage (%)
<i>Gender</i>		
Male	294	55.8
Female	233	44.2
<i>Age</i>		
25 and below	50	9.5
26 to 30	280	53.1
31 to 35	88	16.7
36 to 40	46	8.7
41 and above	63	12
<i>Education</i>		
Graduation	345	65.5
Post-graduation and above	182	34.5
<i>Income (per month)</i>		
High income: Greater than Rs.30,000	199	37.7
Medium income: Rs.15,000 < income < Rs.30,000	237	45
Low income: Less than Rs.15,000	91	17.3
<i>Type of Organization</i>		
Manufacturing	85	16.1
Service	130	24.7
IT	312	59.2

The descriptive statistics are as follows: CSR (Mean 5.388, SD=0.938); Green products (Mean=5.125; SD=1.172); Environmental performance (Mean=5.327; SD=1.12). A t-test was conducted to find if there is a significant difference in the study variables against gender and education. The results are presented in Table 2. It is seen from the table that for green product and environmental performance, there is no significant difference with regard to gender ($p > 0.05$). However, with regard to CSR, it is found that there is a significant difference with regard to gender. This indicates that male and female employees perceive the adoption of CSR initiatives in the organization differently. Since for the other two

variables, there is no significant difference, the data was considered homogenous in this study. However, this is a limitation and leaves scope for future work. In the case of education, it is found that for all the three variables, there is no significant difference. This indicates that whether they are graduates or post graduates, they perceive the three variables in a similar manner. ANOVA was used to test if there is a significant difference in the study variables with regard to age, income and type of organization. The results are presented in Table 2. The analysis reveals that there is a significant difference in the case of all the three variables with regard to age and income. This indicates that analysis has to be done for each age category as well as for each income category separately. However, the sample size was not adequate in each of the categories and hence in this research, it was not possible to partition the data and do the analysis for each category separately. In the case of the type of organization, the employees were attached to, there is no significant difference in the case of CSR and green product while there is a significant difference in the case of environmental performance. However because the sample size in the three categories was not adequate, the entire data was considered homogenous and further analysis carried out.

The model fit indices for the measurement model is as follows: CMIN = 355.31; df = 129;

Table 2: Independent 't' test and ANOVA

	Test	Significance
<i>Gender</i>	't' test - t_{525}	
CSR	-2.285	$p=0.023^*$
Green product	0.013	$p=0.989$
Environmental performance	-0.13	$p=0.896$
<i>Education</i>	't' test - t_{525}	
CSR	0.798	$p=0.425$
Green product	0.961	$p=0.337$
Environmental performance	1.727	$p=0.085$
<i>Age</i>	F test = $F_{2,524}$	
CSR	4.019	$p=0.003^*$
Green product	3.565	$p=0.007^*$
Environmental performance	4.394	$p=0.002^*$
<i>Income</i>	F test = $F_{2,524}$	
CSR	7.029	$p=0.001^*$
Green product	8.207	$p=0.000^*$
Environmental performance	7.929	$p=0.000^*$
<i>Organization</i>	F test = $F_{2,524}$	
CSR	0.319	$p=0.727$
Green product	1.035	$p=0.356$
Environmental performance	3.503	$p=0.031^*$

Note: * $p < 0.05$

$p=0.00$; $CMIN/df=2.754$; $GFI=0.929$; $AGFI=0.906$; $NFI=0.934$; $TLI=0.946$; $IFI=0.957$; $CFI=0.957$; $RSME=0.058$; $SRMR=0.0447$. The acceptable fit indices as per Hair et al. (2010) cutoff values are $CMIN/df < 3$; $GFI > 0.85$; $AGFI > 0.8$; $NFI > 0.9$; $TLI > 0.9$; $IFI > 0.9$; $CFI > 0.9$; $RSME < 0.08$; $SRMR < 0.08$. Since the values are all in the acceptable domain, the model fit was found to be acceptable. The composite reliability (CR), average variance extracted (AVE) and discriminant validity (DV) was then checked and the values are given in Table 3. The composite reliability (CR) for all the three study variables are above 0.85 indicating a high level of reliability. The average variance extracted (AVE) was found and it was found that for all the three variables the AVE was above 0.5 indicating the measurement strength of each variable is very good.. Discriminant validity indicates the distinctiveness of each variable against the other variables. The DV of each of the variable was good since the values along the diagonal are more than the corresponding value in the row or column.

The structural model was developed and the model fit indices are as follows: $CMIN = 355.31$; $df = 129$; $p=0.00$; $CMIN/df = 2.754$; $GFI=0.929$; $AGFI=0.906$; $NFI=0.934$; $TLI=0.949$; $IFI=0.957$; $CFI=0.957$; $RSME=0.058$; $SRMR=0.0447$. The model fit indices was within the recommended cutoff value. The results of the structural model along with the corresponding unstandardized coefficients is given in Figure 2. From the figure, using the unstandardized coefficients, it was found that hypothesis 1 is satisfied since there is a significant positive relationship with 0.903 between CSR and green products. Also, hypothesis 2 is satisfied since there is a significant positive relationship with 0.221 between green products and environmental performance. It is also

found from the figure, that hypothesis 3 is also satisfied since there is a positive relationship between CSR and environmental performance with 0.559. From the unstandardized coefficient, it is also found that the mediating hypothesis 4 is also satisfied since there is a significant mediating relationship of CSR through green products on environmental performance with 0.200. This indicated that green products partially mediates the relationship between CSR and environmental performance.

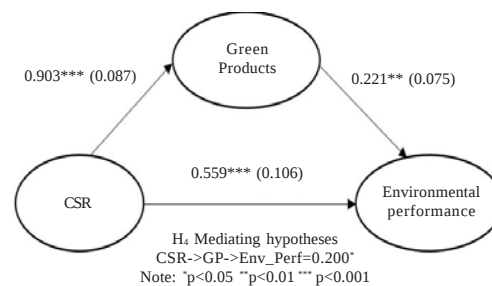


Fig. 2. Structural model

The full structural model with the latent structure along with standardized path coefficients is given in Figure 3. From the figure it was found that CSR explains 52 percent of green products while CSR and green products explain 38 percent of environmental performance. This indicated that CSR explained to a large extent green products (52%) while for environmental performance there could be other factors in addition to CSR and green product that can explain environmental performance. The factor loadings of the items are also presented. Among the items influencing each of the dimension, it is found that for stakeholders items CSR2, CSR3, CSR4, CSR6 seemed to have

Table 3: Composite reliability, convergent and discriminant validity

Construct	CR	AVE	CSR	Green product	Environmental performance
CSR	0.854	0.665	0.815		
Green product	0.864	0.616	0.723	0.785	
Environmental performance	0.927	0.808	0.598	0.531	0.889

Note: (i) The elements along the diagonal are the square root of average variance extracted (AVE) and is greater than the off-diagonal elements which are the correlations between constructs
 (ii) All items in each variable have AVE >0.5 and CR>0.7

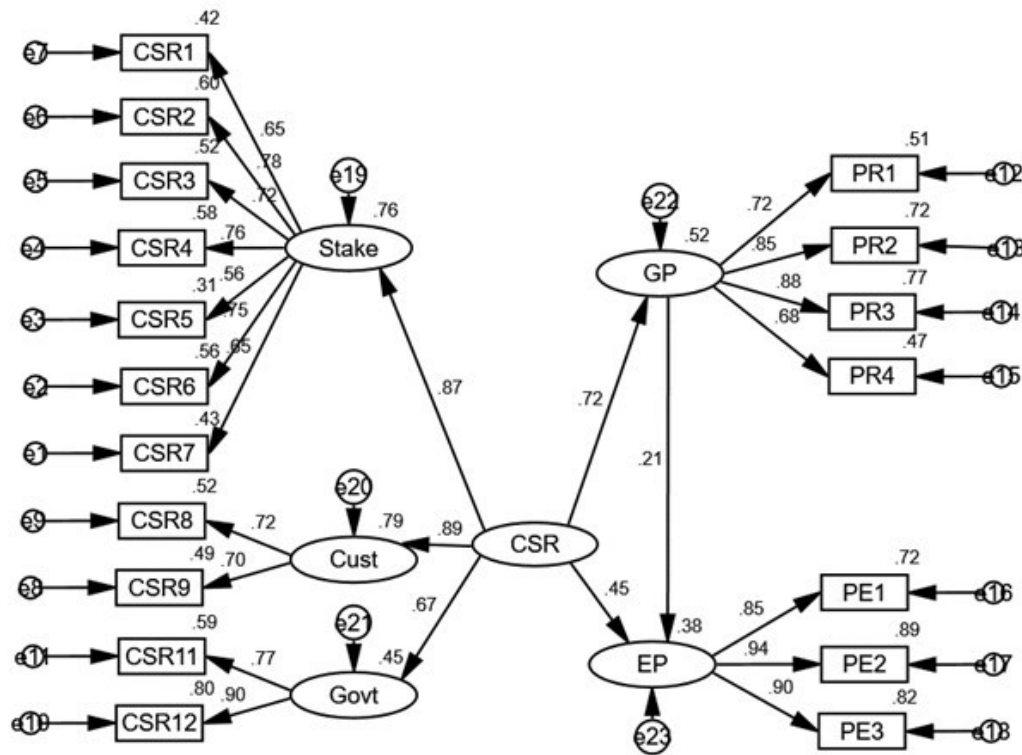


Fig. 3. Latent structural model with path coefficients

heavier loadings. In the case of customer dimension both the items, CSR8 and CSR9 were found to be equally loaded. For government dimension, CSR12 was found to be very heavily loaded with 0.9. Among the items loaded under green products, it was found that PR2 and PR3 were very heavily loaded as compared to the other two items. In the case of environmental performance the three items namely PE1, PE2 and PE3 were very heavily loaded.

The latent structure model was run using the bootstrap technique with 10000 samples at 95 percent confidence in AMOS. The analysis confirmed that the hypotheses H_1 , H_2 , and H_3 was found to be significant. The mediating hypothesis H_4 was also found to be significant as shown in Table 4. Among the path coefficients, it was found that the adoption of CSR initiatives has a strong relationship with the introduction of green products (0.72). Also the adoption of CSR initia-

tives has a significant positive relationship with environmental performance. The introduction of green products was found to have a significant positive relationship with environmental performance (0.21). The mediating hypothesis was checked and it was found that green products significantly mediates the relationship between CSR and environmental performance.

The direct, indirect and total effects of the model are also given in Table 4. The direct effect of CSR on environmental performance was found to be significant (0.599) and the total effect of CSR on environmental performance was also significant (0.799). The indirect effect of CSR on environmental performance through green products was found to be significant (0.2). This confirmed the mediating hypothesis H_4 indicating the presence of partial mediation. This means that apart from directly influencing environmental performance, adopting of CSR initiatives also has an

Table 4: Mediating effect of green products using the bootstrap method

				Bootstrap BCa 95 %CI		Hypothesis supported
Path				Lower	Upper	
Total (without a mediator)	CSR-> Env Perf	0.799	0.118	0.592	1.055	
Direct effect (with a mediator)	CSR-> Env Perf	0.599	0.154	0.323	0.932	
Hypothesis 4 Indirect effect	CSR-> GP-> Env Perf	0.2	0.091	0.034	0.393	

Note: Bootstrap 10000 sample, BCa – bias-corrected- accelerated CI - confidence interval

impact on the introduction of green products which in turn increases the environmental performance. The adoption of CSR initiatives has a very strong influence on the introduction of green products. The introduction of green products has a moderate influence on environmental performance. However because of its mediating role, the adoption of CSR initiatives has a greater impact on environmental performance.

DISCUSSION

Among the dimensions used to measure CSR, it was found that customers play a very important role with the factor loading of 0.89. This is followed by social and non-social stakeholders with the factor loading of 0.87. This indicates that these two sector of people are very important and they need to be focused upon during the implementation stage of CSR initiatives. The research also indicates the role played by the government is also significant but the factor loading is only 0.67 far lesser than the factor loadings of the other two dimensions namely stakeholders (social and non-social) and customers. This confirmed with the results of Maignan et al. (2005) wherein they have indicated the important role of customers and stakeholders in marketing using stakeholder's theory. Also the results confirmed the findings of Baskentli et al. (2019) indicating the importance of customers' moral foundations for a pro-company behavior. Organizations should draft the CSR initiatives taking the customers and stakeholders viewpoint and if possible include them in the decision making process. This will result in manifold success to the organization.

The path coefficients of the conceptual model indicated the adoption of CSR initiatives by the organization influences the introduction of

green products to a large extent. This result aligns itself with the green theory which indicates that organizations will move towards greener practices in the interests of protecting the environment (Connelly et al. 2010). The outcome variable environmental performance was found to be significantly influenced by both the adoption of CSR initiatives (Zhu and Sarkis 2004; Khojastehpour and Shams 2019) and the introduction of green products in the organization (Rehman et al. 2016). Very little research was found during review, research papers on the relationship between the adoption of CSR initiatives and green product introduction. This research indicated the presence of a strong significant positive relationship between the two. Hence, when organizations adopt CSR initiatives, it has a strong influence on the green practices followed in the organization that motivates corporates to adopt green products. Also, it is expected that such practices will percolate through all business domains so that the entire business chain becomes sustainable. The importance of green product introduction is also stressed in the mediating relationship. Adoption of green practices has a strong significant influence on environmental performance through green product introduction. Thus the adoption of CSR initiatives catapults the introduction of green products in the organization. This causes improved environmental performance. Organizations will hence witness a synergistic effect taking place because of their responsible attitude for community development. Though implementing the CSR initiatives may be a challenge during the nascent stages yet the multifarious benefits arising out of it is worth the cost and effort. Once the green practices become a norm, it will result in holistic development and businesses can start reaping the benefits both in terms of financial performance as well as in market performance.

This research has also contributed to the organization behavior theory in filling the research gap of how the introduction of green products mediate the relationship between the adoption of CSR initiatives and environmental performance. The research has certain limitations. A cross-sectional study has been carried out in this research. A longitudinal study need to be undertaken to examine the relationship between the three study variables over a period of time.

CONCLUSION

Though the review of the literature indicated mixed findings with regard to CSR and performance, in this research, it was found that green products partially mediates the relationship between the adoption of CSR initiatives and environmental performance. Implementing CSR initiatives will have a direct impact on environmental performance as well as impacts environmental performance indirectly through green product introduction. When organizations look outwards towards societal development through its CSR initiatives, it results in holistic development of the organization and the society at large. The environmental concerns namely depletion of natural resources and climatic change will be addressed through the adoption of green technology and green practices for sustainable growth. A longitudinal study may be taken up in the future to validate the influencing role of the study variables.

RECOMMENDATIONS

Organizations are finding strategies to reorient their business practices towards corporate sustainability. For this, firstly, organizations need to adopt and strategize their processes and procedures towards introducing green products. Secondly, organizations need to find mechanisms on how it can give back to society through CSR initiatives. When customers and stakeholders perceive the positive movement happening in the organization, it not only helps in corporate image building but also improves environmental performance.

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APPENDIX 1 Instrument**CSR****A. Stakeholder**

- CSR1 My company participates in activities, which aim to protect and improve the quality of the natural environment.
- CSR 2 My company makes investment to create a better life for future generations.
- CSR 3 My company implements special programs to minimize its negative impact on the natural environment.
- CSR 4 My company targets sustainable growth, which considers future generations.
- CSR 5 My company supports nongovernmental organizations working in problematic areas.
- CSR 6 My company contributes to campaigns and projects that aim to promote the well-being of the society.
- CSR 7 My company encourages its employees to participate in voluntary activities.

B. Customer

- CSR 8 My company respects consumer rights beyond the legal requirements.
- CSR 9 My company provides full and accurate information about its product to its customers.
- CSR10 Customer satisfaction is highly important for our company.

C. Government

- CSR11 My company always pays its taxes on a regular and continuing basis.
- CSR12 My company complies with legal regulations completely and promptly.

GREEN PRODUCT

- PR1 My company substitutes greener materials/parts in the place of polluting and hazardous materials / parts
- PR2 Product design is focused on reducing resource consumption/waste generation during production and distribution.
- PR3 Product design is focused on reducing resource consumption and waste generation during product usage
- PR4 Product is designed for disassembly, reusability and recyclability

ENVIRONMENTAL PERFORMANCE

- PE1 The company has reduced its carbon emission
- PE2 The company has reduced its waste water generation
- PE3 The company has reduced its solid wastes generation
- PE4 The company has decreased its consumption of hazardous / harmful / toxic materials
- PE5 The frequency of environmental accidents has reduced

Note: i) A 7 point scale was used for CSR, green product and performance – from strongly disagree (1) to strongly agree (7)